

Harold Glasser, Ph.D. & Professor, Environmental and Sustainability Studies
Executive Director for Campus Sustainability
1903 West Michigan Avenue
Western Michigan University
Kalamazoo, MI 49008-5286

o: 269.387.0942

e: harold.glasser@wmich.edu

w: <http://www.wmich.edu/sustainability/>

y: <http://www.youtube.com/user/WMUSustainability?feature=watch>

Toward robust foundations for sustainable well-being societies: Learning to change by changing how we learn

ABSTRACT

This chapter explores foundational issues around the meanings, measurement, creation, and continuous renewal of sustainable well-being societies. It begins with a probe into the long history of concern around advancing human well-being and follows with an inquiry into the deep roots of why sustainable well-being societies are not ubiquitous today. The role of three catalytic, historical revolutions – cognitive, agricultural, and industrial – in shaping the underlying metanarrative that guides the present is investigated. Four bedrock assumptions that form the core of the dominant, guiding metanarrative are identified and their role in both forging the status quo and impeding the development of sustainable well-being societies are discussed. While these cornerstones of the prevailing metanarrative may have had significant relevance for leveraging new opportunities and advancing quality of life in the past, they are no longer consistent with our knowledge of the state of the planet, the goals of sustainable well-being societies, or our survival as a species. Calls for large-scale, transformative change, which leverages human capacities for learning and modeling the change we seek, are spiraling. I argue that realizing these calls rests on three, intertwined building blocks: constructing new, life-affirming metanarratives, clarifying what we mean by sustainable well-being societies and how to measure them, and learning how to use broad heuristics to rapidly develop, prototype, and test promising social and technological innovations. The chapter concludes with sanguine examples that illustrate how meaningful, lasting change is already resulting from using these sorts of heuristics to create powerful new models that are displacing the existing model of reality, not by fighting it, but by making it obsolete – thus ushering in a fourth, sustainable well-being revolution.

(272 words)

Keywords: anticipatory decision-making, beliefs and action, common good, core competencies in learning for sustainability, first- and second-order change, guiding metaphors, human progress, interconnectedness, meanings and measurement of sustainable well-being, metanarratives, robust sustainability, root problem-solving, social learning, transformative change, wicked problems, UNESCO Decade of Education for Sustainable Development, UNESCO Global Action Programme, UN Sustainable Development Goals.

To appear in: Cook, Justin, ed. 2017. *Sustainability, Human Well-Being, and the Future of Education*. Basingstoke, UK: Palgrave Macmillan.

I. WELL-BEING CONCERN: A LONG VIEW ON THE HUMAN PREDICAMENT AND PROGRESS

As long as the people of your culture are convinced that the world belongs to them and that their divinely-appointed destiny is to conquer and rule it, then they are of course going to go on acting the way they've been acting for the past ten thousand years. They're going to go on treating the world as if it were a piece of human property and they're going to go on conquering it as if it were an adversary. You can't change these things with *laws*. You must change people's *minds*. And you can't just root out a harmful complex of ideas and leave a void behind; you have to give people something that is as meaningful as what they've lost – something that makes better sense than the old horror of Man Supreme, wiping out everything on the planet that doesn't serve his needs directly or indirectly.

(Quinn 1992: 249)

In this chapter, I explore foundational issues around the meanings, measurement, creation, and continuous renewal of sustainable well-being societies. My central premise is that the separation between how we currently behave as a species and exercising the “better angels of our nature”¹ is not limited by innate capacities or “human nature,” but by learning to recognize, liberate, and harness many of the latent capacities we do have in service of people and the planet. Learning how to leverage these capacities should start with probing the deep roots of why sustainable well-being societies are not ubiquitous today, not with trying to generate increased awareness, care, or concern, however important they are – as these already exist to a significant extent. In fact, ruminating on the conditions that enhance or diminish quality of life has both fascinated and anguished people for millennia and spawned a modest, yet sincere and serious, tradition around advancing human well-being.²

This discourse on human progress, which is both wide and deep, ranges from envisioning “ideal” societies that elevate the common good to cautionary tales about key stumbling blocks and nightmarish worlds that could result from untamed recklessness, greed, and foolishness. It includes practices for cultivating self-knowledge, virtue, compassion, wisdom, and our shared humanity and speculations about why *Homo sapiens* – of the at least four *Homo* species extant 40,000 years ago – are the only *Homo* species alive today. Popular themes, which have existed for at least four millennia and are exhibited across cultures, include avoiding biophysical and social carrying capacity limits, building just and equitable societies, distinguishing among needs and desires, respecting all life, and coupling awareness and concern to meaningful action.

Making many illuminating, but disquieting, parallels to contemporary society, Samuel Noah Kramer (1981: 259-269) used Sumerian literary documents from 4,000 years ago to chronicle the first “sick” society. Kramer showed how Sumerian society asserted equanimity but was incessantly at war; avowed commitments to fairness, equality, and kindness, but teemed with unfairness, inequity, and cruelty; and undermined the ecological systems upon which thriving economies depend by pursuing shortsighted, unsustainable economic growth (p. 259). The Sumerian *Epic of Gilgamesh* (Kovacs 1989), perhaps the first literary classic, and its precursor, *Gilgamesh and the Cedar Forest* (Shaffer 1983; Al-Rawi and George 2014), can be read as cautionary tales about the trials and tribulations that may befall us if – filled with hubris, ennui, or a mindless search for lasting fame – we transgress our essential humanity, demean our relationship to nature, or attempt to defy our mortality.³ Like operating a funnel in reverse, these early concerns about advancing and sustaining well-being expanded over time.

Plato (427-347 BCE) outlined what may be the first “ideal city” in the *Republic* (1925) and in *Critias* considered the ills of deforestation and its effect on erosion, biological diversity, and local climate change (1989: 271-275). The Chinese philosopher Mencius (372-289 BCE) discussed the importance of following specific harvesting practices, rates, and times to maintain both high yields and high quality of life (Hughes 1989). Emperor Ashoka (304-232 BCE) unified most of the Indian subcontinent through brutal conflict, yet became one of the most exemplary rulers in history. His most lasting influence – the rock and pillar Edicts of Ashoka, scattered around

modern day India, Nepal, Pakistan, and Afghanistan – outlines real-world reforms and policies for a just and humane society, wildlife conservation, respect for all life, and vegetarianism (Nikam and McKeon 1966). Vitruvius (≈80-15 BCE), the Roman architect and engineer, drawing on well-understood health problems that were ubiquitous among lead smelters and crafters, cuts a bit too close to the bone by spotlighting our own lack of prudence with his calls in *De Architectura* for using earthenware, instead of lead, pipes to bring potable water to homes (pp. 181 and 189).⁴

