

Article

“Not Really a Musical Instrument?” Locating the Gumleaf as Acoustic Actant and Environmental Icon

Robin Ryan

Western Australian Academy of Performing Arts, Edith Cowan University, 2 Bradford Street, Mount Lawley, Western Australia 6050, Australia; E-Mail: robinryan25@gmail.com

Received: 4 April 2013; in revised form: 9 May 2013 / Accepted: 14 May 2013 /

Published: 29 May 2013

Abstract: Leaf instruments have occupied a post-European contact role in constituting Australian societal networks, and their epistemologies reflect native/exotic binaries in the species selected by Indigenous and non-Indigenous musicians respectively. Accordingly, this essay examines some musical applications of native plant populations in the construction of arboreally-based cultural heritages and social traditions in the southeastern Aboriginal societies. In a broad characterisation of the practices of Indigenous leaf players (“leafists”), it extends the actor-network framework of “reaching out to a plant” established by John C. Ryan in 2012. When leafists play tunes on plants—either at their own source, or on leaves intentionally plucked for performance—music furnishes an intimate and vital part of their reflection to and from the nonhuman world. The author conceptualises eucalypt leaf instruments (“gumleaves”) as *actants* and iconic sensors of place, providing further evidence for their role as conduits between land and people in some cultural blendings and positionings with art, drama, and poetry. This interrogation of confluences between musicians and Australian land and plants works towards more nuanced understandings of the complex interlinked systems of music, ecology, nature, and societies.

Keywords: leaf instruments; ecomusicology; human-plant studies (HPS); Aboriginal sociocultural practices; actor-network theory

1. Introduction

The universal concert is always in progress, and seats in the auditorium are free.

—Canadian composer and acoustic ecologist R. Murray Schafer [1]

Humanity has ingeniously exploited ways in which sound—a disturbance in the air—can be produced, and for the purposes of this essay, the character of an innocuous ribbon-reed aerophone, commonly known in Australia as the “gumleaf”, offers the world a welcome picture of a simple, archaic wind instrument. Curt Sachs described the vibrating *anche á ruban* as the prototype of all reed aerophones in noting their ancient use as mechanical sound sources ([2], p. 38).

The practice of leaf music illustrates the existence of a close relationship between musician and plant in the Australian Aboriginal societies of which Western philosophy has little awareness. A new wave of ecomusicology allows scholars scope to trawl back and forth between the humanity/nature divisions that shape—or are shaped by—environments, landscapes and societal conditions (see [3], for instance). R. Murray Schafer observed that music’s original context, the outdoor environment, blends inclusively with whatever other sounds are present: “It does not seek walls for protection or an impounded audience for its appreciation” ([4], p. 60).

Leaf instruments occur in many music-cultures notwithstanding a sense that gumleaf sounds “belong” to Australia. Unlike the complex leaf-derived instruments of Australia’s closest neighbours in the Indian Ocean littoral and Oceania, the “gumleaf” is composed of unmodified organic leaf matter. Doctoral research by the author [5] morphed into botanic musicology as “leafists” spoke of their attachment to local “music trees”, bushes, or plants. Since all trees and bushes are plants, these terms are tautological; a “music plant” may be defined as any flora from the malleable environment with dependable sound-bearing foliage.

Authentic “gumleaf music” is confined by the limits of natural distribution of the three genera *Eucalyptus*, *Corymbia*, and *Angophora* that are known collectively as “eucalypts”. The leaf instrumentarium in its biodiversity includes the box/ironbarks of the Victorian goldfields; the river red gums of the Murray River; the stringybarks of Lake Tyers, Gippsland; the ghost gums of coastal New South Wales; the coolabahs (coolibahs) of the Channel Country; and the kurrajong rainforest trees of northern Queensland. Building on eleven locations for a “folded leaf whistle” collated in 1974 by Moyle [6], Ryan [5] established even prevalence for a ribbon reed aerophone used by Indigenous musicians in Australia’s southeastern crescent. Fletcher describes this aerophone as a free-reed instrument in which the reed vibrates at its own natural frequency ([7], p. 18), the leaf being blown so as to act as a vibrating valve with “blown-open” configuration ([8], p. 1). Details of how the leaf vibrates against the player’s lip to produce sound will follow.

The current essay represents a previously unexplored attempt to describe the ecomusicology of the gumleaf through the lens of frameworks established in 2012 by the environmental philosopher John C. Ryan. The first framework regards plants as capable subjects rather than “passive flora” ([9], p. 106); the second the actor-network framework of “reaching out to a plant” ([10], pp. 29, 33). Human-plant studies (HPS) provide two keystones for this essay. The first holds that plants are integral to socioecological networks and practices and *act upon us* in cogenerating our cultural practices ([9], p. 104). As this essay will demonstrate, leaves are integral to music-making in spite of a well-worn subject/object binary that surrounds the idiosyncratic cultural practice in question.

In venturing to view the leaf instrument as an *actant*, I note that plants are sensually aware organisms in their own right. One recent breakthrough in plant neurobiology has established that plants see light and bend to it through the photoreceptors in their leaves. They live in a tactile world in which they are sensitive to heat, cold, and insect vibrations. Corn roots, moreover, will grow towards specific

frequencies of vibrations ([11], pp. 35–37). In Latour’s “sociology of associations” [12], nonhuman entities can act, can be actants... as the focus shifts from the actor to the network ([13], p. 596) that incorporates and folds about actants.

J. Ryan’s second keystone holds that the roles of plants in society are best articulated through interdisciplinary research that considers art, literature, philosophy, Indigenous knowledge, and science ([9], p. 106). Interaction with non-western worldviews furnishes flexibility for both ecomusicology and HPS to nourish dialogues about the “more-than-human environment”, indeed, the vegetal-music-culture connection pushes musicology far beyond the comfortable confines of the concert hall and library. This discourse is therefore couched in the “often messy, definitely polluted, world of existential threats and complexities” [after Allen ([14], p. 418)].

The leading contemporary Indigenous leafists were naturally schooled in soundscape awareness. Herbert (Uncle Herb) Patten (born 1943) of Melbourne is an Elder of the Gunai-Kurnai Nation of East Gippsland (Victoria); and Roseina (Aunty Rose) Boston (born 1935) of Macksville is an Elder of the Gumbaynggir nation of the Nambucca district (New South Wales). For over 60 years, each has teased acoustic sounds out of leaf matter in accordance with inherited local traditions.

The leaf instrument sits at odds with a conventional view of music because it focuses attention beyond the economic conditions of art. “For, while we are created from nature”, asserts Rothenberg ([15], p. 5), “we are somehow cast out by our wily, civilized ways”. In 1992, an onlooker expressed an opinion to Patten that the gumleaf was “not really a musical instrument”. Provoked by this assertion, I determined to uncover the history and significance of gumleaf playing. Besides preserving “music leaves”, I set up a research team at Monash University with a eucalyptologist and an acoustician in a tentative process of collaboration with practising leafists [5].

