

5 What about My Pineapples? The Wicked Implications of Nonlinearity, Embedded Systems, and Transformative Social Goals

KAITLIN KISH

In early 2017, I acted as guest editor for a special issue of *Alternatives Journal (AJ)*, a Canadian academic transfer journal for environmental issues. The issue was a follow-up to the Canadian Society for Ecological Economics's 2015 biennial conference in Vancouver, BC. Our main objective was to disseminate the underlying principles and applications of ecological economics to the broader environmental community. During this time, I learned that editors of academic transfer journals have a difficult task; they need to be a certain degree of expert on a different topic for every issue of their journal. The *AJ* editor at the time, Leah Gerber, took this task very seriously. Over the months of development, Gerber and I spent hours talking about degrowth, agrowth, and low-growth economics. We discussed ecological economic philosophy, toolkits, and places where it has been implemented successfully. As our publishing date neared and we were having a final meeting on the structure and organization of the issue, Gerber seemed dissatisfied.

I asked her what she thought was missing. After a moment's pause she turned to me and said: "What about my pineapples?"

The framing of this question has stuck with me ever since. Gerber was tapping into a problem that few environmentalists engage with openly and honestly: what are the trade-offs we'll have to make by living in a more sustainable way? After telling Gerber that her children, or maybe her children's children, are likely to eat pineapple as only a very special treat, if at all, we went on to discuss the wider implications of her question.

It's easy for environmentalists to look at supply chains and see that it might be difficult to have access to pineapples in a sustainable society as we reduce the amount of unnecessary transportation. It is more difficult for environmentalists to see the "supply chain" of abstract concepts that hold a great deal of power and importance in our modern lives such as freedom, individual rights, and relative peace.

This is primarily because, ever since the early 1700s, these concepts have come to define every moment and thought in our modern, Western lives. They

have become the ideals that we strive to uphold and maintain. They are the fundamental rights and responsibilities of all citizens. So, it is very difficult to step back and see the evolution of such entrenched and ingrained concepts in our lives, and even more difficult to consider that our well-intentioned sustainability agendas might undermine them.

In this chapter I break this argument down into three pieces. I start by telling the story of how the neoliberal growth agenda has fuelled and empowered our progressive and liberal thoughts. While liberal environmentalists tend to rail against the inequality and biospheric degradation associated with neoliberal economics, it has helped us to obtain unfettered access to pineapples and less innocuous commodities such as child care and health care. Using a complex systems perspective in conjunction with the sociological notion of the base-superstructure heuristic, I then discuss why it is difficult to unwind growth and social progress. Undermining the transportation system that gives us access to pineapples may not lead to any significant discomfort, but undermining the consumer system that funds child care and therefore women's access to the workplace is much more complicated and uncomfortable. This argument was first drawn out by Quilley (2013), who argued that "degrowth is not a liberal agenda" because cultural patterns of thought and institutional structures are not freestanding. I will end with some examples demonstrating the kinds of trade-offs we need to begin to deal with and contemplate.

There are, of course, those with far less privilege who are unable to ask questions about pineapples, transportation systems, child care, and health care. These are questions that befall to those who have benefited the most from progress and contributed the most to associated problems. Canada imports most of their pineapples from Costa Rica, where farming practices are unsustainable, there are regular human and labour abuses, and wages are too low to meet minimum living costs, all to keep costs lower for the top 20 per cent of the population who do not want to pay the real cost of a pineapple (Lawrence, 2010). This is not a problem isolated to pineapples – again and again we see the privileged top 20 per cent of the world use the rest of the world to keep living standards high all while generating the highest ecological footprints.

This chapter represents a challenge to those living in this top 20 per cent. What kinds of discomforts will we need to make our reality to make the world a more sustainable, just, and equitable place?

How Progress Binds Our Thought

Since the Industrial Revolution, growth has dominated world history and human behaviour (Jackson, 2009; Victor, 2008). As the global commitment to growth was solidified, so too were patterns of thought supporting such a system, and institutions to uphold the realization of growth. Growth emerged

alongside of, and relied upon, the process of individualization and movement towards individual rights (Beck, 1992; Giddens, 1987). Undercutting complex societal systems (i.e. actions by environmentalists to avoid limits) may undermine the social progress that has come to define a great deal of Western ideals. This history, from the field of sociology, provides a widely accepted framework for understanding the role of social dynamics within discourse and politics.