Nearly two-thousand years later, the 18th century German Inspector General of Mines, Hans Carl von Carlowitz, coined the term *Nachhaltigkeit* (sustainability) when he decried the wasteful, short-termed exploitation of forests for silver mining and smelting and argued for a more circumspect approach to forestry, which called for logging only as much wood as could grow back in the same period (Grober 2010: 80-82). These concerns were echoed more broadly and loudly by 19th century intellectual reformers such as John Stuart Mill, Thomas Malthus, Harriet Martineau, and others who explicitly connected practical, real-world improvement of the human condition to conservation of nature and the flourishing of life on Earth (Lumley and Armstrong 2004). The effort of these reformers to ground well-being advances in a reflective analysis, which integrates an assessment of the human condition with the state of the planet, figures into a long-running, life-affirming stream of thought that runs through Buddha, Chuang Tzu, Ashoka, Saint Francis of Assisi – includes Thoreau, John Muir, and Aldo Leopold – and came of age in the contemporary era with Rachel Carson's *Silent Spring* (1962), Gary Snyder's *Turtle Island* (1969), Arne Naess's deep ecology (Glasser 2011), Paul Shepard's *The Tender Carnivore and the Sacred Game* (1973), Donella Meadows' leadership on the Limits to Growth project (Meadows et al. 1972; Meadows et al. 1992; Meadows et al. 2004), and the work of many, many others.⁵

Building on this wider concern for the future, Joel Cohen (1995), in *How Many People Can the Earth Support?*, reviewed more than 65 peak population estimates, dating back to Antoni van Leeuwenhoek's 13.4 billion in 1673, and concluded, "it depends." How many people the Earth can support depends on future events, many of which are beyond our control; natural constraints and processes, many of which we don't understand; values regarding the kinds of worlds we want, which are likely to change over time; and, most importantly, human choices, which are often fickle and ill-informed. But that's only part of the story.

Cohen contends that there are also three kinds of panaceas to address resource challenges: create a bigger pie, reduce the number of forks, and improve manners (1995: 17). Building on Cohen, I suggest that the more expansive and challenging goal of improving well-being for all rests on three, closely-related factors:

- (1) **do more with less** – increase human productive capacities by employing new, "advanced" technologies (Brand 2010); re-imagine our approach to technology and design, as with the principles of biomimicry (Benyus 1997) and biophilic design (Kellert, Heerwagen, and Mador 2008); rethink our approach to production and consumption by creating circular resource flows and eliminating waste (McDonough and Braungart 2002); or utilize more environmentally sensitive and accessible traditional and open-source, appropriate technologies (Hazeltine and Bull 2003; Pearce 2012),
- (2) **do better with less** – decrease human numbers, expectations, or both by slowing, and ultimately reversing, the rate of human population growth; decrease overall per-capita consumption equitably; reduce profligate consumption; increase equity and vital consumption by the needy; end exploitation of humans and nature; and support the regeneration of biological and cultural diversity by acknowledging planetary and social carrying capacity limits (Rockström 2009 a/b; Raworth 2012), and
- (3) **elevate the common good** – reinvent how we define and measure quality of life, educate, plan, govern, allocate scarce resources, and re-produce culture so that human and planetary well-being are the ultimate metrics and the behaviors we most seek are incentivized and reinforced through well-thought-out and sophisticated "choice architectures" (Thaler and Sunstein 2008; Johnson, et al. 2012).

Disagreement over competing models of sustainable development centers on how these three factors – *doing more with less*, *doing better with less*, and *elevating the common good* – are understood, what combination of the three is favored, and what practical strategies for driving change are advocated. If we trust in technology, we likely lean toward (1); if we believe that human behavior is malleable and swayed by information, rules, institutions, mindfulness practices, and knowledge of our neurobiology, we probably emphasize (3); if we concentrate on avoiding carrying capacity limits – technological, biophysical, or social – and view them as hard constraints, we are apt to focus on (2).

Cohen (2010) subsequently explored a policy hypothesis that exploiting his three remedies to address resource challenges rests on the availability of effective problem solvers and this, in turn, requires making universal primary and secondary education available to everyone. He followed up this research with further work on the role of nutrition for pregnant women and infants, arguing that effective utilization of educational opportunities rests on the brain development of fetuses and young children (2010). While clearly correct, this line of reasoning, as becomes quickly apparent, reveals a slippery slope of other significant factors upon which taking advantage of educational opportunities also depends: peaceful societies, sufficient resources to invest in education, high quality teachers, adequate teacher training, institutions and educational policies that enable teachers to do their best work, families that value formal education and can support their children to devote the necessary time and energy, etc. This problem has a myriad of intertwined causes and there is no stopping rule for addressing resource challenges effectively – new challenges will arise and old, previously effective solutions will generate unintended consequences.

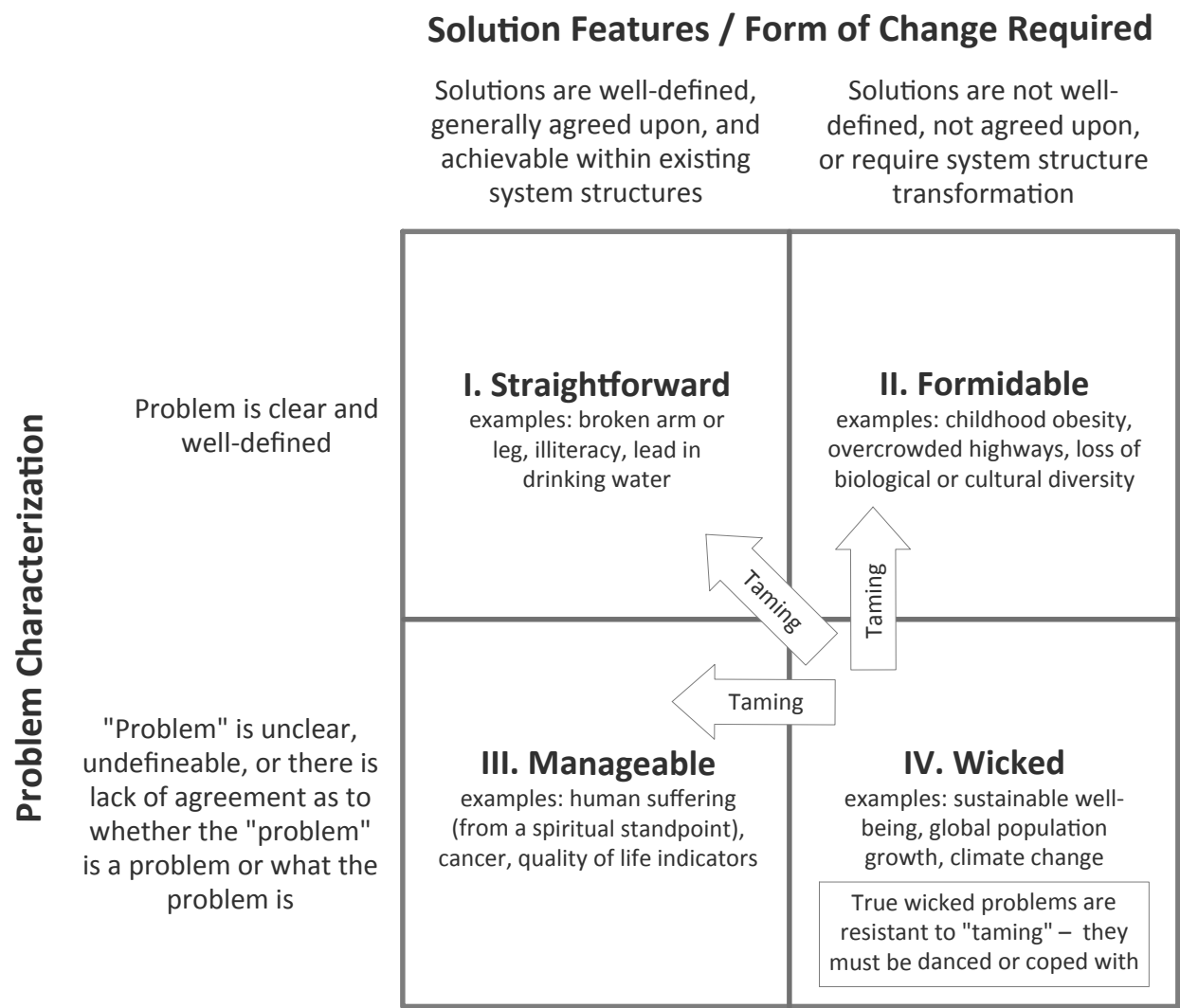
Whether our focus is limited to global resource challenges or directed at the more expansive well-being for all, transitioning towards sustainable, one-planet living requires that we embrace the “wicked” nature of such problems (Balint et al. 2011). As a class, wicked problems are intrinsically ill-defined, unruly, and daunting (Churchman 1967; Rittel and Weber 1973; Protzen and Harris 2010). There is no unequivocally correct formulation of wicked problems, so each stakeholder is apt to define them with their own unique spin. The relationships between the current state of affairs, some desired future state, and the most appropriate actions to reduce the discrepancy simply cannot be foretold in advance – at least not with any confidence or consensus. Consequently, no exhaustively describable set of potential solutions can exist and no single preferred solution, backed by incontrovertible good reasons can emerge. Wicked problems are simply not amenable to strict optimization by black boxes, however sophisticated, objective, and data-driven they might be. Wicked problems are not only resistant to optimization, they are impervious to ‘resolution’ as we know it, because they have no stopping rule. Furthermore, as with Cohen’s problem of identifying the core requirements for creating effective problem solvers, every wicked problem can be seen as the symptom of another problem. Wicked problems also involve values that are frequently evolving, partly intangible, often contested, and sometimes competing. As with aiming to characterize the exact position and momentum of an atomic particle at any particular instant in time, attempts to rigorously define wicked problems become part of the problem. Under such conditions, the problem itself morphs unavoidably and analysts are constrained to courses of action that exclude potentially promising alternatives.