Broadly speaking, a “musical instrument” is any implement used to produce music, where music itself, as humanly organised, structured sound, has different meanings according to its cultural context. Plants, according to J. Ryan ([9], p. 110), “inhabit the world dynamically and liminally at the margins between being and becoming; stasis and process; synchronicity and diachronicity; visual and representational and bodily experience”. Musically speaking each leaf is an individual instrument that can “call the land”, *i.e.*, adapt to the land where it is played by echoing the sounds of nature.

In addition to examining how the music produced is a direct product of the scientific properties of leaves, and what ecomusicological interaction takes place between people and leaves, I also venture to ask: What is the status of the leaf instrument’s agency? Is the action involved in playing a leaf not shared or co-produced with the leaf itself? Three broad themes therefore permeate my explanation of the art and science of leaf playing in its confluences between musicians and Australian land and plants: (i) native/exotic typologies of leafists’ instruments and their acoustic properties (ii) sociomusical applications of native plant populations in the construction of arboreally-based Indigenous cultural heritages, sometimes in referential blendings with the other arts and in the representation of the leaf as an iconic sensor of place; and (iii) issues in metaphysics concerning the differing modes of being of the vegetal and the human with a view to assigning enough agency to the leaf instrument for it to boost reconsideration of the status of leaves within the sphere of life. I will subsume these themes under a set of six complementary sections, the first two of which give pride of place to the trees and leaves in question and their acoustic properties.

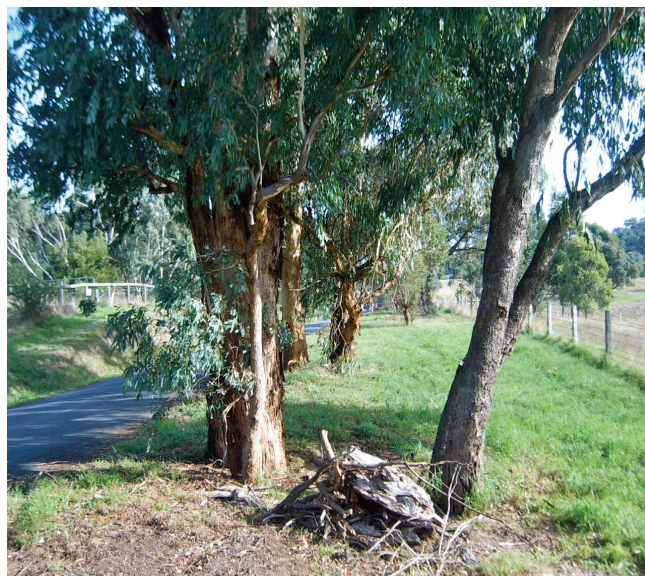
2. A Botanical Consideration of Leaf Music

A typical gumleaf is symmetrical, its lamina being separated into two equal parts at the mid-rib. Music leaves are usually isobilateral, *i.e.*, with a uniform structure across the central folding line that permits maximum resilience. A leaf comparable to the size and shape of the mouth is preferable, but a larger or irregular-shaped leaf will suffice provided one presses the rounded section of the leaf blade (which players call the “curve” or the “bump”) against the lip. Lanceolate, ovate and elliptically shaped leaves contain such curves but round (orbicular) leaves are suitable. Leaves of most introduced species are dorsiventral, *i.e.*, structurally different on the upper and lower surfaces. Most leaves vibrate uniformly and cause minimum interruption to sound when players switch side; in fact Patten sometimes derives a superior sound from the leaf’s underside.

After European settlement, Australia became a kind of species factory for introduced plants as settlers added layers of diversity to the existing landscapes, although in 2011 Rotherham and Lambert ([16], p. 5) considered how, with a longer-term perspective, most native flora could be considered “alien invaders”. Research into this set of variables confirmed my hypothesis that settler leafists experimented with species from Asia and Europe, indeed many dispensed with native leaves altogether in favour of non-native species including lemon. Introduced leaves are generally more palatable and less tough to play than the average eucalypt. However the underlying reason for settler bias may simply be the lack of an inherent attachment to a land that they considered to be empty rather than sublime (based on McKie [17]).

After the Australian Gumleaf Playing Competition was founded in 1977, the choice of so-called “music trees” became a key concern. The leaves of many species can be discounted for physiological and sonic reasons, and since foliage from optimum musical species may vary in age and quality, musicians are bound to discriminate carefully between both trees and leaves (see Patten [18]). Yellow Box (*E. melliodora*, see Figure 1) furnished the preferred “Stradileaf” of Victorian contestants in the Australian Gumleaf Playing Competition [19].

Figure 1. Yellow Box trees at Warrandyte, Victoria, 2012. (Image source: Author.)



Based on primary and secondary sources, Tables 1 and 2 broadly reflect the native/exotic binaries of cross-cultural choice.

Table 1. Comparative typology of native Australian leaf instruments.

Aborigines' Choices	Non-Aborigines Choices
Black Box/River Box (<i>E. largiflorens</i>)	Boobialla (e.g., <i>Myoporum acuminatum</i>)
Blackbutt (<i>E. pilularis</i>) *	Bushy Yate (<i>E. lehmannii</i> , a mallee)
Blue Box/Round-leaved Box (<i>E. bauerana</i>)	Candlebark (<i>E. rubida</i>) *
"Bone Leaf" (unidentified species) *	Jarraah (<i>E. marginata</i>): young, supple leaves only *
Brittle Gum (<i>E. mannifera</i>) *	Kurrajong (<i>Brachychiton populneus</i>) *
Bush Lemon/Wild Lemon (<i>Canthium oleifolium</i>)	Lemon-scented Gum (<i>E. citriodora</i>) *
Coast Grey Box (<i>E. bosistoana</i>)	Lilly-Pilly (<i>Acmena smithii</i>)
Common Reed (<i>Phragmites australis</i>)	Marri or WA Blue Gum (<i>Corymbia calophylla</i>) *
Coolabah/Coolibah (<i>E. microtheca</i> ; <i>E. coolabah</i>)	Pittosporum (<i>Pittosporum undulatum</i>)
Curtain Fig (possibly <i>Ficus microcarpa</i> var. <i>hillii</i>)	Red Box (<i>E. polyanthemos</i>) *
<i>E. porrecta</i> (no common name; NT leaf-whistle)	Red Flowering Gum (<i>Corymbia ficifolia</i>) *
Flooded Gum/Swamp Gum ("Moitch"; <i>E. rudis</i>)	Red Gum (unidentified species)
Forest Red Gum (<i>E. teriticornis</i>) *	Red Ironbark ("Mugga"; <i>E. sideroxylon</i>) *
Gippsland/Southern Mahogany (<i>E. botryoides</i>) *	Scribbly Gum/White Gum (<i>E. rossii</i>)
Ghost Gum (<i>Corymbia aparrerinja</i> / <i>E. papuana</i>)	Sugar Gum (<i>E. cladocalyx</i>) *
Grey Box/Inland Grey Box (<i>E. microcarpa</i>)	Yellow Box (<i>E. melliodora</i> ; the "Stradileaf") *
Kurrajong (<i>Brachychiton populneus</i>) *	
Manna Gum/Ribbony Gum (<i>E. viminalis</i>)	
Red Bloodwood (<i>Corymbia gummifera</i>) *	
Red Box (<i>E. polyanthemos</i>) *	
Red Ironbark ("Mugga"; <i>E. sideroxylon</i>) *	
River Red Gum (<i>E. camaldulensis</i>) *	
Southern Blue Gum (<i>E. globulosa</i>)	
Spotted Gum (<i>Corymbia maculata</i>)	
Sugar Gum (<i>E. cladocalyx</i>) *	
Swamp Bloodwood (<i>Corymbia ptychocarpa</i>) *	
Swamp Mahogany (<i>E. robusta</i>)	
Sydney Blue Gum (<i>E. saligna</i>)	
Turpentine (<i>Syncarpia glomulifera</i>) *	
Victorian Eurabbie (<i>E. pseudoglobulosa</i>)	
White Mahogany (<i>E. acmenoides</i>)	
White Stringybark (<i>E. globoidea</i>) *	
Wild Orange (<i>Capparis mitchellii</i>)	
Yellow Box (<i>E. melliodora</i> ; the "Stradileaf") *	
Yellow Box (<i>E. phoenicea</i> , leaves blown in NT)	
Yellow Mallee (<i>E. incrassata</i>)	
Yellow Stringybark (<i>E. muelleriana</i>) *	