Karl Polanyi argued that the central dynamic during the early shift into modern society, was the disembedding of economic activities as a distinct domain, separate from cultural ties (1944). As peasants and families moved from farms into cities, livelihoods came to be structured around individual incentives for economic gain, rather than being oriented towards community and kin. In premodern societies the economy was not a separate domain – individual livelihood was motivated by ongoing patterns of social life. Polanyi argued that the disembedding of economic activity “freed” the individual from family and kin obligated relationships. This was a revolution for the rights of the individual. Modernization is characterized by this emergence of new markets:

Not blood tie, legal compulsion, religious obligation, fealty or magic compel participation in economic life, but specifically economic institutions such as private enterprise and the wage system (Polanyi, 1971, p. 81).

Separation from land and kin ties allowed for individual mobility, enabling more and more people to become part of the emerging industrial complex. As industrialism and the industrial workforce grew, groups of people began living in conveniently located clusters to access work. This was the early beginning of industrial cities. Cities were filled with “frantic bustle, rife with egoism and alienation from neighbours” (Kumar, 1991, p. 67). Cities created the conditions for multicultural exchanges and tolerance of ideas, faiths, and cultures leading to a growing number of distinct social roles and a shift in the I/We balance, towards the “I” (Elias, 2014).

The combination of migration associated with the enclosure movement and freedom to pursue new activities (such as moving to the city to participate in the industrial revolution) removed any functional attachment to group/kin membership. Peasants were morphed into individualized, free-agent wage labourers who required support and security provided by the state. While individuals had previously been taken care of in times of need by their community and family members, these obligations shifted to the state – starting with labour unions. Individuals needed to create networks to ensure their security, and in doing so shifted the burden towards the state to set up institutions, such as public safety standards and the welfare system. During the

industrial revolution we see more intervention of the state on the well-being and livelihood of the individual.

The individual is key. Rights, standards, security, and punishments were no longer family based. The public shaming of one's uncle no longer meant a stain on the family name for decades to come. Such shame was associated only with the individual; the rest of the family could easily distance themselves from that person. This way of thinking started to shape the way that we think about ourselves as members of an equal-access society. This is why, since the Industrial Revolution with exponential growth during the Great Acceleration, there was a rise in indicators of social progress (Pinker, 2012) such as labour laws, animal welfare groups, rights for the disabled, acceptance of alternative lifestyles, and women's emancipation. These indicators of a society firmly committed to acceptance and protection of the individual rose in tandem with consumption patterns, access to telecommunication networks, and environmental degradation. This has become the canon of Western society, and it is tied to the process of disembedding (people needed to move out of families to be considered individuals) and generation of the highly complex systems produced by modernization (to take place of the family). Thus, liberal commitments (and ideological attempts to make sense of one's self within the process of modernity – feminism, jihadism, Marxism, environmentalism) are intimately tied to capitalist modernity (Quilley, 2012), and consequently the high energy throughput society associated with industrialism.

The state assisted in setting up systems to ensure that the rights of the individual were upheld, but these systems were not free. Socially progressive systems of welfare and protection require money, infrastructure, and bureaucratic organization – all inputs that in turn require energy and order to create and maintain. These systems are therefore intimately coupled with high energy throughput, as a characteristic of, and supplied by, capital growth. There is a correlation between the hundreds of millions of commodities traded on the internet, the hundreds of thousands of distinct social roles, the mobility of both people and capital, the enormous expansion in regulatory infrastructure of the state, and the social-psychological process of individualization. These systems arose together, intimately entangling social progress with environmental degradation.

Nonlinearity is a key concept in the field of complex systems. Nonlinearity in systems means that we don't always know which way the system will tip – we can nudge a system in a certain direction but the vast complexity within a system as huge as health economics means we have no idea where the system may actually go (Berkes, Boulding, and Folke, 2008). From this standpoint alone, we can assume there will be unintended consequences of change in any system. Beyond that, complex systems studies also tell us that scale and nested complexity is important when considering the reaction of a system. If one

subsystem is reliant on another, and that higher ordered system is disturbed, then the lower-ordered system will also be disturbed. Environmentalists and proponents of a society of simplicity argue for a contraction in the larger system, often not realizing that it is in this larger system that their own arguments and progressive liberal commitments lie.