In short, true wicked problems, because of their complex and tangled roots, defy all efforts to fully specify their boundaries and ascribe their causes. They are often characterized by incomplete or seemingly contradictory knowledge, erroneous perceptions, and indeterminate scope and scale; multiple explanations and contested opinions regarding their solution; “solutions” that, because of the interconnected nature of the problems are temporary at best and have the potential to generate more and worse problems; and uncertain, potentially significant, economic, environmental, and social burdens, which are passed on to future generations, those most at risk, and nonhumans. To make matters even more challenging, only one of these elements needs to be present to make a problem wicked. And because every wicked problem is unique, evolving, and always partly wild, there is limited potential to learn directly by trial and error or generalize “solution” strategies from past practice in a literal sense.⁶ In the conclusion, I’ll sketch my strategy for learning

to come to grips with creating and maintaining sustainable well-being societies as a wicked problem, which I refer to as skillful muddling.⁷

For the time being, it's important to be able to differentiate between pseudo-wicked and true wicked problems, as one of the most difficult obstacles can be understanding the nature of the problem. To do so, I present a more general conceptual framework for categorizing four key problem classes – I. Straightforward, II. Formidable, III. Manageable, and IV. Wicked – based on two distinguishing features: the extent to which the problem is clear and well-defined and the extent to which solutions are well-defined, agreed upon, and the character of change that has been identified. Understanding these four problem classes will help us to identify and elucidate appropriate solution pathways. New insights, information, and understanding can warrant efforts to “tame” or reduce wicked problems to manageable, formidable, or straightforward problems. Sometimes these bear fruit. In such cases, the problems were pseudo-wicked. True wicked problems, however, cannot be simulated – their interactions are too complex and their relationships are too poorly understood and too uncertain to be modeled. As with building a giant dam, creating national education policy, or predicting the effects of the Trump administration, ascertaining the full consequences, many of which are co-evolving over time, counterintuitive, unforeseen (and possibly unforeseeable), long-lived, or irreversible, is only possible by experiencing them.

Figure 1. Four Primary Problem Classes



The previous discussion bears significantly on the guiding question for this Sitra project, “Education for a Changing World,” which asks, “How do we enable students, schools, and communities to become the building blocks of a sustainable well-being society?” On first blush this question seemed refreshingly straightforward or at least manageable, but this alluring ease did not last. Its wicked nature began revealing itself to me slowly and this, in turn, repeatedly stymied my many efforts to design a coherent and effective strategy for approaching this chapter. Sitra thought-leaders, Hellström et al., have done a groundbreaking job outlining a promising and inspiring framework for a “sustainable well-being society” (2015). Hellström et al.’s focus is on “advanced Western Societies” (p. 2). I, on the other hand, wanted to approach the guiding question from a more general species-scale, planetary perspective. I’m interested in broadly relevant, widely applicable strategies and innovations for improving well-being that can stand up to the full array of challenges (and opportunities) before our species, but without seeking totalizing and colonizing, homogenous solutions that lay claim to universal or transcendent truths. I’m also eager to flesh out some of the practical details, especially those around the learning foundations for creating and supporting sustainable well-being societies. It wasn’t until I began to thoroughly embrace the Sitra challenge with a wicked problem lens that a coherent approach, like a Rorschach inkblot, gradually emerged. Needless to say, I was left with an alarming array of questions that did – and still do – gnaw at me.

What do we mean by the phrase “sustainable well-being society” generically (but not too generically) and operationally? What are the broad dimensions and constituents of sustainable well-being? Do people agree on these dimensions and constituents? How does “sustainable well-being” differ from plain old “well-being”? Can the planet support many equi-valid, yet qualitatively different, sustainable well-being societies? And what about the diversity of lifestyles and equity challenges within these societies? Can we measure sustainable well-being, fluidly and on scales that are meaningful for individuals, communities, nations, etc.? If so, how *should* we be performing (and sharing) these measurements? What are the “building blocks” of sustainable well-being societies? How might we facilitate broad-scale learning about and via these building blocks in ways that create fecund environments for bridging the gap between concern about well-being and meaningful action (both individual and collective) to advance well-being for all? And, perhaps most importantly, why don’t we have a profusion of sustainable well-being societies now?

When taking a long view, the quest for well-being is seen as a wicked problem of extraordinary import, one that has bedeviled our species with its challenge and promise for millennia. Addressing this problem is vital for *Homo sapiens* to come of age, to progress from carefree adolescence to a more deliberate path towards maturity. As Quinn asserted in the epigraph to this section, the task of advancing species-scale well-being for all is two-pronged. It rests on rooting out both the harmful complex of ideas that have brought about *unsustainable* well-being and sustained *unwell-being* and replacing them with more meaningful and compelling guiding metaphors that elevate the common good and are more appropriate for our times – the Anthropocene epoch, on a planet that is home to 7.5 billion people with diverse aspirations. The real challenge is not to identify what sorts of societies our human nature can support, but to explore, as Maslow (1971: 335) asserted, how good a human nature society can permit? In other words, will we allow our “better angels” to reveal themselves and flourish? All of these questions will be taken up in this chapter, but for the time being I must focus on the last two – and explore the deep roots of how the current, broader sociocultural-economic system came to be and how it has become conservative, reproductive, and a powerful counterforce to creating sustainable well-being societies.