Note: The species played by both Aboriginal and non-Aboriginal musicians are marked in bold type; and the species that command the most interest historically, culturally or musically are highlighted with an asterisk.

Table 2. Comparative typology of introduced Australian leaf instruments.

Aborigines' Choices	Non-Aborigines' Choices
Common Edible Fig (<i>Ficus carica</i>)	Almond (<i>Malus domestica</i>)
Flax (<i>Linum sp.</i>)	Apple (<i>Prunus dulcis</i>)
Lemon (<i>Citrus limon</i>) *	Banana (<i>Musa sp.</i>)
Rose (leaves and petals of <i>Rosa sp.</i>)	Camellia (<i>Camellia japonica</i>) *
Sweet Orange (<i>Citrus sinensis</i>)	Camphor Laurel (<i>Cinn. Camphora</i>)
	Common Edible Fig (<i>Ficus carica</i>)
	Cumquat (<i>Fortunella sp.</i>)
	Dock (weeds of the genus <i>Rumex</i>)
	Grapefruit (<i>Citrus paradisi</i>)
	Lemon (<i>Citrus limon</i>) *
	Lilac (e.g., <i>Syringa oblata</i>)
	Lime (<i>Citrus aurantifolia</i>)
	Mandarin (<i>Citrus reticulata</i>)
	Paddy's Lucerne (<i>Sida rhombifolia</i>)
	Passionfruit (<i>Passiflora laurifolia</i>)
	Peach (<i>Prunus persica</i>)
	Pear (<i>Pyrus communis</i>)
	Photinia (e.g., <i>Photinia glabra robusta</i>)
	Plum (<i>Prunus domestica</i>)
	Privet (e.g., <i>Ligustrum lucidum tricolor</i>)
	Rose (leaves and petals of <i>Rosa sp.</i>)
	Seville Orange (<i>Citrus aurantium</i>)
	Sweet/Common Violet (<i>Viola odorata</i>)
	Sweet Orange (<i>Citrus sinensis</i>)
	Sycamore (e.g., <i>Acer pseudoplatanus</i>)
	Variegated Periwinkle (<i>Vinca major</i>)
	Wandering Jew (<i>Tradescantia sp.</i>)

Note: The species played by both Aboriginal and non-Aboriginal musicians are marked in bold type; and the species that command the most interest historically, culturally or musically are highlighted with an asterisk.

The Indigenous epistemology of leaf instruments outlined above confirms the Aboriginal leafist's preference for native leaves, thereby providing a link to the study of ethnobotany (contextualised plant use). What, then, are the secrets of the magical transformation that takes place when the selected leaf is placed against the player's lips and blown?

3. An Acoustic Consideration of Gumleaf Music

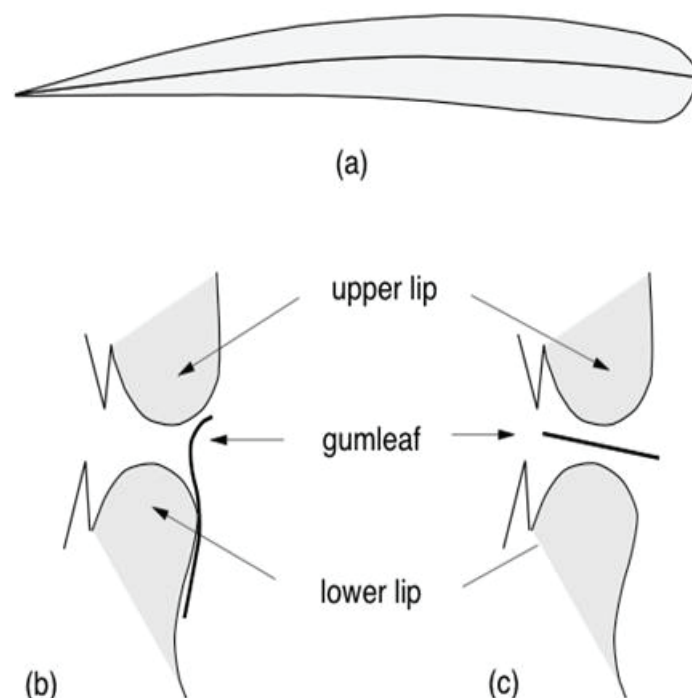
In the creative process of playing a tune on a plant—either at its own source, or on a leaf intentionally plucked for performance—the leaf is held in tension across the lips by the player's hands in such a way as to block the lip opening. According to Fletcher [20], air pressure introduced to the mouth from the lungs then forces the leaf to move away from the lip along one side and allow escape of the air, thus reducing the air pressure in the mouth. This allows the leaf to spring back against the lip and close the aperture again. This cycle repeats continually at a frequency that is largely determined by the tension in

the leaf but also the shape of the lips and the volume of the mouth, which can be varied by changing the position of the tongue. The player can control the pitch of the note being played over a range of about one octave. The pulses of air emitted by this “leaf valve” provide the sound that is heard, *i.e.*, (a) air pressure causes leaf vibration → (b) pulsating air flow → (c) sound wave → (d) ear = receptor of sound.

Virtuoso performer Herbert Patten cups his upper lip over the leaf, stretching it across the embouchure with about the same gentle pressure that it would take to tear a piece of folded tissue. As the leaf curves into the shape of the mouth, Patten blows—as if softly blowing out a candle—mainly on the inside of the mouth ([5], p. 303). The curved leaf provides a reed of variable length and tension that can be controlled by the mouth and the fingers. The air stream (power supply) directed against the edge of the stretched leaf flows in pulses as the leaf-valve opens and closes, thus radiating sound. This air flow also excites resonances of the vocal tract to produce resonant formant bands which alter the tonal quality of the sound. Tension of the leaf and lip is increased to raise frequency; released to lower it, thus controlling the musical pitch.

