The Sentience of Plants:
Animal Rights and Rights of Nature Intersecting?

Alessandro Pelizzon[3] and Monica Gagliano[4]

The emerging legal theory known as 'Earth Jurisprudence' has grown exponentially in the last decade. One of the most notable proposals of this novel legal theory is the attribution of subjective legal status to nature, a proposal that has already been legislated in a number of jurisdictions, as discussed below.

The recognition of nature as a subject of and with rights raises a number of questions, most notably concerning the issue of agency of and on behalf of nature. Similar questions have been already explored by the animal rights discourse, in its attempt to confer subjective legal status to animals. The importance of the intersection between 'Earth Jurisprudence' and animal rights is thus readily apparent.

Emerging scientific research has revealed that plants show all the traditional indicators of sentience. This casts doubt upon the utility of the traditional rigid division made between plants and animals. It also suggests that sentience is a contingent and fluid concept; one that depends upon a constantly changing combination of scientific and cultural assumptions.

These developments suggest that the fundamental proposal of 'Earth Jurisprudence', that all things have rights by virtue of their very existence, may not need to be based on such as 'sentience', but may be used as the premise for a radical challenge to many anthropocentric legal principles. In doing so, 'Earth Jurisprudence' can learn from the legal tradition that has developed around the concept of animal rights, while at the same time stretching all previously established boundaries that traditionally extended rights exclusively to non-human animals alone.

INTRODUCTION: WHEN LAW AND SCIENCE MEET

In 2012, one of the authors of this paper, founder and then board member of the Global Alliance for the Rights of Nature, the Australian Wild Law Alliance and the Earth Laws Network at Southern Cross University, convened a colloquium entitled 'Animal Rights and the Rights of Nature – Intersections and Tensions', to explore the intersection between the rights of nature and animal rights discourses. Although many might consider animal protection law advocates and rights of nature proponents natural allies, this very quickly appeared not to be the case during the colloquium. The classical divide between eco-systemic approaches faced against the specific concerns of individual animals was rehashed,[5] with dividing arguments as to the actual interaction between the two legal perspectives.

At the same time, the other author of this paper was exploring communicative and cognitive abilities of plants. By adopting a quantitative approach commonly used to test these abilities in animals, the exploration delivered innovative, rigorous, experimental evidence showing that plants can not only acquire learned behaviors (i.e. behavior that is not innate but one an individual develops by being taught or by observing others) in a matter of seconds but that they also remember what has been

[3] Dr Alessandro Pelizzon is a Lecturer in the School of Law and Justice at Southern Cross University.
[4] Dr Monica Gagliano is a Research Associate Professor in the Centre for Evolutionary Biology at the University of Western Australia.
[5] See, for example, R Nash, *The Rights of Nature* (The University of Wisconsin Press, 1989).

learned for several weeks. The new finding called for a revision of the way plants are perceived and conceived, and of the traditionally held boundary between plants and animals.

When the two authors met, only a couple of years later, it appeared that the two paths of independent exploration had converged, making it possible for many of the separate threads of the multiple discourses – law and science, rights of nature and animal rights alike – to begin to be woven together. And thus a dialogue began between a legal theorist and an evolutionary ecologist, to unravel epistemological complexities at the intersection of law and science. This dialogue, using the novel legal philosophy of 'Earth Jurisprudence',[6] had a particular focus on the concept of sentience, in order to show, by reference to the most recent research on plant sentience, that that concept is a cultural construct replete with contextual meaning.

RIGHTS OF NATURE RISING

When Christopher Stone asked his provocative question at the end of an introductory class in property law at the University of Southern California in 1972, 'should trees have standing?',[7] he could not have predicted how his suggestion would have affected the dominant legal paradigm in decades to come. In the author's words, '[this suggestion] has since assumed a modest but apparently enduring place in contemporary environmental law and ethics, quite out of proportion to its actual impact on the courts.'[8] Since Stone's own reflection in 2010, the article's impact on courts and legislators alike has been, arguably, more noteworthy than that.