II. THE ROOT CAUSES OF SUSTAINED UN-WELL-BEING AND UNSUSTAINABLE WELL-BEING: METANARRATIVES AND GUIDING METAPHORS

Sapiens regime on earth has so far produced little that we can be proud of... [D]id we decrease the amount of suffering in the world? Time and again, massive increases in human power did not necessarily improve

the well-being of individual Sapiens, and usually caused immense misery to other animals... Moreover, despite the astonishing things humans are capable of doing, we remain unsure of our goals and we seem to be as discontented as ever... We are more powerful than ever, but have very little idea what to do with all that power. Worse still, humans seem to be more irresponsible than ever... Is there anything more dangerous than dissatisfied and irresponsible gods who don't know what they want?

(Harari 2015: 415-416).

I agree with Harari that we humans have often used our tremendous power irresponsibly and that well-being improvements have been spotty, inequitably distributed, and frequently at the cost of nature. Despite an enormous, accelerating upsurge of awareness, modeling capacity, and causal insight over the last fifty years, we have seen little tangible, enduring progress and very few efforts to adapt human production and consumption, education, or governance to fit what nature and the planet can afford and still flourish (Glasser 2016). Even with many promising global environment and sustainability initiatives – the 1972 United Nations (UN) Conference on the Environment, the 1992 UN Earth Summit, and the two subsequent UN Rio + events in 2002 and 2012 – and a parallel set of education for sustainability events – creation of the Environmental Education Programme at the UN Environment Programme in 1975, which was followed by the UN Decade of Education for Sustainable Development (ESD) in 2005 and the launch of the UN Education, Scientific, and Cultural Organization (UNESCO) Global Action Programme on ESD in late 2014 – global trends in quality of life, climate change, biological and cultural diversity, environmental quality, and equity are mostly worse or improving very slowly (Abdallah et al. 2009; Gresh et al. 2006; Prescott-Allen 2001; IPCC 2014; Smil 2011; Steffen et al. 2015; Steffen et al. 2005; WWF 2016; MEA 2005; Rockström 2009a/b; Stiglitz et al. 2013; Wilkinson and Pickett 2011; Sivard 1996). On the other hand, global military expenditures, which represent 2.3% of global GDP, are holding steady (Perlo-Freeman et al. 2016). These military expenditures are now in excess of the production of all but the top nine GDP nations. Yet only 0.5% of global military expenditures go to peacekeeping (Sambira 2017). There seem to be some misplaced priorities here.

At my worst, I question the sincerity of commitments to sustainable development and education for sustainable development – and wonder, like Harari, if we have made any real progress toward catalyzing a paradigm shift in action towards advancing well-being for all. We have come to enshrine anthropocentrism, individualism, exploitation of humans and nature, and unfettered economic and technological growth into decontextualized, taken-for-granted root or guiding metaphors. These metaphors forged the status quo into being and continue to guide and perpetuate it. Taken together, they form the four cornerstones of what I refer to as the Dominant Metanarrative, which came into being both slowly and spontaneously, through accretion, in an unplanned manner. The Dominant Metanarrative is the creation of a young, impetuous, highly intelligent, and opportunistic species testing its wings in an abundant and resilient world with low population, low population density, and low resource demands. Yet, in the age of the Anthropocene, we continue to take these four guiding metaphors on blind faith and let them serve as tacit design principles for our societies.

That said, I am not so dismissive, fatalistic, or gloomy as Harari. In the midst of unfathomable wealth and poverty, erosion of ecosystem services, ennui, and loss of biological and cultural diversity, I believe our species also has a lot to be proud of and a lot to work with. Harari's comments skirt dangerously close to what primatologist Frans de Waal refers to as the Veneer Theory, which views human kindness "as a charade and morality as a thin veneer over a cauldron of nasty tendencies" (2013: 34). We embrace the dominant guiding metaphors and then code them into our laws, policies, and institutions, perhaps naively but not without dissent, as the previous section illustrated. We are also learning that the choices we make are also frequently the result of the kinds of rules and institutions we construct (Ostrom 1990) and the way the choices are presented to us; they are often more a function of what Thaler and Sunstein refer to as "choice architectures" than our values or a methodical analysis (2008). There is no reason to believe that they are coded into our DNA or somehow written into our "human natures." Drawing on decades of social cooperation and altruism research with our closest primate relatives, de Waal argues by analogy that morality and "the self-control

needed for a livable society, is built into us” (2013: 2). Using functional Magnetic Resonance Imaging, James Rilling and colleagues demonstrated a neural basis for social cooperation that may result from “labeling cooperative social interactions as rewarding, and/or by inhibiting the selfish impulse to accept but not reciprocate an act of altruism” (Rilling et al. 2002: 403). Yet there are also powerful counterforces, as Harari points out. These counterforces gained momentum as social organization evolved and local rules of reciprocity and reputation based on intimate association foundered. “[I]t wasn’t God who introduced us to morality” de Waal argues, we put God “into place to help us live the way we felt we ought to” (2013: 220).

My fundamental premise is that the human potential to learn, assess, reflect, mature, and flourish – as both individuals and as a species – is limitless. Human beings have prodigious underdeveloped and underutilized capacities – “intelligences” in Howard Gardner’s sense (2006, 2004). In particular, our capacities to empathize with others and identify with all life forms, make the “common good” the meter stick for decision-making, learn how to exercise restraint and limit exploitation by respecting biophysical constraints in ways that are fair and equitable to all humanity, species, and future generations, and appreciate that progress is contingent, has no bound. We don’t live in a world of scarcity; we live in a world of abundance, but one where the vision of advancing well-being for all can only be realized by honoring biophysical, behavioral, neurobiological, and social constraints (Raworth 2012; Kahneman 2013; Thaler and Sunstein 2008; Ariely 2010; Rockström et al. 2009a/b; Glasser 2016). And this requires taking back responsibility for our future – we cannot leave it to the invisible hands of Gods or blind faith in progress.

Despite the message of limitless growth encoded in the Dominant Metanarrative, progress is not inevitable. As Maslow so wisely pointed out, “Good human beings will generally need a good society in which to grow” (1993: 7). This means having guiding metaphors that consciously and deliberately code for the actual state of the planet and human quality of life and integrate these with our highest human aspirations to advance the common good, a nuanced understanding of our neurobiology, and a rich understanding of how we came to behave as we do. The enemy of sustainable well-being societies is grand narratives and guiding metaphors that substitute curiosity, identification with all life, rigorous evaluation, reflection, responsibility, and effective corrective action with misguided perceptions, dogma, snap judgments, and wishful thinking. By exploring the origins of consciousness, we can investigate the roots of the Dominant Metanarrative and how it took hold – and hopefully learn to make wiser, more deliberate decisions about our guiding metaphors and the choice architectures that shape our actions.