While the universe has an overall tendency towards unorganized chaos (entropy), pockets of order appear in localized areas. These pockets may have ever-increasing propensities towards organized complexity:

Certain factors – energy, matter, life, and complexity among them – appear to be self-potentiating: the more of them there is, the more powerful the impetus to the production of yet more. Left to its own devices without let or hindrance, such a tendency is liable to result in exponential growth (Rescher, 1998, p. 3).

Applying these ideas analogously, it can be said that human culture and current modes of experience (modernity) are one such pocket (Christian, 2011) and that proponents of degrowth need to find a way to internalize constraint in individuals and society to go against this, with two consequences. First, this increasingly ordered complexity requires the constant throughput of energy. For example, industrialization emerges only on the complex and technical repertoire of agrarian civilization, thereby increasing overall complexity. Second, the more complex the pocket becomes, the more energy is required to maintain complexity, making the ordered state fragile and potentially unsustainable. Historically, greater complexity at the level of human culture is, for the most part, achieved at the expense of order elsewhere in the biosphere (Odum, 2007). Complexity in any system always engenders entropic disorder out of that system; complexity and low entropy is achieved by exporting high entropy disorder (Daly, 1990; Georgescu-Roegen, 1975). Daly applies this to the process of production:

People can measure their throughput, or the rate at which the economy uses them, taking them from low-entropy sources in the ecosystem, transforming them into useful products, and ultimately dumping them back into the environment as high-entropy wastes (Daly 2005, p. 1).

Degrowth and environmentalism partially hinges on the allocation of low entropy resources between the biosphere and human culture. From a limits perspective, the growth in the scale and complexity of human activities is as astonishing as it is unsustainable. At the dawn of the human Odyssey, the human brain itself was possibly the most complex entity in the universe (Chaisson, 2001). Using a measure of free energy rate density measured in

ERGS per gramme per second, Chaisson contrasts the complexity of a galaxy (0.5), a planet (75), a typical plant (900), an animal body (20,000), a human brain (150,000), and modern society (500,000). He comments that it is “not surprising [sic] a group of brainy organisms working collectively is even more complex than the totality of its individual components” (Chaisson, 2001 p. 139). With language and culture, the network of connected brains engendered a step change in complexity, in turn accelerated by writing and the integration of human societies across the planet.

In an era of limits, this complexification cannot continue indefinitely, and we need to begin picking apart the system that has given us growth; this will mean that we also need to start picking apart and rethinking the system that has given us individual rights and social progress. There are other scholars who begin to touch on this problem. Most recently, Dan O’Neill published a paper that quantified the resource use associated with meeting basic human needs for over 150 countries and compared this to what is globally sustainable (2018). He found that there is currently no country that achieves a good life for its citizens at a level of resource use that could be extended to all people on the planet. Spash (2017) recognizes there is a tension between the idea that individuals have freedom to do whatever they please and the recognition that constraints on that freedom are required to achieve communal goals. Victor et al. recognize that degrowth would mean less investment opportunities, lower government tax revenues, withdrawal of social investment, job loss, and recession, and that this could be solved by investment in the “green economy” (2014). Ecofeminist perspectives recognize that gender relations in a post-growth world are “murky” (Bauhardt, 2014, p. 63) and that the care economy is vital, but the gendered nature of this is not explored in degrowth literatures. Likely, there would be an increase in demand for unpaid work in roles such as education and health care, and consequently a deeper focus on home economics, i.e. cooking and family. The question is – who would this be assigned to? Would it fall to women or would men take on unpaid work traditionally assigned to women? Will the unpaid sector remain undervalued and misunderstood?

Oh, the Thinks You Can’t Think!

The first question that comes to mind when the above argument is presented is: why not keep the social progress and throw away the consumer society that makes it so environmentally unsustainable?

Because the two systems evolved together, this is either difficult or impossible. Dr Seuss has misled generations of children with the claim of “oh the thinks you can think if you only try!” Rather, we are constrained by our cognitive and social reality. Marx expands on this:

In the social production of their life, men enter into definite relations that are independent of their will, relations of production which correspond to a definite stage of development of their material productive forces.