Patten uses the top of his jaw above the cheeks to push air across the leaf, thus equipping himself with power to hold notes. He rolls his tongue to produce glissando and to “round off” phrases, and changes the pressure of the lips to achieve greater loudness. He tightens his cheeks and “kicks” from the diaphragm to attack high notes, whilst his low notes are best achieved by “puffing up” the cheeks and playing on the bottom lip. In fact, most contemporary leafists use the lower lip method ([6], pp. 301–306) diagrammatically represented by Fletcher [8] in Figure 2.

Figure 2. (a) The shape of a typical gumleaf from a eucalypt tree (b) In normal playing, the leaf is held firmly against the lower lip and rested lightly against the upper lip, and it is the upper edge of the leaf that vibrates. (c) A variant way of holding the leaf that results in a raucous quasi-chaotic sound [8].



The leaf may be viewed as a reed, though it vibrates in the opposite direction to a clarinet reed. In proposing the concept of a leaf-lip double reed action, organologist Reis Flora observed that the leaf vibrates more than the (mostly stationary) lip, producing a tickly feeling as one begins to play ([5], p. 14).

There is another way of playing the leaf in which it is sandwiched between two opposing thumbs with a narrow space on each side. When air pressure is applied through the mouth the leaf is deflected by Bernoulli pressure and executes a torsional vibration that opens and closes the flow aperture at a frequency that is twice the torsional oscillation frequency. The frequency itself is controlled by adjusting the longitudinal tension on the leaf ([7], p. 18). In this way of playing it is difficult to control the frequency (pitch) and the leaf oscillation is often irregular, thus producing the “rough” sound associated with jazz “blue-notes”. The context for this performative technique, together with other slants on the functions of leaf music, is explained below.

4. Sociocultural Considerations of Leaf Music

Country calls on people in the fullness of their being, and so they find their fullness of being in interacting with country.

—Deborah Bird Rose *et al.* ([21], p. 135)

Indigenous gumleaf playing can be read as a metaphor for a distinctive world of common meaning—namely a culture’s own self-image. In fact, the activity was so closely woven into the cultural networks of Indigenous societies throughout the first half of the twentieth century that performances of Western tunes on gumleaves came to be regarded as a tradition in its own right. To support this approach, I argue that many musical traditions come to us from the past as relics of something already observed, in line with Blacking’s definition of *musical change* as “changes of ideas from within musical systems” ([22], p. 11). Most musicians and Aboriginal Australian Elders I interviewed believe that native leaves were first blown during the pre-contact period. Sources written at the end of the high colonial period (1850–1901) confirm the use of an Aboriginal leaf music toy and the use of blown leaves in a corroboree [5].

The musical/extramusical functions that Aborigines ascribed to leaves slowly changed with European contact to produce a new eastern Australian musical model: the gumleaf band [23]. Dating back to at least 1892 [24], the Europeanised Aboriginal gumleaf ensemble represented a stable communal activity that crossed barriers of age, gender, ability, and clan affiliation. As a familiar aspect of material culture and environmental kinship, leaf blowing served to alleviate the tensions of uncertain situations in which disparate clanspeople were subjected to a spreading missionary network. The tradition culminated in a touring gumleaf band period (late 1910s–1940s) in which the local traditions emanating from Wallaga Lake, NSW and Lake Tyers, Victoria closely illustrated the sociological dimensions of gumleaf playing. These two bands were packaged for exploitation by the ex-colonial civic, religious, and military powers ([5], p. 23; [23]). This in itself bears testimony to the agency of the gumleaf instrument.

In its capacity to enhance Indigenous artistic cultural survival, the gumleaf instrument can confidently be regarded as a kind of “retrofit” (after Latour [25], p. 24) that has continued to develop its strange fringe novelty potential whilst projecting a degree of continuity of cultural practice. The acceptability of novelty noise as a 1920s entertainment virtue enabled Aboriginal leafists to beguile their audiences well into the 1930s, when The Leaf Band of Ulladulla, NSW created “a fair

razz-a-ma-tazz” with, for example, their simulations of battlefield shots ([26], p. 28). Evidence for other novel performative traits executed by leafists includes the imitations of various insects; and leaf playing while playing mouth organ with the nose, or whilst vigorously dancing and foot-tapping [5].

Influenced by the European and Black American entertainment industry as well as by church hymnody, Aboriginal musicians created various syntheses of indigenous and borrowed musical elements as they adapted Western tunes to suit the pitch ranges and idiomatic qualities of specific leaves. Producing a significant number of harmonics in addition to the fundamental, leaves allowed for convincing performances of the muddy-sounding blue-notes characteristic of the jazz craze of the 1920s [5]. In the execution of a blue-note, the leaf makes irregular contact with the lips or the thumbs and this upsets the motion. Fletcher describes the resultant sound, while having a predominant pitch, as “quasi-chaotic” ([8], p. 4).

Unlike whistles, which have no moving (vibrating) parts, leaves are elastically subject to variations in shape and the fact that serious leaf players rarely produce “pure” (simple) tones can be demonstrated by means of spectral analysis [27]. The gumleaf sound has anecdotally been mistaken for several other wind instruments as well as the violin and the human voice, providing evidence for Gaver’s observation that musical sounds seem to reveal little about their sources ([28], p. 2). Gumleaves have been seen and heard in the company of other indigenous instruments but primarily in juxtaposition with Western instruments. Leaf playing, in fact, came to be regarded as a predestined talent and a symbol of identity ([5], p. 68). On the north coast of NSW, Biripi descendant Fred Bugg believed that he was born a leaf player, proof being a birthmark on his leg that had the form of a gumleaf ([29], p. 32). This exemplifies an Indigenous person reading a specific meaning into his destiny that was shaped by the way that kinsmen used and experienced the products of their culture in adherence to the belief system(s) of the bush.

Leaf playing also facilitated a pleasurable pastime in which, for example, the stockman’s custom of blowing gumleaves to call cattle to attention was a work feature shared by men who mixed in shearing sheds ([30], p. 6). Most leaf playing in settler Australia emerged as a curiosity characterised by the freedom and naturalness of open-air life for men known as “stringybarks” ([31], p. 118); and from at least the 1920s, non-Aboriginal men acquired skills taught to them by Aboriginal leafists.

There are natural, social and cultural constraints on leaf playing, and—like the leaves themselves—cultures of leaf playing evolve, develop, and decay. Caught up in the mid-twentieth century drift of Aboriginal people seeking employment in cities, bandsmen splintered into casually-grouped leaf quartets, trios, duos, and soloists who busked for a living. From its inception in Maryborough, Victoria in 1977 through until 1997, The Australian Gumleaf Playing Competition incorporated Indigenous soloists on Western terms [5]. The 1990s also saw the activity impacted by a trend to ecological awareness; to which end the next section links leaf playing to the significant aural culture of birdsong.