The gift of consciousness and the potential for social learning⁸ and widespread innovation through cultural transmission was made in and by nature. This is the basis of ecologist E.O. Wilson’s assumptions about biophilia as “the inborn affinity human beings have for other forms of life, an affinity evoked, according to circumstance, by pleasure, or a sense of security, or awe, or even fascination blended with revulsion” (1994: 360). Today, intimate, personal knowledge of the environment, at least in most rich, Western nations such as the United States, is at an all time low (Louv 2005). According to Wilson, however, our spirit is woven from, and hope rises on, the currents of our innate identification with life and lifelike processes: “To the degree that we come to understand other organisms, we will place a greater value on them, and on ourselves” (1984: 1).

But how do we come to better understand others and ourselves? Where do these capacities originate? What, exactly, are they and how do we learn to foster and leverage them as individuals and as a species, especially as we separate ourselves further from nature and each other? The Buddhist monk, Thich Nhat Hanh, developed a notion parallel to Wilson’s, albeit one that takes practice. His concept of “interbeing” is the idea of fluidly and spontaneously seeing ourselves in others and all things – and them in us (2009: 3-4). Interbeing gives rise to the awareness that there are no independent selves or things. You and I are in this paper or computer monitor along with the logger or the clean-room worker that made them possible. So is the sun, which drove the hydrological cycle by evaporating the surface water that condensed into clouds and eventually fell as the precipitation that nourished the trees, hydrated the workers, and washed the paper fibers or the integrated

circuits. All things and all phenomena are connected and interdependent; the same ephemeral life force courses through all of us. Interbeing inclines us to see our place on the planet and our relationships to nature and each other differently. It can and must be cultivated through practice (although reading this might just start to shift your perspective).⁹

The psychologist of consciousness Robert Ornstein and ecologist Paul Ehrlich, in their *New World New Mind* (1989: 4), maintain that “many of the predicaments of our society come about from the way people respond to, simplify, and, ultimately, ‘caricature’ reality in their minds” – to how we perceive nature and ourselves. They contend that evolution favored “ancestors with limited perceptions and quick reflexes” (1989: 17). The old world that “made” our contemporary brains, they contend, was essentially static. The mind evolved to register – and respond to – dramatic short-term changes of immediate, personal consequence. There was no fundamental need for early humans to develop acute perceptions for detecting long-term, subtle environmental change or the sorts of collective responses that these problems often entail today (1989: 29-30). While I agree with Ornstein and Ehrlich that the central issue facing humanity today is learning how to update our caricatures of reality (grand narratives) and make them better match both our highest aspirations and fit our times. The world protohumans perceived – especially without the gift of consciousness and symbolic communication – must have appeared highly varied over space and, in some locations, by season.

The human origins anthropologist, Rick Potts, in *Humanity’s Descent* (1996) explores this idea further. He argues that the period in which much of our essential contemporary neurological “hardware” came into existence was a time of unusual and exceedingly rapid climate variability. This favored an alternative form of selection, not referred to by Darwin. Potts and others refer to this as “variability selection,” an evolutionary foundation and proclivity for detecting, responding, and adapting to environmental change (including that which is relatively subtle from the perspective of an individual human lifespan).¹⁰ What became protohumans didn’t simply descend from the trees and walk out onto an open savannah. They learned to move fluidly between shifting forests and savannah in a complex, dynamic landscape. And the reward for learning about subtle environmental change was an enhanced survival potential.

Approximately 100,000-55,000 years ago (YA), *Homo sapiens* were probably anatomically and neurobiologically similar to contemporary humans. From a behavioral perspective, however, they were most likely similar to Neanderthals and other nonmodern humans (Klein 2009: 741). In Southern Africa, during the period from 70,000-50,000 YA there was a dramatic drop in temperature, sea level recession, and drought. Key protein sources, inland prey and shellfish, became scarce. Early humans, perhaps a band of only 10,000, were on the brink of extinction (Wells 2003). The survivors, however, were part of an innovative burst 50,000-40,000 YA, which enabled humans to carpet the planet. These survivors are believed to be the ancestors of every human living today. Genetic tracing of Y-chromosome mutations from people dispersed around the planet has now led to widespread acceptance of this “Out-of-Africa Hypothesis” (Wells 2003; Klein 2009). But what were the innovations and what made this disruptive change or “Great Leap Forward” possible?

The unique innovations included: burgeoning in the diversity, standardization, and rate of technological improvement of artifact types – including bone tools and fish hooks; broader and more efficient exploitation of food resources; transportation of stone, highly desirable for tools, hundreds of kilometers; ceremony, ritual, art, and personal ornamentation; and increased population densities (Diamond 1992: 32-57; Wells 2003: 85, Klein 2009: 742). Many believe this bundle of innovations, which significantly enhanced human fitness, to have been made possible by an unparalleled advance in language, symbolic thought, and communication (Klein 2009: 742, Diamond 1992). Harari refers to this collection of advances as the Cognitive Revolution (2015).

My conjecture is that these advances in symbolic thought and communication engendered new forms of consciousness and nurtured latent capacities, which sewed the seeds for collective exploration (and reimagination) of the future. These advances created the opportunity for some early humans to begin

contemplating three core issues, or questions, regarding the future – its *predictability* (What is our capacity to know the future?), *tractability* (What is our capacity to shape the future?), and *welcomability* (To what extent is the future inviting or inhospitable from the perspective of human interests and concerns?) (Rescher 1998: 232). After the Cognitive Revolution, humans were destined to inhabit both physical reality and, increasingly, an imagined reality of our own creation.

These advances sowed the seeds for what Rescher has described as the “three principal spheres of human endeavor,” knowing, doing, and evaluating (1998: 232). They also permitted the invention of collective foresight and large-scale cooperation. With the opportunity to ask questions about the future, seek meaningful answers together, and share the responses widely, rational planning of human action (or at least the guise of it) became both possible and profitable, even in a highly unpredictable world. Life no longer needed to be entirely *ad hoc*. What I refer to as our *adaptive* and *anticipatory* capacities could now be developed and unleashed on a scale heretofore unimagined.

These gains made it possible for humans to go well beyond considering the immediate consequences of individual short-term decisions. We were now able to use inductive logic, not to predict the fate of these decisions, but to create thought experiments by playing “what-if” – or, rather, “what-could” or “what-might be” – games, invent scenarios, create experiments, and consider multiple consequences of collective actions relative to alternative courses of action. This mental modeling, which very early on leveraged our human capacities for integrating contemplation, experience, action, and reflection, ushered in the dawn of culture (Klein with Edgar 2002).

While our mental hardware is now essentially fixed – and has been since the Cognitive Revolution – it is also tremendously robust and malleable. Cultural evolution takes advantage of neural plasticity by permitting rapid, consequential “software updates.” In doing so it allows innovation to develop and spread independently from the relatively slow pace of genetic change. This robust capacity to develop and spread innovation is what made the Agricultural and Industrial Revolutions possible. Today’s tightly coupled, networked world permits even more rapid, global-scale transmission of new ways of learning, perceiving, thinking, expanding compassion, planning, and acting. Cultural evolution could, for example, re-define long-held perceptions and views on nature and growth-based economics as well as re-rig laws and institutions.