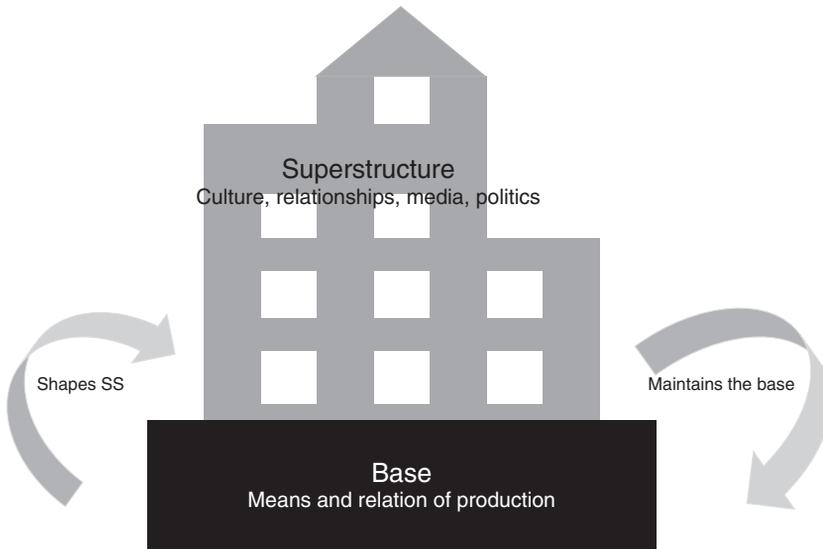
The sum total of these relations of production constitutes the economic structure of society, the real basis on which rises a legal and political superstructure and to which correspond definite forms of social consciousness. (Marx, 1964)

Our ideas and the way we speak are not random (Marx, 1964). They are intimately connected with one another and with social structures and institutions. How we create things, consume, and relate to one another (the social base) is intimately tied to media, culture, and politics (the superstructure). The base shapes and maintains the superstructure and the superstructure shapes and maintains the base (figure 5.1).

This is a metaphor associated with a brutal form of Marxism but begins to frame the problem of change quite well. While this metaphor suggests a determinism in society, I will frame it for this discussion as the base representing “conditions” or “limits” to the superstructure. Different people have interpreted this metaphor with varying degrees of literalness. Extreme Marxists view the base as a strong and deterministic force of production that “inevitably advance, and that this in turn leads to changes in society” (Harman, 1986). In this way, political and ideological struggles are seen as playing little to no role in social change because individuals are products of their circumstance; revolutions, wars, and arguments are already determined. The other side argues that Marx’s writing is devoid of fatalistic approaches to history; laying great emphasis on remarks from Engels:

Political, juridical, philosophical, religious, literary, artistic, etc. development is based on economic development. But these all react on one another and also upon the economic basis. It is not that the economic situation is cause, solely active, while everything else is only passive effect. There is rather interaction on the basis of economic necessity which ultimately always asserts itself (Engels, in Selsam and Martel, 1963).

Post-1956 new leftists argued that “the terms ‘base and superstructure’ were simply a metaphor, not to be taken too seriously. The reciprocal influence of the superstructure on the base meant that determination was not to be seen as a strict causal relationship” (Harman, 1986). After this, society was seen as having a number of different interacting structures, each developing at their own speed; for example, politics, economics, ideologies, linguistics. All these structures are influenced by the base and influence the base in a reciprocal formation.



5.1 The base/superstructure model

For environmentalists, I draw on this less deterministic metaphor of the base/superstructure. Despite the lack of strict determinism, this still means that as we change the material base of society (or shift to a new basin of attraction), our superstructure will also change, likely in unpredictable and non-linear ways. Environmental advocates of simplicity and low/no/degrowth may underestimate the wider implications of their visions for Western liberal society. For example, any large-scale increase in people working in agriculture might engender the kinds of feelings, priorities, and temporal orientations that peasant agriculturalists once had (Quilley, 2013) – that is, a life devoted to work with little consideration or time invested constructing one’s identity or contemplating the meaning of one’s life.

