JULIAN RAXWORTHY

BORN TO BE WILD:
HEAT LEAKS, AND THE WRONG SORT OF REWILDING

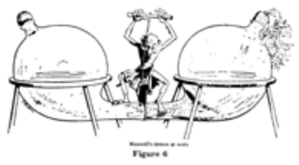


Figure 6

Julian Raxworthy is a Lecturer in the Master of Landscape Architecture program at the University of Cape Town. He completed his PhD with the University of Queensland, Australia in 2013, concerning the relationship between gardening and landscape architecture, in regard to change. He co-edited *The MESH Book: Landscape & Infrastructure*, and co-authored *Sunburnt: Landscape Architecture in Australia*.

+ THERMODYNAMICS, ECOLOGY, DESIGN

Rewilding, which George Monbiot describes as "the re-introduction of animal and plant species to habitats from which they had been excised," would seem at first glance to be a very Anthropocene concept which, like geoengineering, accepts that since we have already modified the environment ecologically we can, or rather must, continue to intervene deliberately.[1] But either way, to intervene or not intervene still rests upon an ideological sub-division of nature and culture. Instead of imposing an ideological overlay on ecological process, in this essay I propose using energy–described in thermodynamic terms–as a language that unites (and indeed does not distinguish between) people and the environment. Seen in terms of energy, I use the practices of Dutch artist Louis Le Roy and English scientist-gardener Geoffrey Dutton in their 'gardens', as examples of how gardening can be a model for working productively with existing ecological processes.

I refer to the preference for a particular date-stamped state of the environment (for rewilding, the pre-human) as ideological because it assumes that there is a right and a wrong state, whereas ecology teaches us that everything is ecological, regardless of what humans might think about it. From my own experience of the Gondwanan colonies (Australia, South America and, more recently, South Africa), this ideology can be commonly seen where ecological restoration welcomes regeneration–when its ideological frame is redemption–since it is concerned with restoring an indigenous order, but is undesirable when such spontaneous vegetation is non-indigenous "weeds," which are nonetheless an ecological response. From my Gondwanan perspective, Monbiot's view of wilderness is nostalgic because it fails to recognize that even seemingly pristine pre-white settlement wildernesses were in fact manipulated in a way that resembles gardening. In the Amazon, for example, plants were introduced into created forest clearings and then abandoned,[2] while in Australia, Aboriginal people used fire to manipulate grasslands to encourage macropod grazing.[3] Both these practices work economically with existing landscape processes to spontaneously create the same ecological outcomes as rewilding. In them, plants occupy niches on the basis of entirely non-ideological thermodynamic transfer processes that are already operational in ecological systems responding to disturbance in an ongoing fashion.

Thinking thermodynamically is a useful way to think about ecology because it removes the limits around systems, including the limits that are overlaid by particular ecological ideologies about what the appropriate ecological state is. When Monbiot says that "the ecosystems that result are best described not as wilderness, but as self-willed: governed not by human management but by their own processes,"[4] this suggests that human intervention is somehow assisting the teleological desires of nature. Thermodynamics instead focuses on flow throughout the broader energy system across ecological states and welcomes the unintended consequences from state change as a description of the ecological system, rather than of a particular "order" or "material organization." Seen in the light of constant and irreversible state change, the desire for a particular ecological order is the creation of a boundary around an ecology; however, this is impossible because energy *leaks* from a given system of any type to the systems surrounding it.

Dutch artist and teacher Louis G. Le Roy noted that "for anyone who thinks and works ecologically, the most important aspect is the management of energy."[5] Between the late 1970s and his death in 2012, Le Roy constructed what he called an "Ecocathedral," near Heerenveen in the Netherlands, from recycled masonry salvaged from dumping by the local council. Artfully stacked by hand without tools or mortar, and leaving gaps for "nature," over 30 years an empty agricultural field became a biodiverse forest due to a combination of naturalization of introduced species and spontaneous vegetation that thrived in the diverse microclimates created by the brick stacks.