But there is also a double-edged element to this notion of the gift of consciousness arising in and as a product of nature. The sophisticated leaf-shaped points characteristic of the Upper Paleolithic, which helped to secure a ready source of animal protein for our calorie devouring large brains (they consume 20% of our caloric intake and only represent about 2% of our body weight), were almost certainly implicated in cases of late Pleistocene megafauna extinction (Martin 1990; Martin and Klein 1984). Similarly, while the advances of the Agricultural Revolution allowed more food to be produced per unit area, which resulted in rapid population growth, denser populations, increased technical innovation, specialization, and the invention of luxury goods, these advances came at the cost of healthier diets, leisure, varied work lives, more equitable societies, and an intimate connection with all of nature (Sahlins 1972; Shepard 1973; Diamond 1997; Harari 2015).

The emancipatory, intellectual foundation of the Industrial Revolution, the Enlightenment, rests on what Rescher refers to as “tendency optimism” (1998: 240) – regardless of the current state of affairs, things will improve in the future. The Industrial Revolution helped accelerate the rise of individualism, specialization, conformity, and exploitation of humans and nature that began with the Agricultural Revolution. And while the it brought unprecedented increases in productive capacity, standard of living, life expectancy, and infant mortality, these advances came at the cost of increased pollution, inequity, and the breakdown of family, community, and nature. With the growth of economies based on fossil fuels, growth, and profit, these trends accelerated and many of the functions once reserved for families and communities were unwittingly, and unsuccessfully, transferred to states and markets.

While there is unlimited potential for human development, there are limits to growth (Meadows et al. 2004; Rockström 2009 a/b; Raworth 2012). Uncritical, unrestrained expansion of human populations, economic systems, production, technology, material consumption, specialization, and exploitation of the environment ultimately bring consequences (mostly unintended and often unforeseen, although generally not unforeseeable) that are inimical to a fuller realization of our human potentials. Such views stand in stark contrast to the core, taken-for-granted tenet of the Enlightenment – that economic progress, scientific progress, technological progress, and social progress are the inevitable byproduct of the application of reason and all reinforcing. Tendency optimism does not hold in practice, however. All of the components of progress are contingent. Couplings most certainly exist, but their relationship is frequently inverse and the benefits and costs are often not distributed uniformly or fairly (Wilkinson and Pickett 2011). The scale and character of any couplings are determined by the interplay of biophysical constraints and the social systems, institutions, and rules we make. From my perspective in the Anthropocene, the core tenets of the Enlightenment and Neoclassical Economics are both untenable and in desperate need of rethinking.

The processes (technical and social/normative) that we create to help us distinguish between random environmental signals and meaningful information, the information we choose to collect, the methodologies we create to make sense of this information, the strategies we develop to make this information accessible in a timely, undistorted fashion (or not), and the ways in which we act on it all matter. Rescher (1998: 240) refers to this form of conditional characterization of our future possibilities as “prospect optimism.” The state of affairs will only get better, *if* we do the right things in the right ways. Rising to our potential as a species, allowing the rest of the world – especially the poor, the disenfranchised, future generations, and nonhumans – to thrive and flourish, will necessitate a radical departure from present ways of life in most parts of the world.

We’ve had a nearly five-hundred year run of profound and expansive growth of data, information, and knowledge without a corresponding expansion of meaning, understanding, and wisdom. As the Dalai Lama has pointed out, “It is all too evident that our moral thinking simply has not been able to keep pace with the speed of scientific advancement” (2005). But this issue goes beyond coupling moral thinking to scientific advancement. It speaks to the age-old distinction between care and action. Our capacity for innovation frequently surpasses our realized collective abilities to recognize, understand, and cope with the consequences of our innovations – especially before they happen. Yet as the Norwegian ecophilosopher, Arne Naess, counsels, “Our species is not destined to be the scourge of the Earth. If it is bound to anything, perhaps it is to be the conscious, and joyful, appreciator of this planet as an even greater whole in its immense richness. This may be its ‘evolutionary potential’ or an ineradicable part of it” (2005v10: 187). The solutions for developing our full capacities as a species are not a matter of rising above our biology – or cultural evolution – but a matter of learning to understand and work with them, and each other, to become more fully human. As Gandhi presciently noted, “The difference between what we do and what we are capable of doing would suffice to solve most of the world’s problems.” Meeting these exalted goals for our species, however, requires learning more about how we think, learn, and make decisions.

The psychologist and Nobel Prize winner in Economic Sciences, Daniel Kahneman, notes that when we think, our minds appear to employ two cognitive systems (2011). He refers to these “useful fictions” as System 1 and System 2. “System 1” functions effortlessly and spontaneously, drawing on familiar patterns, metaphors, instinct, intuition, and other associations. It is largely responsible for assembling and maintaining our models of reality and worldviews. System 1 makes rapid judgments, seemingly unconsciously, and can’t be shut off. Kahneman refers to this as “fast thinking.” “System 2,” on the other hand, requires conscious effort to invoke and attention to sustain. It demands intense, deliberate, and methodical focus. Kahneman refers to this as “slow thinking.”

When a situation calls for thinking, the two systems interact constantly. The fast processing System 1 is extremely efficient. It tends to arrive at conclusions intuitively, based on heuristics (simple rules based on

fragmentary models of reality). It's the default mode. System 2 takes effort and tires easily. As a result, Kahneman contends, System 2 usually, and lackadaisically, defers to System 1. The key insight here is that we are highly influenced by our neurobiology and our surroundings in ways that we generally don't consider and don't fully fathom. The danger is that System 1 suffers from not knowing what it doesn't know. System 1 derives its speed through simplification and leaping to conclusions freely. As a result, it's subject to a host of nonrational biases and interference effects (the halo, "Florida" (priming), framing, and anchoring effects; confirmation, outcome, hindsight, and availability biases; the focusing illusion, etc.). The upshot is that as a species, we tend to overestimate our own rationality and vastly underestimate the role of chance (Kahneman 2011). When System 1 is well suited to the environment this marriage between the two systems generally functions symbiotically. When this is not the case, as when the Dominant Guiding Metaphors do not fit the current state of the planet or our highest aspirations, the relationship can be toxic or even anti-biotic.

So why go all the way back to the origins of the Cognitive Revolution when exploring the learning foundations of sustainable well-being societies? Because from a System 1 perspective, Harari's caricature is correct – we don't really know who we are, what we're doing, or why we do what we do. We tend to be overly optimistic and overly generous about our own knowledge. We anchor present judgments in a past that no longer exists and likely bears little relationship to a future that is highly uncertain. Our vast and sometimes dangerous oversimplifications can result in giving our assumptions of knowledge much greater credence than they deserve. The upshot is that our minds habitually contradict themselves, distort data and our own expertise, and mislead us. We can, however, no longer afford to do planetary-scale, random prototyping of technical and social innovations on an ad hoc basis. While the future is highly uncertain, its character is also highly dependent on the plans and decisions we make today.