Progressive forms of social emancipation relating to class, gender, race and ethnicity, disability, and sexuality have been made possible by the base consisting of growth economics and by the expansion of social complexity, which is in turn dependent on harnessing cheap energy. The rights of individuals, characteristic of the enlightenment, mean that someone with a disability has the right to independent living – this requires complex structures of care, emergency communication methods, and complex technological production to provide necessary goods for individuals to be on their own.

All public goods and infrastructure depend upon tax transfers generated, at least partially, by consumption. At the same time, the trajectory of technological

innovation that has delivered everything from the internet to antibiotics is also inextricably bound up with expansive consumer capitalism. The patterns of social life, socialization, and identification that reproduce the individuals' characteristic of liberal societies – voters, citizens, rights holders, consumers – are themselves engendered by and dependent upon high and expanding flows of energy and materials. Successful environmental activism and/or exogenous shocks sufficient to undermine growth, would reduce the availability of cheap energy (although we would need less energy in general) and potentially force societies to shed layers of complexity (Kish and Quilley, 2017; Quilley, 2013; Zywert and Quilley, 2017). This would be devastating for taken for granted and cherished forms of social emancipation.

Anyone who takes limits to growth seriously and as such supports an agenda of low/no/degrowth seeks to alter the base while enjoying a great deal of the progressive superstructure. But the base and superstructure may coexist in a mutually defining feedback cycle.

The Complexity of Simplicity

Environmental advocates of simplicity or a low-growth system underestimate the wider implications for societies if their visions are realized. Progressive forms of social emancipation relating to gender, multiculturalism, disabilities, and sexuality are made possible, and upheld, by growth economics and the harnessing of cheap energy. Successful environmental activism and/or exogenous shocks that undermine growth reduce the availability of cheap energy and force societies to shed layers of complexity.

In this section I very briefly explore a few implications for Westerners of the above reasoning, particularly for women's emancipation. This discussion is not to say that women's emancipation and sustainability are necessarily mutually exclusive – rather, it is a challenge for simplicity advocates to think more broadly about the implications of their work and arguments on important areas of society. These are privileged challenges that we need to become critical of to decide what we really need and what we're willing to trade or make different.

In table 5.1 I have laid out modern social norms alongside the modern requirements that uphold them; any simplicity activism that undermines the modern requirements is threatening the norm. For a more detailed discussion of these relationships, see the paper “Wicked Dilemmas of Scale and Complexity in the Politics of Degrowth,” in which Quilley and I (2017) discuss these modern progressive norms that would potentially be undermined by low growth economics. Related and interesting discussions with far greater detail come most notably from Norbert Elias (2000) in *The Civilizing Process*, Steven Pinker (2012; 2018) in *The Better Angels of Our Nature* and his newest book *Enlightenment Now*, and Jeremy Rifkin (2009) in *The Empathic Civilization*.

5.1 Cherished modern norms and the social processes that uphold them

Norm	Definition	Developmental requirement	Modern Requirement
Internal peace and security	State's monopoly of violence; a general assumption of safety and state control of violence.	Effective nation-state (Elias, 2014); Imagined community (Anderson, 1991)	Police institutions; state funding; tax systems
Capital growth	Large trading partners and the right to accumulate wealth.	Individualization (Beck and Beck-Gernsheim, 2002)	Capitalism; high energy throughput; extended empathy
Social progress and rights	Increasing respect for marginalized groups.	Citizenship (membership based/exclusive) and/in tension with human rights	Gender emancipation; state child support; tax systems; birth control; secularization
Cosmopolitanism	Everyone is a member of a shared community with shared morality. Rise in literacy, mobility, and mass media.	Literacy, mobility, mass media (Giddens, 1990; Gellner, 1983) Effective states/markets	Cities; disembedding; individualization; educational institutions; bureaucracy
Science and rationality	Intensifying application of rationality, knowledge, and technological development.	Detribalization (Gellner, 1983) Integrated system of nation-states (Giddens, 1990)	Rationalization; secularization; educational institutions; bureaucracy; time/space abstraction; disembedding

Innovation, Health Care, and Women

Consumerism has become part and parcel of the very fabric of life in developed countries. Areas of life that are integral to livelihood that were once free of the marketplace, such as religion and family, now compete with consumerism. What we consume defines who we are as individuals, helping us to curate an identity that may once have been fully informed by our place in our community. As free-floating individuals, we are no longer prescribed an identity and so we spend a great deal of our lives struggling with what it means to be one's self. Corporations have seized this opportunity and capitalized on the deep insecurities of the modern individual, promising with each swipe of the credit card that they'll feel better about themselves. Consumerism has become the primary way in which people develop self-esteem and curate their world views (Arndt et al., 2004; Solomon, Greenberg, and Pyszczynski, 2004).