Le Roy was inspired by a book by Nobel Prize–winner Ilya Prigogine and Isabelle Stengers entitled *Order out of Chaos*, which concerns the thermodynamics of nonequilibrium systems, of which life is an example.[6] Since energy is never destroyed, "thermodynamics" essentially refers to how energy is transferred. This is called the First Law of Thermodynamics, which accompanies a change of state of the energy, from water to steam, for example. The Second Law of Thermodynamics describes how "entropy" increases as this change of state occurs. Entropy is often called "disorder" but it could really be described as a change in utility. This is because the application of thermodynamics originally aimed at limiting these state changes to get as much use (or work, as it is called) out of the energy as possible, classically in a steam engine. Theoretically, entropy increases until the system reaches equilibrium, when it becomes static or unchanging.[7] However, no system can truly reach equilibrium because, according to the First Law, the energy keeps transferring.[8] While this was a problem for classical thermodynamics, for Le Roy it was a welcome, unifying factor that linked the actions of man to the environment, so that he saw his own energy expenditure in stacking resulting in growth and ecological complexity (both as biodiversity and diversity of microclimates) of the Ecocathedral.

In scientific terms, Prigogine and collaborator Dilip Kondepudi use the notion of *local equilibrium* as a way of literally measuring entropy, which relies on considering variables as functions of position and time, treating a moment as an autonomous system before it again changes state, when it becomes another system with different properties.[9] Thought of in this way, as Erwin Schrödinger writes, "entropy is itself a measure of order."[10] At the Ecocathedral, Le Roy then is *forming entropy*, a role that Luis Fernández-Galiano ascribes to architecture, which "can be understood as a *material* organization that regulates and brings order to energy *flows*."[11] However, Kondepudi and Prigogine's use of local equilibrium is really a conceptual convenience, like focusing on a lifeboat at sea, because energy is continually leaking from one system to another. Thus, while an organism seems bounded, autonomous, it "maintains itself stationary at a fairly high level of orderliness [that] really consists in continually sucking orderliness from its environment."[12] Correspondingly, the order in a system is a leak from another system, across a state change boundary. Thus, the best that can be described in an ordered way is not the thing itself, but its form in a moment of change, as its energy moves through time and space, something which Sanford Kwinter discussed in relation to Boccioni and the Futurists.[13] This notion of leakiness demonstrates that the maintenance of an ideological boundary condition around an ecological system is an attempt to constrain it in the face of its flux, which is the very thing the discourse of ecology arose to describe in the first place.

By focusing on the biodiversity of a particular historic moment, like the Pleistocene, rather than accepting that ecological systems are already operating in a normal manner, rewilding is making choices that represent a kind of cultivation, ostensibly gardening – a term that I, unlike many landscape architects, do not use pejoratively.[14] Monbiot, however, sets up rewilding specifically in opposition to conservation practices that he regards as gardening: practices that treat nature as a museum and expend energy trying to keep it in a particular state. Le Roy's use of

plants (introduced and spontaneous) in the Ecocathedral is ruthless and pragmatic but, as the following suggests, arguably more "ecological:"

> Which plants are included in the system is in essence unimportant. It may be the original ones...if they can stick it out; if they can't, we'll introduce other ones indiscriminately as long as they can cope with their surrounds. In other words, I don't feel any need to create some plant-sociologically correct grouping artificially: what I want is artificial ecosystems.[15]

If one subscribes to the view that we currently occupy the Anthropocene epoch, then all ecosystems are artificial because the climate system that all ecosystems occupy is modified. Le Roy asserts that "because ecology claims to study the relational patterns of living creatures...and the environment, it is unthinkable that human beings should be excluded as creators! But increasingly human beings are being treated as spectators, while this passivity is in total contradiction with everything that is ecological."[16]

Le Roy's ecological pragmatism may allow a level of adaptation within the changing biosphere that could create novel[17] and, above all, useful ecologies by optimizing ecological niches through a gardening-like relationship to natural systems. Despite contrary suggestions, gardening is inherently ecological and its success relies on the practical catalyzation of ecological systems through gardening technique.[18] To embrace Le Roy's model is to embrace a thermodynamic pragmatism that is concerned with monitoring local conditions and intervening to increase complexity or achieve other effects.