5. Ecological Considerations of Leaf Music

5.1. The Gumleaf's Iconic Status

Sensory experience of plants nurtures the formation of sense of place as an embodied reality ([10], p. 30), for example a gumleaf projects deep symbolism as a visual, aromatic, and sonic icon that can pique one's senses. The gumleaf instrument is thus more than a resource for manipulation; it also carries cultural overtones propagated by its representation in art as a reflection of landscape and colour. The musical capabilities of the gumleaf act to evoke this icon as a signifier of national identity, illustrative of Schafer's observation ([4], p. 68) that

When a sound object is known and loved it functions more as a sensory anchor, assuring us that we are at home even when other features of the environment are alien or intimidating.

In an "Aussie" wartime practice, families sent postcards to the troops overseas with eucalypt leaves attached. ([32], p. 116–118). So strong was this signifier that soldiers returning by ship from the two world wars could smell eucalypts long before land was visible ([33], p. 37–38). The poet Ethel Phillips Fox may have noticed the Lake Tyers Military Gumleaf Band playing outside the Melbourne Town Hall or Flinders St Station c. 1939, because she penned "The Song of the Gumleaf" for the officers and men of the Royal Australian Air Force (RAAF) in 1940. Verse I and the chorus speak of "a leaf that is tough and true" and "an emblem of those who are fighting" ([5], p. 160).

5.2. The Cultural Ecology of Music Leaves

J. Ryan speaks of a field of sensation where subject/object binaries do not hold ([10], p. 30). He argues that dialogic engagement with plants positions the human subject as a participant in a shared performance, based in the rhythm of ecology ([34], p. 2). Cultural ecology orients to the processes by which societies adapt to environments ([35], p. 194), and for the purposes of this section, leafists are uniquely positioned to educate spectators to respect Australia's natural environments.

That the Indigenous peoples ascribed mythic value to native plants is axiomatic to a culture that depends for its very survival on a deep level of knowledge and respect for the environment. As we muse on sounds that have been forgotten and the scant cultural memory left of old landscapes, leaf music supplies us with a means for recontextualising the perception of sound in nature, exemplifying what Marett, in his seminal 2010 lecture on musical extinction, describes as an "articulation in performance of non-mainstream ways of being" ([36], p. 255).

Assuming that there is only a finite number of ways in which humans can elicit sound from leaf-reeds, today's vegetal sound sources can spark our imagination of ancient soundscapes. Evidence abounds for Aboriginal children resourcefully using leaves of varying textures, length, breadth, and shape in their games. Haagen ([37], p. 55), for example, compiled evidence for a so-called "improvisational bush symphonic" produced by Aboriginal boys during quiet-tread stalking. The transformation that occurs when a child plucks a leaf from its locus to produce sounds arguably elevates the leaf—within an actor-network context—from passive to actant status.

By the 1990s the practice of blowing leaves to imitate animals and birds in hunting contexts had functionally transposed to a celebration of natural bush soundscapes in which leafists—in direct

ecological audition—learn avifaunal musicalities from the creatures themselves. I argue, furthermore, that the leaf, in metaphorising the sounds of fauna, shares in the agency of Indigenous reterritorialisation. Patten’s synergistic relationship with sound-producing plants was originally informed by the alfresco hereditary culture of his Great-uncle Lindsay Thomas at Newmerella, Victoria. With curiosity and openness, the young “Herbie” emulated the sonorous notes that Thomas produced on *Bangalay* (the Gippsland Mahogany; *E. botryoides*) and other local leaves. This acoustic information inspired Patten to seek out “strong resonance leaves”, and for this reason he grows a Forest Red Gum (*E. teriticornis*) in his backyard, and trusts Turpentine (*Syncarpia glomulifera*) to reach all the notes that he needs ([38], p. 18).

Together we identified and recorded the sounds that Patten and his forebears produce(d) on leaves. A constellation of cockatoos, curlews, king-parrots, magpies, owls, robins, and swans were culturally significant for the Brabuwooloon branch of the Gunai-Kurnai in their richly reverberant environment. Feld’s ground-breaking ethnomusicological findings in the Bosavi district of Papua New Guinea (e.g., 1982) spring to mind as we contemplate Aboriginal musicians working in harmony with their arboreal environments [39]. Patten copies the female Eastern Whipbird (*Psophodes olivaceus*) with a human tongue roll or trill on a leaf; and re-interprets the “spiritual” sound of *Guniyaruk* (the Gippsland Black Swan; *Cygnus Atratus*) on Gippsland Mahogany leaves. More recently, Patten recorded his “take” on the Red-tailed Black Cockatoo (*Calyptorhynchus banksii*).

Renowned storyteller “Auntie Rose” Boston loves to “shiver” the cacophonous chuckling sounds of her personal totem *Gaagum* (the Laughing Kookaburra; *Dacelo novaeguinae*) on a Brittle Gum (*E. mannifera*) leaf: “This is how we played the leaf, imitating birds, just as we imitated animals and birds with our dancing” ([5], p. 46). She will often talk seriously to a bird (*bijjin*) or to a tree (*bigwrr*); or use leaves to enact acoustic cues. Acoustic space is an expression of the profile of a sound over the landscape ([1], p. 115), and in its hey-day the practice of Aboriginal gumleaf playing was clustered around rivers, lakes, billabongs and creeks. On one occasion, Boston noticed some boys preparing to shoot birds on the Nandock River, NSW. Knowing that if the parrots heard a bird-of-prey they would scatter for cover, she intuitively plucked a leaf from a Spotted Gum (*E. maculata*) and simulated the tremulous, silvery-toned whistle of *garriirrl*, the district’s Square-tailed Kite (*Lophoictinia isura*) ([5], p. 47).

“Sound”, in the words of Gaver, “provides information about an interaction of materials at a location in an environment” ([28], p. 5). Leaves that Aborigines blew at night near smooth water, for instance, could be heard echoing at a great distance because when sound waves strike the surface of water most of the sound energy is reflected. Having explored the leaf’s status as an acoustic actant and environmental icon, I will now interpret its peculiarities, possibilities, and limitations in relation to the politically contested “nature of nature”.

6. (Eco) Philosophical Considerations of Leaf Music

French philosopher Marin Mersenne opined that sounds can shed more light on philosophy than any other quality [40]. Indeed sound artist/philosopher David Dunn ([41], p. 98) argues that the sounds of non-human living things are “evidence of mind in nature and are patterns of communication with which we share a common bond and meaning”. A gumleaf arguably projects sound as a “vibrant plenum” that “reminds us of the profound physical interconnectedness that is our true environment” (after [41], p. 99). At the same time its ephemerality comes to the fore in the tradition under question:

to produce prize-winning melodies, competitive leafists literally “consume” their fragile instruments into disintegration.

Just as Latour focused the interactions of a network into “a very local, very practical, very tiny locus” ([25], p. 17), J. Ryan theorises people and plants intermeshing and fluxing in close contact as bodies in becoming ([42], p. 299). Plants change before our senses, so too do our bodies in relation to plants ([42], p. 329):

The observation that people assimilate plants to social practices and customs reflects only one side of the reciprocity that characterizes human-vegetal relationships, it entails only the single condition of humans *acting upon* plants ([10], p. 104).