Consumer capitalism has proven itself very resilient, altered by corporations and advertising companies as times change. Companies are constantly required to focus on innovation to remain relevant and provide new products for consumers. One could see this as an honest pursuit of a better product for consumers or from a slightly more cynical perception that it is simply to make more money – an argument that is especially convincing when we look at new generations of iPhones and consider the extent to which the product was actually improved. Either way, innovation has become so important that it is touted by the world's top universities as their primary objective, and corporations will hire heads of innovation to ensure they're at the cutting edge. Innovation drives capitalism and capitalism supports innovation (Hans-Ruediger, 2014).

Problematically for environmentalists, the trajectory of technological innovation that has delivered useless iterations of the iPhone has also helped to produce antibiotics, state-of-the-art MRI machines, perfected the tools necessary for successful organ transplants, and much more. Innovation labs for health sciences are immensely energy intensive and expensive, making them inextricably bound up with expansive consumer capitalism (Zywert and Quilley, 2017). It is unlikely that we can separate consumer innovation from necessary and life-saving or emancipatory innovation. Therefore, it stands to reason that a more localized economy may see the loss of sophisticated (read: “high energy”) medications and health services such as birth control, which has given women enormous freedom over their bodies and lives. An IUD requires the creation of plastic and mining of copper, and pills require exact measurements of hormones in a laboratory – all of which require a lot of energy.

One could easily argue that there are very simple ways to have a reduced form of birth control, i.e. cycle tracking. Leaving aside the fact that this is just one example of many that will not have such a straightforward low-energy alternative, this energy footprint is not just embodied in the particular artefact or processes of development. The energy footprint of birth control is also distributed across the entire network of socioeconomic systems that are necessary platforms for their production – for example, these forms of birth control are highly associated with women's liberation and entry into the workforce (Heer and Grossbard-Shechtman, 1981; Goldin and Katz, 2002). They are, in other words, associated with what Odum refers to as high transformity values (Odum, 2007): “the systems of nature and society are interconnected in webs of energy flow” (M. T. Brown and Ulgiati, 2004). The transformity is the amount of one kind of energy that is required to make another kind of energy within that web.

This isn't the only way that women's rights could potentially be threatened by simplicity advocates. In Canada, provinces provide varying levels of child care subsidies or monthly child benefits. Most of the budget this comes from tax revenues provided by citizens and consumers. If we limit the amount of consumption and scale back the economy, we can expect to see a reduction in tax revenues; even if we increase tax rates or innovate how taxes work, we will

still almost certainly see less available income from social service spending. In this case, the government may no longer be able to provide subsidies for child care and/or child rearing. Child care has given women a great deal of freedom for returning to work and pursuing their careers. If, in a low-growth society, the government can no longer provide these subsidies, there would be fewer families with both parents working, or an urgent call for the re-emergence of “the village” in parenting. Since parents are often tied to the house, this role is typically associated with a reduction in freedom and the inability to pursue one’s individual need to self-explore, or as a less empowered option than joining the workforce. Simplicity advocates need to a) attempt to reframe this discourse, arguing instead that staying at home is a radical act as one removes themselves from the constraints of capitalism and work, and b) talk more openly about the relationship between a return to domestic work and environmental sustainability.

Conclusion

There are, of course, many creative and innovative ways to solve the problems I briefly engage with above. Women could end up better off in a low-growth scenario – we don’t know how this will shake out. Perhaps women will run governance structures or perhaps feminism will expand to include different forms of womanhood as empowering. However, only by facing these difficult questions head-on and recognizing that there will be trade-offs will we finally be able to talk about what a sustainable future really looks like. The actual consequences of a low growth economy are undeterminable, but examples like those above raise an interesting question: what is the smallest possible ecological footprint we can have that will support a minimum acceptable level of liberal and technological social progress?