The most significant outcome of Stone's provocative suggestion has certainly been the proliferation of rights of nature legislation. Operating since 1995, the Community Environmental Legal Defense Fund (CELDF) is a US-based not-for-profit organization that, in 2006, managed to draft, on behalf of the local community of Blaine Township in Pennsylvania, a series of local laws, or ordinances, which declared that ecosystems had rights within Blaine Township.[9] In the intervening decade, the number of similar local ordinances facilitated by CELDF in the US grew to well over a hundred. The *Earth Charter* is a 'global civil society initiative',[10] born as a United Nations initiative but then finalized and launched in 2000 by the Earth Charter Commission, an independent international organization. Although not explicitly representing 'nature' as a subject with rights and legal standing, the Charter recognizes 'the right of all, without discrimination, to a natural and social environment supportive of human dignity, bodily health, and spiritual well-being […] Towards this end, it is imperative that we, the peoples of the Earth, declare our responsibility to […] the greater community of life'.[11] Even more remarkably, Chapter 7 of Title 2 of the new Ecuadorian Constitution of 2008 expressly grants constitutionally enshrined rights to nature or 'Pacha Mama' (therefore, with a clear reference to a pre-colonial Andean cosmology): 'Nature, or Pacha Mama, where life is reproduced and occurs, has the right to integral respect for its existence and for the maintenance and regeneration of its life cycles, structure, functions and evolutionary processes.'[12] Three years later, the first constitutional vindication of nature's rights occurred in the case of the Vilcabamba river, whereby the provincial court of Loja in Ecuador found against the municipality of Loja

[6] See T Berry, *The Great Work* (Broadway Books, 1999); C Cullinan, *Wild Law* (Chelsea Green, 2nd ed, 2011).
[7] Christopher Stone, 'Should Trees Have Standing? Towards Legal Rights for Natural Objects' (1972) 45 *California Law Review* 450. See also, Christopher Stone, *Should Trees Have Standing?* (Oxford University Press, 3rd ed, 2010).
[8] Ibid, xi.
[9] M Margil, 'Stories from the Environmental Frontier', in P Burdon (ed), *Exploring Wild Law* (Wakefield Press, 2011) 249. See also, for more direct information on CELDF, 'CELDF', accessed March 25, 2015, http://www.celdf.org/html.
[10] J Ronald Engel and B Mackey, 'The Earth Charter, Covenants and Earth Jurisprudence', in P Burdon, *Exploring Wild Law* (Wakefield Press, 2011) 313.
[11] *Earth Charter*, s3 and s4. See also 'Earth Charter International', accessed March 25, 2015, http://earthcharterinaction.org/html.
[12] *Constitution of the Republic of Ecuador*, art 71.

and in favor of the Rio Vilcabamba in accordance with the new constitutional provisions.[13] The result of the World People's Conference on Climate Change and the Rights of Mother Earth, convened by Bolivian President Evo Morales in Cochabamba, Bolivia, in 2010, was the *Universal Declaration of the Rights of Mother Earth*, an aspirational document that expanded upon both the legal innovations and the post-colonial conceptualizations introduced by the Ecuadorian Constitution. Following suit, Bolivia's Plurinational Legislative Assembly passed, late in 2010, the *Law of the Rights of Mother Earth* (*Ley de Derechos de la Madre Tierra*, Law 071 of the Plurinational State of Bolivia). Interestingly, in the text of the law, human communities are explicitly described as *part of* nature, in a very nuanced definition of life-systems as 'complex and dynamic communities of plants, micro-organisms and other beings and their environments, in which human communities and the rest of nature interact as a functional unit, under the influence of climatic, physiographic and geologic factors, as well as the productive practices and cultural diversity of all Bolivians'.[14] When the recently negotiated and finalized Whanganui Iwi Deed of Settlement is passed into law, the Whanganui River in New Zealand will be granted legal personhood, thus representing the first instance within a common law country of such a radical reconceptualization of both the legal person and of what constitutes property. It will also represent a strong recognition *at law* of a non-Western worldview, by way of recognizing the agency vested on the traditional Maori Iwi – whose identity is intrinsically intertwined with the river itself – on behalf of the river.[15] Finally, the Global Alliance for the Rights of Nature,[16] a not-for-profit international organization established in 2010, has recently instituted an International Rights of Nature Tribunal to 'hear cases' on a yearly basis and as part of activities running parallel to the United Nations Framework Convention on Climate Change Conferences of the Parties. Although void of any official legitimacy, the tribunal represents a powerful voice of the global civil society on the issue of nature's standing.