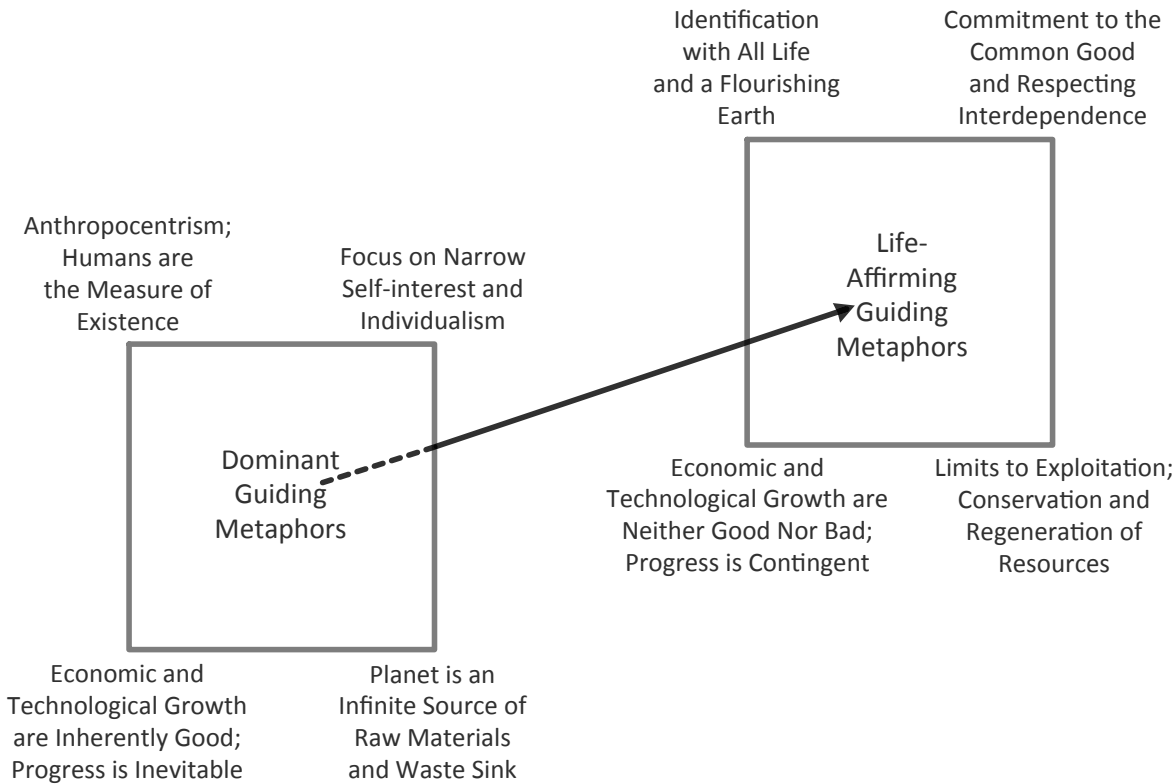
The Cognitive, Agricultural, and Industrial Revolutions were adventitious. They were not planned or designed; they happened spontaneously and gradually.¹¹ Driven by System 1, they were the result of our species' unconscious opportunistic tendencies and ostensible biases towards perceived short-term benefit, self-interest, and silver bullets (leaping to innovative solutions before we really understand the problem we think we are trying to solve or whether the solution is really better than the status quo). Later, the acceleration of unfettered, decontextualized economic and technological growth further enshrined anthropocentrism, individualism, exploitation of humans and nature, and swelled inequity. While the taken-for-granted guiding metaphors of the prevailing Dominant Metanarrative (see Figure 2) may have had significant relevance for leveraging new opportunities and advancing quality of life in the past, they are no longer consistent with: (1) the best scientific understanding of the state of the planet, (2) the most up-to-date insights regarding how our neurobiology, reason, and emotion interact to support decision-making, (3) the overarching goals of sustainable well-being societies, or (4) our survival as a species. Profound, disruptive change is no longer sporadic; it's become the status quo. Simply put, we can no longer afford to leave the ultimate goals of our species and major social decisions up to chance floundering and spontaneous decision-making. As the psychologist Mihaly Csikszentmihaly eloquently counsels, "The time for innocence ... is now past. It is no longer possible for mankind to blunder about self-indulgently. Our species has become too powerful to be led by instincts alone" (1994: 18).

Our coming of age as a species, the Sustainable Well-being Revolution, is about taking responsibility for the awesome powers that we stumbled into. It's about slowing down our thinking, as Kahneman advises, so that we can learn to use our prodigious powers to envision an alternative, more sustainable, desirable, and equitable future for all of the planet's inhabitants. Unlike the previous three revolutions, this fourth Sustainable Well-being Revolution must be purposeful, anticipatory, fully conscious, and rapid. Its success rests on: (1) learning about the state of the planet and the roots of the status quo – including how and why we behave as we do; (2) understanding why many of the tenets and foundational, taken-for-granted assumptions of the contemporary era are no longer (or were never) relevant or appropriate; (3) envisioning a healthier, fairer, more meaningful future for all of the planet's inhabitants (not perfection or a single, standard "ideal"

state, but a world of possibility, which lives up to our highest aspirations as a species); and (4) demonstrating activeness in relation to this knowledge and understanding by working to transform the present in radical ways and on an unprecedented scale. It demands rich, transparent public discourse and massive personal responsibility to leverage the many examples of positive deviance (Parkin 2010) that are proliferating in the periphery, albeit mostly invisibly.

We have learned in this section that the habits that perpetuate global unsustainability are deeply ingrained and reinforced through taken-for-granted guiding metaphors, which act as a powerful counterforce to creating well-being societies. As David Korten has admonished, “When we get our story wrong, we get our future wrong. We are in terminal crisis because we have our defining story badly wrong” (2015: 1). In my view, visioning a healthier, fairer, more meaningful future for all of the planet’s inhabitants involves learning to change by changing how we learn. This is a species-scale process that consists of two steps: (1) turning on and engaging System 2 so that we can (2) reboot System 1.

Figure 2. Dominant and Life-Affirming Guiding Metaphors



The first step involves engaging System 2 to confront outmoded perceptions and entrenched, maladaptive habits and beliefs. The importance of parsing out guiding metaphors and a metanarrative for global unsustainability – of going to the core of why sustainable well-being societies are not ubiquitous – is, I believe, central to dismantling the Dominant Metanarrative. It’s also crucial for identifying and characterizing a more appropriate and compelling Life-affirming Metanarrative and re-aligning our priorities, choice architectures, and institutions to foster sustainable well-being societies. Rebooting System 1 involves transitioning from the Dominant Metanarrative, with its diminishing relevance and ever more precarious foundations, to a Life-Affirming Metanarrative (See Figure 2) that encodes our species’ highest aspirations – our better angels – into Kahneman’s fast thinking. Life-Affirming Metanarratives are not new; they have been a minority tradition for millennia, as we learned in Section 1. They elevate the common good and advance quality of life for all,

equitably, in a manner that offers people the possibility of a compelling shared vision that is much more meaningful, desirable, credible, and sustainable than what they fear losing. Life-Affirming Metanarratives don't serve as rigid, fixed ideals; they act as open flexible vantages from which to re-vision and reconstruct our future. They prepare us to skillfully muddle with wicked, real-world problems of unprecedented global significance by affording us a new "navigational compass" (de Geus 1999) that can help us update our heuristics to guide the conscious design and reconstruction of educational, economic, consumption and production, and governance systems for the age of the Anthropocene.