In considering how plants “*act upon* us... and are shrewdly used by intelligent beings to produce the things of culture”, J. Ryan looks towards von Uexküll’s *Umwelt* (environment) of plants to define intelligent behaviour in relation to the condition of reciprocity with people and the environment ([9], pp. 104, 109). Theoretically, a particular organism creates and reshapes its own *Umwelt* when it interacts with the world in a “functional circle”, a concept applicable to a musician playing a leaf “in contact at the liminal edge between bodies, botanical and human” (after [34], p. 6). It is safe to say that a leaf instrument represents the mediating object that “makes the music happen” in its own *Umwelt*.

Soper ([43], pp. 5, 38) points out that anthropocentric privileging of our own species—encouraged by its “humanism”—has been distorting of the truth of our relations with nature such that an opposition between the natural and the human has become axiomatic to Western thought. Reinforced by the visual sense, we have generally regarded the ephemeral leaf as the passive object and the leafist as the active subject. So what non-dualist approaches might permit us to conceptualise the unmodified leaf instrument (nature) as being on a continuum with the leafist (human)? Firstly, to abandon yourself to a tune is not exclusively passive; it involves the participation of both the person and the object (Gomart and Hennion [44], p. 227). Another approach, ventured by Morton, views subjects and objects as an open system of *feedback loops* ([45] p. 191). To this end Morton observes how timbral statements can be strongly medial, evoking the medium that utters them. And medial statements can be timbral, pointing out the physicality and materiality of the language. This is strongly environmental. A guitar note brings to mind the wood out of which it is made. The timbral and the medial are two ways of describing the same thing. This axiom asserts that at bottom, foreground and background are more than intertwined ([45], p. 40).

Gaver defines an auditory ecology as a method of listening and understanding sound and its source [28]. Drawing on his idea of “everyday listening” (hearing the characteristics and identities of instruments rather than the sounds per se of “musical listening”), a gumleaf note also brings to mind the organic matter of which it is composed. Tangible information about the musical life of the past is obtainable from bone, ivory, shell, and wood analysis, but biodegradable leaf matter cannot be radiocarbon-dated. As a result no historical leaf instruments are housed in museums, yet the inaugural Australian Gumleaf Playing Champion, Les Hawthorne, claimed to have played the same dried (cured) leaf over many years, lovingly storing it in a mouth organ case ([5], p. 258). In this way, Hawthorne kept his leaf “alive” and “actant” over time.

Leaf matter exhibits natural variability, since biological populations are not identical entities but unique individuals with cells that continuously change their properties ([46], pp. 54–55). That the Aboriginal peoples considered each leaf to have a “voice” of its own [19] bears testament to their own understanding of how, in leaf music, agency is shared. Individual leaves, for instance, possess the means for personifying named spirits. At the old Cummeragunga tribal camp on the Murray River, NSW the leaf (*waala* or *walou*) served as a medium for high-pitched ghost (*bekka* or *pekka*) noises in stories that Yorta Yorta Elders told to children around open fires ([5], pp. 54–55). As an example of their status as actants, leaf instruments generally lend themselves to ghost simulations, since their lower range only extends to a minor third below middle C.

Mimesis—together with the leaf instrument’s agency in hunting and signalling—further strengthens the actor-network concept that any actor is equally important to a heterogeneous social network, in this case one between the human and non-human. A reception-based interpretation provides further evidence for the leaf instrument’s agency in cultural blendings and positionings with art, drama, and poetry.

7. Multi Media Considerations of Leaf Music

Art and nature are siblings, branches of the one tree; and nowhere more than in the continuing inexplicability of many of their processes, and above all those of creation and of effect on their respective audiences.

—Fowles and Horvat [47]

The unique sonic essences of specific leaves first received some public recognition as cultural-musical systems in their own right in 1999 when Sydney soundscape artist Sherre DeLys piped recorded examples of leafists’ bird mimicry through the artificial leaves of her *Experimenta Plant Sculpture*. The exhibition was installed at the Royal Botanic Gardens, Sydney and Melbourne; at the Adelaide Festival; and in various venues around Europe [48]. Featured leafist Herb Patten has since firmly established himself as the custodian of the knowledge that brings the gumleaf to life [49].

Heidegger (cited in Soper [43], pp. 48–49) suggests that only the rare individual, the poet or artist, is in a position to realise, by means of an aesthetic transcendence of technological wisdom, the promise of authentic relations to Being. Patten has imported his medium—a type of text from another time and place—into fields ranging within Aboriginal Australia from entertaining Indigenous communities, to enhancing cultural and political representations, to performing at the Indigenous Deadly Awards (founded 1995). His sculptured “Gumleaf Player” (self portrait) was mounted on display at The Koorie Heritage Trust, Melbourne in 2005; and his gumleaf sounds actively provoked *Tidilick the Frog* and his young audiences to laugh during 75 performances at the Melbourne Museum in 2012 [50]. A wider context for leaf performances, in recent years, has been the ubiquitous video-sharing website YouTube [51].

A multi media exploration of gumleaf music devised by Patten in 2007 communicates his active passion for playing through the medium of original poetry set to photography by Terry Melvin [38]. Patten kindly authorised republication of some verses that depict leaf instruments surpassing their mere equation with sounds from the bush. For example, in “Respecting the Bush” ([38], p. 30), the *Umwelt* that he shares with a leaf reflects on Leopold’s call for land to be regarded as part of a community for which humanity has an ethical responsibility to care ([52], pp. 201–226):

Respecting the Bush

I love playing the Gumleaf Music in the bush.
 It heals my soul.
 It makes clear to me what I owe to the bush.
 I like playing a thankyou to the presence of the bush.
 Prayer is saying thank you.
 I say thank you with my Gum Leaf.

In “Connecting to Spirit” ([38], p. 34), this gesture invokes a sense of liberation that reaches to the core of Patten’s being:

There is also a feeling of grandeur
 I am connected to Spirit
 And the strengthening of my belief in it
 The Spirit is never asleep
 It’s there
 Wherever I am

As illustrated in Figure 3, Herb Patten often plays “back to a tree”—without detaching its leaves—in order to “feel the spirit of the bush through the tree”.

Figure 3. Herb Patten makes music in the bush off Glasshouse Rd, Narooma, NSW. Image Source: Christine Reid, May 1999. Published with permission from *Narooma News*/H. Patten).



I’ve played trees without even picking a leaf and I walked past that tree a couple of years later, it’s greener—it’s got my music growing in it. I believe there could be some healing powers in the sounds I make.

J. Ryan's remark that reaching out gesturally to plants "enables one to tap into the healing attributes of the bush" ([10], p. 33) is demonstrated in Patten's verse *The vibration moves through me/It overhears and unfolds the mystery of feelings* from his poem "I'm exploring the healing power of Gumleaf Music" [38]. "Somehow", discerns Dunn ([41], p. 95), "we have always intuited that music is part of our reflection to and from the nonhuman world. We hear the alien quality of the nonhuman in our music and the humanity of music in nature", and indeed "the sound we hear is only a fraction of all the vibrating going on in our universe".