TOWARDS AN EARTH JURISPRUDENCE

The examples briefly introduced above would be sufficient to vindicate Stone's provocation, but, more importantly, these examples are representative of a conceptual shift that has occurred, both within environmental philosophy and legal theory, in the course of the past four decades. What began as a self-described[17] thought experiment in the halls of US legal academia in the early 1970s has certainly become a lived reality in a number of jurisdictions and much more than a theoretical possibility for many activists and scholars alike. Stone asked 'what would a radically different law-driven consciousness look like? … How would such a posture *in law* affect a community's view of *itself*?'[18] The answer to his questions was fully articulated for the first time by eco-theologian (and self-described 'Earth scholar') Thomas Berry. In direct contrast to Cartesian dualism, Berry argued that the universe is not comprised of a collection of objects, but rather of a community of subjects.[19] Furthermore, if the well-being of each individual subject of the universe community is connected to and dependent from the well-being of the community itself, then the protection of the well-being of the overall community is paramount and ought to take precedence over the protection of any of its members. As a result, Berry

[13] *Wheeler c. Director de la Procuradoria General Del Estado de Loja*, Juicio No. 11121-2011-0010 (*'Wheeler'*). See also E Daly, 'The Ecuadorian Exemplar: The First Ever Vindications of Constitutional Rights of Nature' (2012) 21(1) *Review of European Community and International Environmental Law* 63-66.

[14] *Ley Corta de Derechos de la Madre Tierra*, Art 4. In the original: 'comunidades complejas y dinamicas de plantas, animals, micro organismos y otros seres y su entorno, donde interactuan comunidades humanas y el resto de la naturaleza como una unidad functional, bajo la influencia de factores climaticos, fisiograficos y geologicos, asi como de las practicas productivas, y la diversidad cultural de las bolivianas y los bolivianos'.

[15] See A Hutchinson, 'The Whanganui river as a legal person' (2014) 39(3) *Alternative Law Journal* 174-182.

[16] 'Global Alliance for the Rights of Nature, accessed August 13, 2015, http://therightsofnature.org.

[17] Stone, *Should Trees Have Standing?*, xii.

[18] Ibid, xi.

[19] See T Berry, *The Dream of the Earth* (Sierra Club Books, 1988); T Berry, *The Great Work* (Random House, 1999); T Berry, *The Sacred Universe* (Columbia University Press, 2009).

called for 'a jurisprudence that would provide for the legal rights of geological and biological as well as human components of the Earth community.'[20] He called this an *Earth Jurisprudence*.

Berry's invitation to articulate in political and legal terms the systemic approach to life on earth already advocated by a number of scientists[21] was taken further by South African lawyer Cormac Cullinan in his seminal book *Wild Law*.[22] Cullinan expanded on the concept of the 'Great Law' that Berry had introduced by stating that 'Earth is our primary teacher as well as the primary lawgiver'.[23] Cullinan coined the terms 'Great Law' or 'Great Jurisprudence' to describe the 'laws or principles that govern how the universe functions,'[24] arguing that human governance systems ought to be articulated in harmony with them. It is Cullinan's argument that seeded the theoretical terrain from which all the aforementioned examples sprang, and Cullinan has been personally involved in a number of these initiatives. If Stone's initial argument was significant in redefining the legal conceptualization of *damages* beyond the traditional anthropocentric terms within which they were traditionally defined, Berry and Cullinan's suggestions have made it possible to re-conceptualize nature not anymore as an *object* of legal *human* rights – in particular, of property rights[25] – but rather as a *subject with* and *of* intrinsic legal rights.[26]