Biomedical scientist and gardener Geoffrey Dutton would define this type of gardening practice as "marginal gardening." Like Le Roy, Dutton also saw an edgeless thermodynamic continuum between the energy of the sun, man, and the landscape:

> it is only the simple sunlight
> on a fence post
> out of the snow.
> and I come to set it upright
> at the cost
> of a single blow.
> then I leave them to the sunlight.
> one straight post,
> trodden snow.[19]

In the *Marginal Garden*, Dutton writes both about a type of garden that is marginal in terms of its location and ecology, and a type of gardening practice that could be described as marginal.[20] Dutton's garden (which was unnamed because he kept its location secret, but has been called "Duttonia" by another visitor)[21] is located in the Scottish highlands and was developed between the 1970s and Dutton's death in 2010. As a place, his garden was marginal because it was literally "at the edge of cultivation," occupying the climatic and ecological margin between a garden environment and the Arctic mountains. And further, because the existing site was already interesting, Dutton suggested it called for "marginal gardening," which "minimally differentiated [it] from its environment,"[22] requiring careful judgement about the degree of intervention:

> [I]n the jargon of ecology it was moribund and called for a healing hand. Still, restoration would invite, as always, 'meddling' (to employ a Jekyllian rebuke) and seeing what other kinds of plants would do: the deadliest temptation in a spot like this.[23]

1 George Monbiot, *Feral: Searching for Enchantment on the Frontiers of Rewilding* (London: Penguin Books, 2013), 14.

2 Philippe Descola, *In the Society of Nature: A Native Ecology in Amazonia* (Cambridge: Cambridge University Press, 1996).

3 Bill Gammage, *The Biggest Estate on Earth: How Aborigines Made Australia* (Sydney: Allen & Unwin, 2012).

4 Monbiot, *Feral: Searching for Enchantment on the Frontiers of Rewilding*, 15.

5 Louis G. Le Roy, "Coconut Palms," in E. Boukema & P.V. McIntyre (eds), *Louis G. Le Roy: Nature Culture Fusion* (Rotterdam: NAi Uitgevers, 2002), 36.

6 Ilya Prigogine & Isabelle Stengers, *Order out of Chaos* (London: Fontana, 1984).

7 Artist Robert Smithson famously described the resulting equilibrium state as a kind of "radical banality"–"a kind of architecture without values or qualities...if anything...a fact:" Robert Smithson, "Entropy and the New Monuments," in Nancy Holt (ed.), *The Writings of Robert Smithson* (New York: New York University Press, 1979), 9.

8 "Second Law thinking" has developed as a part of sustainability discourse to look at minimizing such transfers: S. Stremke, A. Van Den Dobbelsteen, & J. Koh, "Exergy Landscapes: Exploration of Second-Law Thinking Towards Sustainable Landscape Design," *International Journal of Exergy* 8, no. 2 (2011).

9 Dilip Kondepudi and Ilya Prigogine, *Modern Thermodynamics: From Heat Engines to Dissipative Structures* (Chichester: John Wiley & Sons, 1998), 87.

10 Erwin Schrödinger, *What Is Life?: The Physical Aspect of the Living Cell with Mind and Matter and Autobiographical Sketches* (Cambridge: Cambridge, 1992), 73.

11 Luis Fernández-Galiano, *Fire and Memory: On Architecture and Energy*, trans. Gina Cariño, *Writing Architecture* (Cambridge, Massachusetts: The MIT Press, 2000), 5. And "simultaneously and inseparably, as an energetic organization that stabilizes and maintains material forms."