Patten's gumleaf emerges as a strong healing actant in other quite different ways ([38], p. 31, 35):

Reaching Through the Barriers

A doctor once asked me to play
To adults and children with mental illnesses
To use the Gumleaf as a way of exploring their feelings
Through music, sound and vibration
I worked with a child who was blind, deaf and dumb
I put a balloon on his cheek
I played my Gumleaf through the balloon
He felt the vibration through the balloon and he smiled
The Gumleaf reached through all the barriers
And we communicated together

Playing the Gumleaf helps me reach another level:

It teaches me to understand music and the world
In a deeper and musical way
Also it helps to tune up the human voice
Tuning up
My Spirit talks to me through my Gumleaf Music
It seems to cure some of my ills
It helps me feel that the journey is safe
For today and into the future

8. Concluding Thoughts

This essay—designed to open up nuanced patterns of understandings of the interlinked systems of leaf music, ecology, nature, and societies—consolidates a role for the physical science and philosophy of music to sit at the crossroads of the art and social science of music. Its exposition of six explanatory approaches corroborates the semiotics for a leaf instrument's lively role in the human-music-vegetal dynamic. An initial consideration saw people-music-flora interactions surviving (sub)urbanisation and degrees of social change in which leafists from different sociocultural backgrounds living in the same foliaceous ecosystems have demonstrated different predilections for music leaves. The lantern of science confirmed that all leaves possess the same natural acoustic functions, with variations in size, shape and texture necessitating minor changes in players' techniques.

A second broad theme saw gumleaf playing in southeastern Aboriginal Australia popularised as an ensemble tradition in the early twentieth century. The cameo that followed illuminated the leaf musician “tuning in” to—and evoking—the mottled effect of nature’s sounds, as what can rightly be called a “leaf instrument” became, in the 1990s, a touchstone for a nature-endorsing decolonisation of place and space. Patten and Boston continue to “speak back to colonialism” by involving audiences in the meanings of natural sounds. The spiritual resonances of leaf birdcalls serve memory, description, and amusement by acting to broadcast the voices of local landscapes, as well as those from which leafists have become spatio-temporally dislocated.

One might, of course, argue agency for other musical instruments. However, the gumleaf’s special association with Aboriginal Australia exemplifies “the interpenetration between an organism and its environment” (based on [9], p. 110) in a shared musical *Umwelt* that breaks down the traditional epistemological dichotomies between humans and nature. The gumleaf may be conceptualised as an acoustic actant, a cultural actant, a social actant, an economic actant, an environmental actant, a healing actant, and a spiritual actant.

Over the last two decades Patten and Boston have cleverly reinforced the instrument’s value, sometimes in combination with other arts—including Patten’s poetry and Boston’s storytelling—to transmit aspects of the environmental, social and spiritual principles of Aboriginal culture. They and other Indigenous leafists have defined the world in their own terms however it is only through the agency of the iconic gumleaf itself that each has gained the means to promote their art within and beyond their respective communities.

This exercise of connecting the *Zeitgeist* of ecomusicology to the newly established field of human-plant studies (HPS) suggests new possibilities. Could the field that I described as botanic musicology in 1999 now be developed (with apologies to J. Ryan for his sympathetic notion of “cultural botany” and to Michael Marder for “critical plant studies”) into “music-plant studies” (MPS)? For “Music”, wrote Dunn ([41], p. 97):

is a different way of thinking about the world, a way to remind ourselves of a prior wholeness when the mind of the forest was not something out there, separate in the world, but something of which we were an intrinsic part. Perhaps music is a conversation strategy for keeping something alive that we now need to make more conscious, a way of making sense of the world from which we might refashion our relationship to nonhuman living systems.

Acknowledgements

The author is indebted to leafists Herbert Patten and Roseina Boston for ongoing collaborations; to Herbert Patten for permission to reproduce examples of his poetry; to John C. Ryan and Hollis Taylor for (eco)philosophical readings; and to Neville Fletcher for explaining more of gumleaf acoustics and for granting permission to reproduce one of his diagrams. During my candidature I received assistance from Margaret Kartomi, Reis Flora, Neville Fletcher, Neil Hallam, Sinisa Djordjevic, John Whiteoak and Aline Scott-Maxwell. Thanks are also due to my two (unidentified) referees for suggesting improvements to this manuscript. Gumleaf recordings are held at the Australian Institute of Aboriginal and Torres Strait Islander Studies (AIATSIS), the National Library of Australia (NLA), and in the author’s personal collection.

References and Notes

1. Schafer, R.M. *The Tuning of the World*; Alfred A. Knopf: New York, NY, USA, 1977; p. 206.
2. Sachs, C. *The History of Musical Instruments*; W.W. Norton: New York, NY, USA, 1940; p. 38.
3. Allen, A.S. Ecomusicology. In *Grove Dictionary of American Music*; Garrett, C.H. Ed.; Oxford University Press: New York, NY, USA, forthcoming 2013; Volume 2.
4. Schafer, R.M. Music and the soundscape. In *The Book of Music and Nature: An Anthology of Sounds, Words, Thoughts*; Rothenberg, D., Ulvaeus, M., Eds.; Wesleyan University Press: Middletown, CT, USA, 2001; pp. 58–68.
5. Ryan, R. A Spiritual Sound, A Lonely Sound: Leaf Music of Southeastern Aboriginal Australia, 1890s–1990s. Ph.D. thesis, School of Music, Conservatorium, Monash University, Australia, 1999.
6. Moyle, A.M. North Australian Music. Ph.D. thesis, Department of Music, Monash University, Australia, 1974.
7. Fletcher, N.H. The winds of music—art and science. In *Westprac VII*, Proceedings of The Seventh Western Pacific Regional Acoustics Conference, Kumamoto, Japan, 3–5 October 2000; pp. 13–22.
8. Fletcher, N.H. Australian aboriginal musical instruments: The Didjeridu, the Bullroarer and the Gumleaf. In *SMAC 03*, Proceedings of the Stockholm Music Acoustics Conference, Stockholm, Sweden, 6–9 August 2003; pp. 1–4.
9. Ryan, J.C. Passive flora? Reconsidering nature’s agency through Human-Plant Studies (HPS). *Societies* **2012**, *2*, 101–121.
10. Ryan, J.C. Towards intimate relations: Gesture and contact between plants and people. *PAN: Philosophy, Activism, Nature* **2012**, *9*, 29–36.
11. Chamovitz, D. Rooted in sensation: Taste. *New Sci.* **2012**, *215*, 34–37.
12. Latour, B. *Reassembling the Social—An Introduction to Actor-Network-Theory*; Oxford University Press: Oxford, UK, 2005.
13. Ritzer, G.; Goodman, D.J. *Sociological Theory*, 6th ed.; McGraw Hill: Boston, MA, USA, 2004.
14. Allen, A.S. Prospects and problems for ecomusicology in confronting a crisis of culture. *J. Am. Music. Soc.* **2011**, *64*, 414–424.
15. Rothenberg, D. Introduction: Does nature understand music? In *The Book of Music and Nature: An Anthology of Sounds, Words, Thoughts*; Rothenberg, D., Ulvaeus, M., Eds.; Wesleyan University Press: Middletown, CT, USA, 2001; pp. 1–10.
16. Rotherham, I.D., Lambert, R.A., Eds. *Invasive and Introduced Plants and Animals: Human Perceptions, Attitudes and Approaches to Management*; Earthscan: London, UK, 2011.
17. McKie, R. *We Have No Dreaming*; Collins: Sydney, Australia, 1988.
18. Patten, H. *How to Play the Gumleaf*; Currency Press: Sydney, Australia, 1999.
19. Ryan, R. Ecomusicology and the search for the elusive “stradileaf”. In *Re-Visions*, Proceedings of the 2010 MSA and NZMS Joint Conference, The University of Otago, Department of Music, Dunedin, New Zealand, 2–4 December 2010 ; Poole, M., Ed.; 2013.
20. Fletcher, N.H. Australian National University, Canberra, Australia. E-mail correspondence, 2 May 2013.
21. Rose, D.B.; Daiyi, N.; Deveraux, K.; Daiyi, M.; Ford, L.; Bright, A. *Country of the Heart: An Indigenous Australian Homeland*; Aboriginal Studies Press: Canberra, Australia, 2011.