The proposal has been replete with possibilities (as exemplified by the many legal initiatives in a number of jurisdictions), but it is also fraught with theoretical difficulties. Anne Schillmoller and Alessandro Pelizzon note that 'nature and rights are contested concepts with negotiable meanings,' cautioning against the risk that the yet largely indeterminate terrain occupied by the theory and practice of Earth Jurisprudence may already be heavily 'inscribed by humanist precepts of what "rights" and "nature" might consist of.'[27] Furthermore, the interpretation of the 'Great Law' as the 'law of nature' that human legal regimes have to be respectful of has led some scholars to interpret it in light of a highly contested natural law doctrinal legacy, thereby potentially missing, we contend, the revolutionary conceptual nature of the suggestion. Peter Burdon, for example, presents the distinction as a novel articulation of the traditional natural law/positivism dichotomy, thus hastily dismissing the notion of a 'Great Law' as 'too general and overwhelmingly broad to have relevance in Earth Jurisprudence.'[28] It is undeniable that a simplistic reference to the 'laws of nature' revives well-established critiques historically advanced against natural law theories.[29] However, we contend that the suggestion is much more nuanced than such a traditional distinction would entail. A complete discussion of the legal theoretical implications of the relevance of the 'Great Law' as the external referent of any human legal and governance initiative is certainly beyond the scope of this paper.[30] However, what is relevant for this paper is the connection between law and science within this nascent branch of legal theory, a connection that, to our knowledge, has not yet been fully examined by scholars in the field.

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[20] Berry, *The Great Work*, above n 17, 161.
[21] See, for example, J Lovelock, *Gaia* (Oxford University Press, 1979); L Margulis, *Symbiotic Planet: A New Look at Evolution* (Weidenfeld & Nicolson, 1998).
[22] Cullinan, above n 4.
[23] Berry, above n 4, 64.
[24] Cullinan, above n 4, 84.
[25] See, for example, N Graham, *Lawscape* (Routledge, 2011); P Burdon, *Earth Jurisprudence: Private Property and the Environment* (Routledge, 2015).
[26] See also Nash, above n 3.
[27] A Schillmoller and A Pelizzon, 'Mapping the Terrain of Earth Jurisprudence: Landscape, Thresholds and Horizons' (2013) 3(1) *Barry Environmental and Earth Law Journal* 3.
[28] P Burdon, 'The Great Jurisprudence', in P Burdon (ed), *Exploring Wild Law* (Wakefield Press, 2011) 66.
[29] See, for example, J M Kelly, *A short history of Western legal theory* (Oxford University Press, 1992); M D A Freeman, *Lloyd's Introduction to Jurisprudence* (Sweet and Maxwell, 8th ed, 2008).
[30] For the numerous critiques, see, among others, T Jagtenberg and D McKie, *Eco-Impacts and the Greening of Postmodernity* (Sage, 1997); B Latour, *Politics of Nature* (Harvard University Press, 2004); T Morton, *Ecology Without Nature* (Harvard University Press, 2007).

OF NATURAL SYSTEMS AND LEGAL PERSONS: THE SENTIENCE CONNECTION

Although Stone's argument has always been taken as the historical basis for the argument of legal personality for entire *ecosystems*, one certainly less explored question raised by his proposition pertains to the inquiry whether *single*, *individual* trees ought to have standing. In other words, could an investigation of the rights of single individual trees tell us anything about the nature of the relationship between the scientific discourse and the project of Earth Jurisprudence? It is such an investigation that opens up an interesting interdisciplinary terrain between an emerging Earth Jurisprudence and the rich tradition of the legal discourse surrounding animals.[31]