This is a difficult question to answer, and we are unlikely to know before change is imperative. While these are real challenges, and low growth economics might be associated with the loss of some liberal institutions and technologies, there are possibly ways to prioritize. First, the loss of certain kinds of liberal freedoms could have both positive and negative consequences. For example, losing the right to unfettered mobility may limit an individual’s freedom, but may also increase a person’s sense of place, which develops ecological identity and extended empathy for a specific region. Ecological economics and degrowth are often associated with outcomes that make it difficult to know how these problems with change will manifest, such as decreases in issues of mental health (stress and anxiety), “the village” re-emerging in parenting, work taking a back seat to family, and overpasses turned into gardens as we limit car use.

By facing this difficult question, and exploring what we really value about life, we can begin to consider what kinds of trade-offs we might face in exchange for living in a more sustainable future.

REFERENCES

- Anderson, B. (1991). *Imagined communities: Reflections on the origin and spread of nationalism*. New York, NY: Verso.
- Arndt, J., Solomon, S., Kasser, T., & Sheldon, K. M. (2004). The urge to splurge: A terror management account of materialism and consumer behavior. *Journal of Consumer Psychology, 14*(3), 198–212. https://doi.org/10.1207/s15327663jcp1403_2
- Bauhardt, C. (2014). Solutions to the crisis? The green deal, degrowth, and the solidarity economy: Alternatives to the capitalist growth economy from an ecofeminist economics perspective. *Ecological Economics, 102*, 60–8. <https://doi.org/10.1016/j.ecolecon.2014.03.015>
- Beck, U. (1992). *Risk society: Towards a new modernity*. Thousand Oak, CA: SAGE.
- Beck, U., & Beck-Gernsheim, E. (2002). *Individualization: Institutionalized individualism and its social and political consequences* (1st ed.). London; Thousand Oaks, CA: SAGE Publications Ltd.
- Berkes, F., Colding, J., & Folke, C., Eds (2008). *Navigating social-ecological systems: Building resilience for complexity and change* (1st ed.). Cambridge, UK: Cambridge University Press.
- Brown, M. T., & Ulgiati, S. (2004). Energy quality, emergy, and transformity: H.T. Odum's contributions to quantifying and understanding systems. *Ecological Modelling, through the MACROSCOPE: The Legacy of H.T. Odum, 178*(1), 201–13. <https://doi.org/10.1016/j.ecolmodel.2004.03.002>
- Chaisson, E. (2001). *Cosmic evolution: The rise of complexity in nature*. Cambridge, Mass.: Harvard University Press.
- Christian, D. (2011). *Maps of time: An introduction to big history*. Berkeley, CA: University of California Press.
- Daly, H. E. (1990). Toward some operational principles of sustainable development. *Ecological Economics 2*(1), 1–6. [https://doi.org/10.1016/0921-8009\(90\)90010-R](https://doi.org/10.1016/0921-8009(90)90010-R)
- Daly, H. E. (2005). Economics in a full world. *Scientific American, 293*, 100–7. <https://doi.org/10.1038/scientificamerican0905-100>
- Elias, N. (2000). *The civilizing process: Sociogenetic and psychogenetic investigations* (2nd ed.). Oxford; Malden, Mass: Wiley-Blackwell.
- Elias, N. (2014). *The collected works of Norbert Elias*. (Revised ed.). Dublin, Ireland: University College Dublin Press.
- Gellner, E. (1983). *Nations and nationalism*. Ithaca, NY: Cornell University Press.
- Georgescu-Roegen, N. (1975). Energy and economic myths. *Southern Economic Journal, 41*(3), 347. <https://doi.org/10.2307/1056148>
- Giddens, A. (1987). *Social theory and modern sociology*. Stanford, CA: Stanford University Press.
- Giddens, A. (1990). *The consequences of modernity*. Stanford, CA: Stanford University Press.