22. Blacking, J. Identifying processes of musical change. *World Music* **1986**, *28*, 3–15.
23. Ryan, R. And we marched to the tune of the gumleaf band ... but to whose tune did we march? In *Popular Music: Commemoration, Commodification and Communication*, Proceedings of the 2004 IASPM Australia New Zealand Conference, held in conjunction with the Symposium of the International Musicological Society, The Victorian College of the Arts, Melbourne, Australia, 11–16 July 2004; Crowdy, D., Ed.; 2005, pp. 21–40.
24. Temora (*nom de plume*). The eucalyptus band: It fetched a crowd. *The War Cry*, 30 July 1892, p. 7.
25. Latour, B. On recalling ANT. In *Actor Network Theory and After*; Law, J., Hassard, J., Eds.; Blackwell: Oxford, UK, 1999; pp. 15–25.
26. Ryan, R. Razz-a-ma-tazz on the Gumleaf. *Trad&Now*, 2006 (Summer), pp. 28–29.
27. Spectral Analysis conducted by acoustician Sinisa Djordjevic in the Anechoic Chamber, Phonetics Laboratory, Monash University, Victoria, Australia, 1 June 1995.
28. Gaver, W.W. What in the world do we hear? An ecological approach to auditory event perception. *Ecol. Psychol.* **1993**, *5*, 1–29.
29. Holmer, N.M.; Holmer, V.E. *Stories from Two Native Tribes of Eastern Australia*; A.-B. Lundequistska Bokhandeln: Upsala, Sweden, 1969.
30. Bradley, K. Leaf music in Australia. *Australian Aborig. Stud.* **1995**, *2*, 2–14.
31. Anderson, H. Lost in the streets: A gumleaf requiem for Bill Bull. *J. Aust. Stud.* **1995**, *44*, 23–37.
32. Wrigley, J.; Fagg, M. *Eucalypts: A Celebration*; Allen & Unwin: Crows Nest, Australia, 2010.
33. Milroy, G.; Milroy, J. Different ways of knowing: Trees are our families too. In *Heartsick for Country: Stories of Love, Spirit and Creation*; Morgan, S., Tjalaminu, M., Kwaymullina, B., Eds.; Fremantle Press: North Fremantle, Australia, 2008; pp. 23–42.
34. Ryan, J.C. ‘Plants that perform for you’? From floral aesthetics to *Floraesthesia* in the Southwest of Western Australia. *Ecological Humanities* **2009**, *47*, 1–15. Available online: <http://www.australianhumanitiesreview.org/archive/issue-November-2009/ryan.html> (accessed on 8 May 2012).
35. Feld, S. Lift-up-over-sounding. In *The Book of Music and Nature: An Anthology of Sounds, Words, Thoughts*; Rothenberg, D., Ulvaeus, M., Eds.; Wesleyan University Press: Middletown, Connecticut, USA, 2001; pp. 193–206.
36. Marett, A. Vanishing songs: How musical extinctions threaten the planet. *Ethnomusicol. Forum* **2010**, *19*, 249–262.
37. Haagen, C. *Bush Toys: Aboriginal Children at Play*; Aboriginal Studies Press: Canberra, Australia, 1994.
38. Patten, H. Stories of aboriginal heritage through a multi media exploration of gumleaf music. Department of Education, RMIT University, Melbourne, Australia, 2007.
39. Feld, S. *Sound and Sentiment: Birds, Weeping, Poetics and Song in Kaluli Expression*; American Folklore Society: Philadelphia, PA, USA, 1982.
40. Mersenne, M. *Harmonie Universelle: Contenant la Theorie et la Pratique de la Musique* (in French); Facs. Ed.; Centre National de la Recherche Scientifique: Paris, France, 1965.
41. Dunn, D. Nature, sound art, and the sacred. In *The Book of Music and Nature: An Anthology of Sounds, Words, Thoughts*; Rothenberg, D., Ulvaeus, M., Eds.; Wesleyan University Press: Middletown, CT, USA, 2001; pp. 95–107.

42. Ryan, J.C. *Green Sense: The Aesthetics of Plants, Place, and Language*; TrueHeart Academic: Oxford, UK, 2012.
43. Soper, K. *What Is Nature? Culture, Politics and the Non-Human*; Blackwell: Oxford, UK, 1995.
44. Gomart, E.; Hennion, A. A sociology of attachment: Music amateurs, drug users. In *Actor Network Theory and After*; Law, J., Hassard, J., Eds.; Blackwell: Oxford, UK, 1999; pp. 220–247.
45. Morton, T. *Ecology without Nature: Rethinking Environmental Aesthetics*; Harvard University Press: Cambridge, MA, USA, 2007.
46. Mayr, E. *The Growth of Biological Thought: Diversity, Evolution, and Inheritance*; The Belknap Press of Harvard University: Cambridge, MA, USA, 1982.
47. Fowles, J.; Horvat, F. *The Tree*; Aurum Press: London, UK, 1979.
48. Delys, S. *Experimenta plant sculpture*. Touring museum exhibition including various mimicry with *Eucalyptus* leaf music recordings with programme notes supplied by R. Ryan (Western Australian Academy of Performing Arts, Western Australia, Australia), 1999.
49. Ryan, R. From *Faint Aeolian Whisperings* to a pop instrument on *YouTube*: Discourse on the origins, adaptability and sociability of the gumleaf. In *Instruments of Change*, Proceedings of the 2010 IASPM Australia-New Zealand Conference, Monash University, Melbourne, Australia, 24–26 November; Cattermole, J., Homan, S., Smith, G., Eds.; 2011, pp. 103–110.
50. Patten, H. Professional gumleaf player. E-mail correspondence, 25 March 2013.
51. YouTube. Herb patten competes in the grand final of *Australia's Got Talent*, 22 April 2007. Available online: <http://www.youtube.com/watch> (accessed on 10 February 2011).
52. Leopold, A. *A Sand Country Almanac and Sketches Here and There*; Oxford University Press: New York, NY, USA, 1949.