12 Schrödinger, *What Is Life?*, 73.

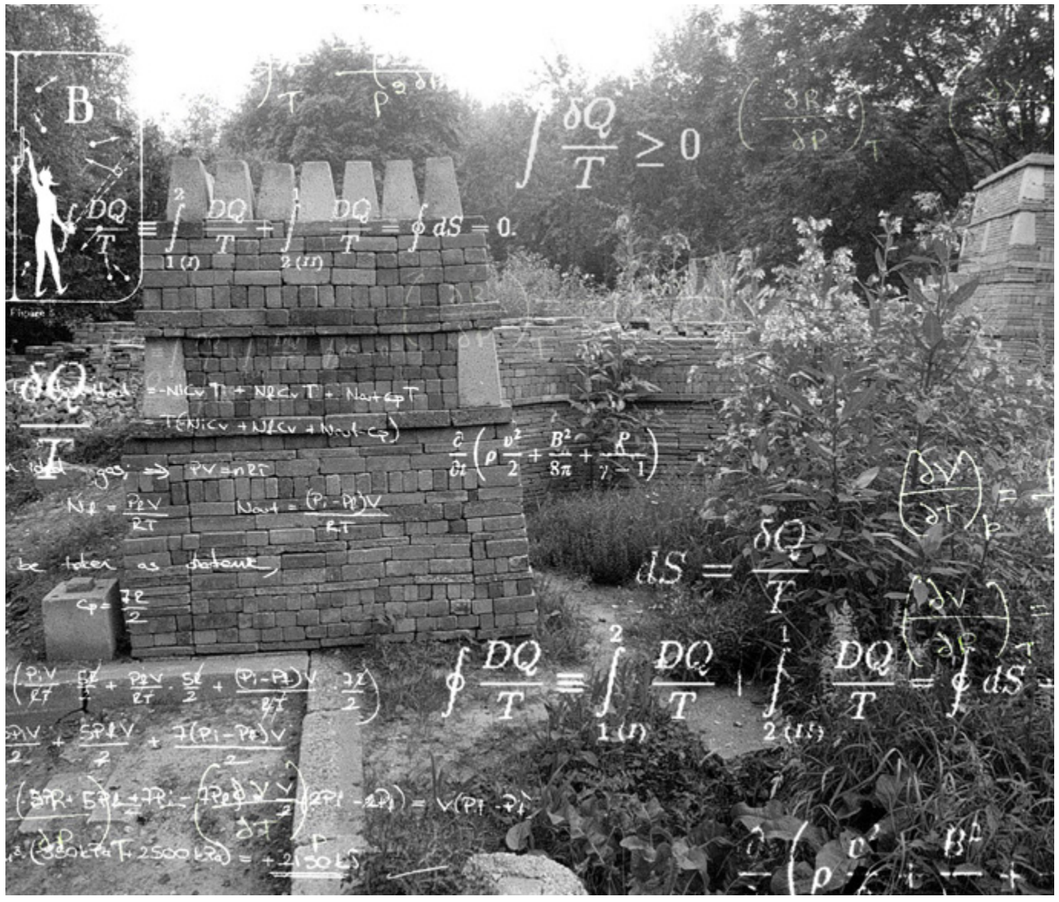
13 Sanford Kwinter, "Landscapes of Change: Boccioni's Strati D'animo as a General Theory of Models," *Assemblage* 19 (1992).

14 I discuss the vital role that gardening can play to achieve unique spatial effects beyond a landscape design in Julian Raxworthy, "Gardening Forms: Landscape Architecture and Gardening in Sven-Ingvar Andersson's Garden at Marnas," *Journal of Landscape Architecture* 12 (2011).

15 Le Roy, "Coconut Palms," 36.

16 Louis G. Le Roy, "New Value," in E. Boukema & P.V. McIntyre (eds), *Louis G. Le Roy: Nature Culture Fusion* (Rotterdam: NAi Uitgevers, 2002), 68.

17 Emma Marris, *Rambunctious Garden: Saving Nature in a Post-Wild World* (New York: Bloomsbury, 2011).



Louis Le Roy's "EcoCathedral."

Geoffrey Dutton's "Duttonia."