Interestingly, some lukewarm responses to Berry and Cullinan's invitation have come from a number of animal law writers. While the unquestionable importance of rights of nature legislation for animals is readily recognized, the wording of such recognition is often rather telling: 'since animals form an integral part of the ecosystem, wild law would seek to invest animals with rights, *not because of any inherent quality of the animals* [emphasis added], but simply because those animals form part of the ecosystem that should be protected.'[32] Traditionally, animal rights arguments have been advanced on the basis of concerns for *individual* animals rather than more abstract concerns for *species* as a whole. Building on Albert Schweitzer's 'reverence for life,'[33] Peter Singer's argument represents one of the best-known animal welfare arguments.[34] A utilitarian ethicist, Singer argues that humans ought to include the interests of animals when evaluating any particular course of action that may affect them. The fundamental interest to be taken into account, for Singer, is the interest in avoiding pain and suffering and experiencing happiness, since '[t]he capacity for suffering and enjoying things is a prerequisite for having interests at all.'[35] Sentience (defined as the capacity to experience pain and suffering, as well as happiness) is thus the deciding feature in Singer's ethical system.

The concept of sentience thus becomes a creative basis for questioning the boundaries and intersections between the rights of nature and animal rights discourses, and more generally for interrogating the connection between scientific knowledge and the project of Earth Jurisprudence.

Traditionally, sentience has not been attributed to plants, so that only animals have been philosophically recognized as deserving of ethical considerations. The rejection of plant life from the realm of the 'sentients', however, clearly demonstrates how 'nature' is discursively construed *within* and *by* the dominant scientific discourse.

PLANT SENTIENCE: AN INTRODUCTION

A quick overview of the scientific literature on the concept of *sentience* shows that plants have rarely – if ever – been included in the scientific discourse on sentience.[36] Philosophers, anthropologists and researchers in religious and ethical studies have long debated whether plants are to be considered sentient,[37] but few scientists have posed, let alone tested, the question.[38] The conversation on plant

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[31] See, among many, D DeGrazia, *Animal Rights* (Oxford University Press, 2002); A Bruce, *Animal Law in Australia* (LexisNexis, 2012).
[32] Bruce, above n 29, 66.
[33] See M Meyer and K Bergel (eds), *Reverence for Life: The Ethics of Albert Schweitzer for the Twenty-First Century* (Syracuse University Press, 2002).
[34] P Singer, *Animal Liberation* (Pimlico, 2nd ed, 1995).
[35] Ibid, 6.
[36] Based on a Web of Science search across all listed databases for all records dated between 1900 and 2015 on the topic *sentien**. A complete output of 1,026 records was then refined by searching within results for the word *plant** (34 records) and *robot** (22 records) separately. A closer examination of results for the word *plant** revealed that only 18 records refer to the sentience *of* plants (rather than sentience as an increased state of human awareness *caused by* plants, such as entheogenic species) and of those, no paper approached the topic from the scientific perspective. Bibliographic data was extracted on June 6, 2015.
[37] For recent examples of philosophical discussions of the topic, see M Hall, *Plants as Persons: A Philosophical Botany* (SUNY Press, 2011); M Marder, *Plant-Thinking: A Philosophy of Vegetal Life* (Columbia University Press, 2013).

sentience, however, has recently been gaining momentum.[39] Interestingly, the growing scientific interest in plant sentience appears paralleled by an even faster growing interest in the question of artificial sentience in robots and machines. Theoretical and experimental investigations on the sentience of artificial intelligences, accompanied by formal considerations of robots as moral agents with their own rights, have increased rapidly in recent years.[40] Sentience, it appears, is bursting out of the confines within which it was previously construed, while also entering the legal discourse.

In 2008, the Swiss Government's Federal Ethics Committee on Nonhuman Biotechnology (ECNH) published a report titled 'The Dignity of Living Beings with Regards to Plants'.[41] The document followed the *Federal Act on Non-Human Gene Technology* (known as the *Gene Technology Act*),[42] which stated, in art 8, that '[i]n animals and plants, modification of the genetic material by gene technology must not violate the dignity of living beings.'[43] The 2008 report expressly issued a series of guidelines and recommendations for the ethical treatment of plants. As far as the authors are aware, this is the first legislative initiative to mandate 'moral consideration of plants for their own sake.'[44] The theoretical background that led to the ECNH recommendations was fed by recent findings in the biological sciences, providing increasing evidence that plants are sensitive organisms, not mere objects.[45]