- Goldin, C., & Katz, L. F. (2002). The power of the pill: Oral contraceptives and women's career and marriage decisions. *Journal of Political Economy* 110(4), 730–70. <https://doi.org/10.1086/340778>
- Hans-Ruediger, K. (2014). Handbook of research on consumerism in business and marketing: Concepts and practices. *IGI Global*. <https://doi.org/10.4018/978-1-4666-5880-6>
- Harman, C. (1986). Base and superstructure. *International Socialism*, 2(32): 3–44.
- Heer, D. M., & Grossbard-Shechtman, A. (1981). The impact of the female marriage squeeze and the contraceptive revolution on sex roles and the Women's Liberation movement in the United States, 1960 to 1975. *Journal of Marriage and Family*, 43(1): 49–65. <https://doi.org/10.2307/351416>
- Jackson, T. (2009). *Prosperity without growth: Economics for a finite planet*. London; New York: Earthscan.
- Kish, K., & Quilley, S. (2017). Wicked dilemmas of scale and complexity in the politics of degrowth. *Ecological Economics*, 44. <https://doi.org/10.1016/j.ecolecon.2017.08.008>
- Kumar, K. (1991). *Prophecy and progress: Sociology of industrial and post-industrial society*. Harmondsworth: Penguin Books Ltd.
- Lawrence, F. (2010). Costa Rica needs a new way of farming. *The Guardian*. Retrieved from <https://www.theguardian.com/global-development/poverty-matters/2010/oct/07/costa-rica-agriculture-development-pineapples>
- Marx, K. (1844). *The economic and philosophic manuscripts of 1844 and The Communist Manifesto* (1st ed.). Amherst, NY: Prometheus Books.
- Marx, K. (1964). *Karl Marx: Early writings*. New York, NY: McGraw-Hill.
- O'Neill, D. W. (2017). The proximity of nations to a socially sustainable steady-state economy. *Journal of Cleaner Production*, 108(A), 1213–31. <https://doi.org/10.1016/j.jclepro.2015.07.116>
- Odum, H. T. (2007). *Environment, power, and society for the twenty-first century: The hierarchy of energy*. New York, NY: Columbia University Press.
- Pinker, S. (2012). *The better angels of our nature: Why violence has declined*. (MP3 Una ed.). Brilliance Audio on MP3-CD.
- Pinker, S. (2018). *Enlightenment now: The case for reason, science, humanism, and progress*. New York, NY: Viking.
- Polanyi, K. (1944). *The Great Transformation: The political and economic origins of our time*. Garden City, NY: Beacon Press.
- Polanyi, K. (1971). *Primitive, archaic, and modern economies: Essays of Karl Polanyi*. Garden City, NY: Beacon Press.
- Quilley, S. (2012). System innovation and a new 'Great Transformation': Re-embedding economic life in the context of 'de-growth.' *Journal of Social Entrepreneurship*, 3(2), 206–29. <https://doi.org/10.1080/19420676.2012.725823>
- Quilley, S. 2013. De-growth is not a liberal agenda: Relocalisation and the limits to low energy cosmopolitanism. *Environmental Values*, 22(2), 261–85. <https://doi.org/10.3197/096327113X13581561725310>

- Rescher, N. (1998). *Complexity: A philosophical overview*. Piscataway, NJ: Transaction Publishers.
- Rifkin, J. (2009). *The empathic civilization: The race to global consciousness in a world in crisis*. (1st ed.). New York, NY: Tarcher.
- Selsam, H., & Martel, H. (1963). *Reader in Marxist philosophy*. New York, NY: International Publishers Co.
- Solomon, S., Greenberg, J. L., & Pyszczynski, T. A. (2004). Lethal consumption: Death-denying materialism. In T. Kasser and A. D. Kanner (Eds), *Psychology and consumer culture: The struggle for a good life in a materialistic world*, (pp. 127–46). Washington, DC: American Psychological Association. <https://doi.org/10.1037/10658-008>
- Smash, C. (2017). The need for and meaning of social ecological economics. *Multilevel Governance and Development*.
- Victor, P. A. (2008). *Managing without growth: Slower by design, not disaster*. Cheltenham, UK; Northampton, MA: Edward Elgar.
- Victor, P., Jackson, T., Drake, B., Kratena, K., & Sommer, M. (2014). Foundations for an ecological macroeconomics: Literature review and model development. WWForEurope Working Paper 65. Retrieved from <http://hdl.handle.net/10419/125724>.
- Zywert, K., & Quilley, S. (2017). Health systems in an era of biophysical limits: The wicked dilemmas of modernity. *Social Theory & Health*, 16(2), 188–207. <https://doi.org/10.1057/s41285-017-0051-4>