Dutton's definition of marginal gardening is useful both because he, like Le Roy, used energy as model and criteria for considering action in relation to its result, and also because it gives a name to the kind of practice that rewilding is, recognizing that it is a gardening-like intervention that works with systems. Dutton's model of marginal gardening is focused on accepting the site as already operational or active thermodynamically and any change should be "minimally costed in gardener's energy."[24] Such meddling needs to be economical because, as he explains, "the natural forces operating here are so violent, the vegetation exploiting them so precisely selected, and the biological equilibrium therefore so finely poised, that a gardener is rapidly taught humility."[25] This sense of biological equilibrium recalls Prigogine's consideration of the organism amongst the laws of thermodynamics, when Dutton describes the cell as a membrane moderating the environment: "this island in the flux was thereby enabled to create its own flux, interdependent with the external one; it became a living system extracting energy from its environment for its own maintenance and growth."

Once one takes on a thermodynamic approach to energy, the questions that I am arguing plague rewilding–primarily concerning the contradiction between ideological preference for "original" conditions and a dispassionate, practical assessment of ecological change–disappear. Like Kondepudi and Prigogine's definition of local equilibrium, Dutton takes a calm and pragmatic view of the form of the garden as a provisional state of energy at a particular point in time, and thus "a marginal garden can be made anywhere and to any degree of formality, consistent with minimal input of energy."[26] Recognizing a plant is an organism that exercises a level of judgement about its locations in terms of how it responds to it (what Michael Marder would call "plant thinking"),[27] Dutton sees native plants that might seem to be the secret of the marginal garden as "satisfying but infuriating creatures. The infuriating part is when you find out–while your back has been turned–the 'natives' have gone: either vanished into carbon dioxide, or busy invading their neighbour's territory, with havoc on both sides."[28] Rather than downplaying intervention in the marginal garden, like Le Roy, intervention, however slight, is the key because it activates the site: "[the marginal garden] is not differentiated from the wild (until it has) some other manifestation of the gardener's intent."[29] The specificity of the interaction between the act and the reaction of the environment is a feature of marginal gardening, as it is of rewilding; and while the latter rejects gardening, I would argue that, in Dutton's terms, it is an appropriate description of how rewilding can operate.

In this essay I have sought to embrace the willfulness and magnitude of the concept of rewilding but to reject its nostalgia for a pre-human ecological condition. This is necessary because while ecology will be the tool for rewilding, in itself ecology has no preference for a particular state apart from that which works. To avoid such ideological overlays on ecology while embracing the ambition and magnitude of rewilding, I have instead adopted thermodynamics as a more neutral way of describing ecological systems that highlights their flux. By using the work of Le Roy and Dutton as case studies I have sought to demonstrate that acting economically and optimizing the effects of thermodynamic transfer is a model that could be used for rewilding. Taking a designerly, but nonetheless ethical, view of these kinds of interventions allows for a liberation of energy and the development of exciting and novel ecologies that move landscape design to act on systems in a way that resembles the notion of gardening it rejects.

18 Stefan Buczaki, *Ground Rules for Gardeners: A Practical Guide to Garden Ecology* (London: Collins, 1986).

19 Anne Stevenson, "Geoffrey Dutton Obituary," *The Guardian*, http://www.theguardian.com/science/2010/jul/20/geoffrey-dutton-obituary (accessed 20 June 2014).

20 Geoffrey Dutton, *Some Branch against the Sky: The Practice and Principles of Marginal Gardening* (Devon: David & Charles, 1997).

21 Alec Finlay, "Duttonia: Framed Wilderness," Skying, http://skying-blog.blogspot.com/2011/12/duttonia-framed-wilderness.html (accessed 20 June 2014).

22 Dutton, *Some Branch against the Sky*, 166.

23 Ibid., 14.

24 Ibid., 166.

25 Ibid., 14.

26 Ibid., 167.

27 Michael Marder, *Plant-Thinking: A Philosophy of Vegetal Life* (New York: Columbia University Press, 2013).

28 Dutton, *Some Branch against the Sky*, 122.

29 Ibid., 165.