Michael Marder suggests that the de-objectification of plants is a necessary step toward the articulation of the inherent worth and dignity of this entire taxonomic kingdom of non-human living *others*.[46] Marder argues that the idea that plants should have rights derives from the philosophical recognition of 'plant subjectivity'.[47] However, Marder continues, the acknowledgment of plants as not mere objects is not a common feature of the modern (and, we may add, even of the post-modern) mind. For example, Anthony Trewavas, one of the pioneers of plant neurobiology, in *Plant Behaviour and Intelligence*, explains how scientists have long underestimated plants, particularly with respect to matters of intelligence, sentience and agency; notwithstanding, Trewavas writes, in the foreword to his seminal text, that 'flowers must rank as some of the most beautiful *objects* [emphasis added] on this planet.'[48] Although using highly effective prose – enriched by quotations from Shakespeare, Robert Burns, and Dylan Thomas among others – to emphasize the range of aesthetic meanings that plants have historically had for humanity. Emblematically, Trewavas still fails to escape the cultural construction of plants as (certainly beautiful) objects of scientific exploration.[49]

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[38] In 1973, the book *The Secret Life of Plants* by Peter Tompkins and Christopher Bird claimed that plants were sentient beings. While it certainly captured the public imagination at the time and continues to do so even today, much of the 'science' described in the book has not withstood the test of reproducibility - one of the main principles of the scientific methods. Over the years, several scientists have tried to reproduce the research experiments described in the book, but without any success. See P Tompkins and C Bird, *The Secret Life of Plants* (Harper, 1973).

[39] An invited presentation on the current status of the science of plant 'consciousness' was delivered as part of a workshop titled "Consciousness - here, there, everywhere? The prospects for panpsychism", held in Byron Bay, Australia, in August 2014. The workshop was a satellite event for the Association for the Scientific Study of Consciousness.

[40] For examples, see J Robertson, 'Human Rights vs. Robot Rights: Forecasts from Japan' (2014) 46 *Critical Asian Studies* 571-598; H Ashrafian, 'Artificial Intelligence and Robot Responsibilities: Innovating Beyond Rights' (2015) 21 *Science and Engineering Ethics* 317–326; H Ashrafian, 'AIonAI: A Humanitarian Law of Artificial Intelligence and Robotics' (2015) 21 *Science and Engineering Ethics* 29-40.

[41] ECNH, *The dignity of living beings with regards to plants. Moral consideration of plants for their own sake*, Federal Ethics Committee on Non-Human Biotechnology, accessed on June, 15, 2105, http://www.ekah.admin.ch/fileadmin/ekah-dateien/dokumentation/publikationen/e-Broschure-Wurde-Pflanze-2008.pdf.

[42] 814.91 Federal Act of 21 March 2003 on Non-Human Gene Technology (*Gene Technology Act*, GTA).

[43] Ibid.

[44] As indicated in the subtitle of the ECNH's report, 'The dignity of living beings with regards to plants.'

[45] For a comprehensive and up-to-date review of the field, see A Trewavas, *Plant Behaviour and Intelligence* (Oxford University Press, 2014); R Karban, *Plant Sensing and Communication* (University of Chicago Press, 2015).

[46] Marder, above n 34, 179-188.

[47] M Marder, 'The time is ripe for plant rights' (*Aljazeera*, 21 January 2013).

[48] Trewavas, above n 43, vii-viii.

[49] See also M Gagliano, 'In a green frame of mind: perspectives on the behavioural ecology and cognitive nature of plants' (2015) 7 *AoB Plants* 75.

However, recent research has been able to show that plants exhibit sophisticated abilities to actively perceive, assess, learn, remember, solve problems, make decisions and communicate with each other by acquiring information from their environment, all indicators of human and non-human sentience.[50] Two recent studies published in 2014 are of particular relevance in addressing even more directly the issue of plant sentience.[51] The first study demonstrated perceptual awareness and memory in plants by measuring the defensive leaf-folding behavior of the sensitive plant *Mimosa pudica* in response to repeated physical disturbance. The second study showed that *Arabidopsis* plants respond to the sounds that caterpillars make when eating other plants and use these 'feeding vibrations', which are transmitted from tissues far removed from the direct site of attack, to increase their chemical defences. Both cases – the rapid closure of *Mimosa*'s delicate leaves and the increase of chemical artillery of *Arabidopsis* – represent clear examples of calculated responses to the impending threat of a predator's harm. In the case of *Mimosa*, for example, the experimental data clearly show that the individual plant does not simply react (in a somewhat instinctive and pre-determined manner) to the immediate stimuli available from the surrounding environment. Instead, the plant assesses a present situation and *preferentially* engages in behavior that appears to be successful from its individual perspective, thus exhibiting a behavioral tendency to approach or avoid similar situations. Examined together, these findings reveal advanced cognitive competences, which are generally attributed exclusively to humans (and, increasingly, to some non-human animals).[52]

CONCLUSION

What does this emerging discourse that recognizes plants as sentient beings mean for Earth Jurisprudence, and for the intersection between the rights of nature and animal rights discourses? Firstly, sentience clearly appears as a cultural construct with a negotiated scientific meaning that exists in a constantly shifting scientific paradigm. If the scientific world is now ready to attribute sentience to plants, then the question arises whether the posited (and inherently socially artificial) boundaries of sentience are just as arbitrary as Descartes' famous dichotomy between the mind (of which, for Descartes, only humans were possessed) and matter (the rest of the universe, including all non-human living *others*).[53] More importantly, the attempt to establish moral universal principles based on historical (and thus inherently particular) cultural constructs is problematic. Sentience, therefore, may not be the most effective basis for an argument that extends rights to non-human entities.

Secondly, far from being a modern re-enactment of universal 'laws of nature', the project of Earth Jurisprudence is a modern invitation to question any absolute foundation of knowledge. Descriptive statements about 'nature' (traditionally, the realm of science) and prescriptive assertions about human behavior (traditionally, the terrain of law) are recognized as inextricably intertwined and co-dependent. In this sense, nature is neither seen as an eternally external *referent* to the system of human cognition, nor is it seen as an immutable reality that human knowledge only ever approximates. Instead, while all meaning is inherently contingent, it is also inscribed within a universe that forms that ultimate term of reference of human knowledge and sustainable human governance systems.

A cautionary principle that originates from the recognition of an intrinsic 'interest to exist' of all things (living and non-living) may be a more appropriate starting point to establish legal and governance structures that are in line with the operating principles that science construes in its observation of the universe. Furthermore, rather than operating in a fixed paradigm, where knowledge of the universe is a somewhat stable quantity, the invitation to an Earth Jurisprudence is also an invitation to inhabit a

[50] Ibid.
[51] M Gagliano et al., 'Experience teaches plants to learn faster and forget slower in environments where it matters' (2014) 175 *Oecologia* 63-72; H M Appel and R B Cocroft, 'Plants respond to leaf vibrations caused by insect herbivore chewing' (2014) 175 *Oecologia* 1257-1266.
[52] M Gagliano and M Marder, 'What Plant Revolution would you opt for?' (*LA Review Books Blog*, November 2014).
[53] See, for example, B Russell, *The History of Western Philosophy* (Simon & Schuster, first published 1945, 1967 ed).

dynamic reality, whereby the non-human other is constantly re-imagined. Therefore, the attribution of legal agency to the non-human other operates more effectively as a theoretical premise, rather than being based on a contextual and contingent concept such as sentience.

Finally, the inherent contingency of meaning described above may overwhelm any prospective scholar of Earth Jurisprudence with an intellectual paralysis in front of the enormous (and possibly amorphous) possibilities it entails. It is in this sense that a more established animal rights tradition can provide support and assistance, by indicating a path well trodden to engage in a continuing normative dialogue with the great *other* with which we share this existence.

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