Creating well-being for all has never been a chance process. Strangely, it's both more challenging and more possible in the age of the Anthropocene. Putting us on this path demands the wisest and most generous intention our species can muster. The question, "what is good for humans?" can no longer be asked in isolation with equanimity. It must be articulated within a set of nested, increasingly more general questions. "What is good for *all* humans?" and "What is good for the community of life on planet Earth at this point in history?" The bounds of the human problématique and the concept of "common good" must be stretched. How we do and should relate to each other – including how we respond to our obligations and responsibilities and the opportunities available to us – is not simply constrained by our human relationships, narrowly conceived. Answering these questions today requires that humans address how we perceive, communicate with, and relate to the larger community of life and systems that both brought us into being and continue to provide for our sustenance and flourishing. And this, in turn, requires exploring what we mean by sustainable well-being societies in much more depth.

III. WHAT EXACTLY DO WE MEAN BY SUSTAINABLE WELL-BEING AND CAN WE MEASURE IT?

The twentieth century will be chiefly remembered by future generations not as an era of political conflicts or technical inventions, but as an age in which human society dared to think of the welfare of the whole human race as a practical objective.

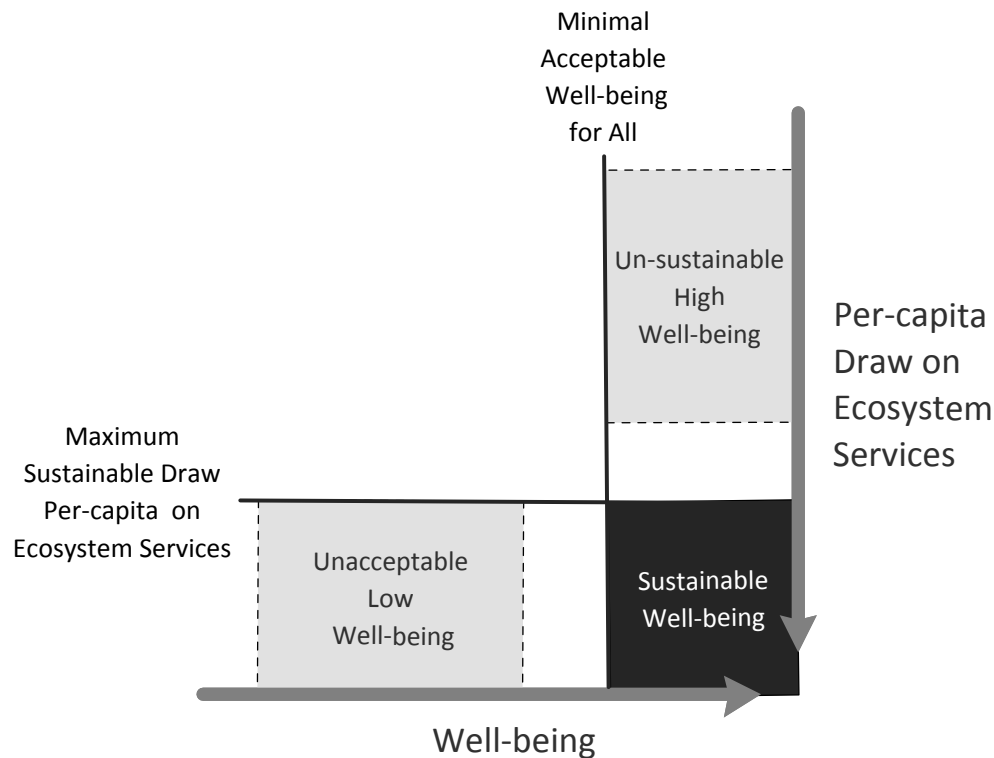
(Arnold J. Toynbee)

Toynbee was on to something. As a metahistorian and brilliant interpreter of the rise and fall of civilizations, Toynbee understood that cultural evolution is driven by challenges. He argued, "the greater the challenge, the greater the stimulus" and that there are no "excessive challenges" (1947: 140). While Toynbee was likely a century off, he recognized that humanity is nearing a point of self-awareness regarding our interconnectivity. We are coming to learn, as Thich Nhat Hanh (2009) emphasized earlier, that the well-being of any individual is connected to the well-being of all individuals. Where Toynbee's analysis was wanting, however, was in not recognizing that human well-being is inextricably bound to and constrained by the well-being of life on Earth. There's a hierarchy. Despite the force of the Dominant Metanarrative, people seem to be slowly coming to learn and appreciate the role we all play in determining the fate of our species and, ultimately, that of life on Earth. Awareness of these challenges brings profound new responsibilities. Put very simply, sustainable well-being is a two-dimensional ultimate goal and process; it's about improving quality of life for all, equitably – now and into the future – while adapting human activity to fit what nature can comfortably provide (Glasser 2016: 56). For fixed production technologies and levels of per-capita consumption, as human population goes up, the maximum sustainable draw on ecosystem services – which can be viewed as a key component of overall ecocultural resilience – must go down.

The cornerstone of the Fourth Revolution – the Sustainable Well-being Revolution – I argue, is this effort to integrate Toynbee's idea of daring "to think of the welfare of the whole human race as practical objective" with the recognition that any viable, long-term, practical organization of human cultures and economies must function safely within the constraints of our highest social goals, our neurobiology, and, most importantly, the environment, upon which we depend for both physical and spiritual sustenance. Continually improving well-

being for all equitably, while reducing our overall draw on ecosystem services is the *summum bonum* of our species and the greatest challenge before it now (see Figure 3).

Figure 3. Sustainable Well-being as Two Coupled Goals



As Costanza et al. (2014: 33) have noted, to get on this path we must craft a new vision for humanity:

The most critical task facing humanity today is the creation of a shared vision of a sustainable and desirable society, one that can provide permanent prosperity within the biophysical constraints of the real world in a way that is fair and equitable to all of humanity, to other species, and to future generations.

I have argued earlier that realizing such a vision rests on learning how to transition society from the Dominant Metanarrative, with its default vision of individualism, anthropocentrism, exploitation, and inevitable progress, to a Life-Affirming Metanarrative, based on commitment to the common good, identification with all life, conservation and regeneration of resources, and contingent progress with limits. The Dominant Metanarrative, as we have discovered, is tremendously influential, socially reproductive, and resilient. We desperately need a compelling and coherent shared vision of “sustainable well-being” that has the power to supplant Quinn’s Man Supreme. While Costanza et al.’s characterization is remarkably crisp and “permanent prosperity” that is “fair and equitable” for all humanity, other species, and future generations represents a good baseline condition, sustainable well-being encompasses much more. On an ultimate goal level, sustainable well-being is an easy concept to grasp – and form a wide consensus around – but like peace, human rights, progress, and democracy, the devil is in the details. As with all truly wicked problems, there is no clear endpoint — we will always be able to improve well-being for some people and do it more equitably. Even more challenging, perhaps, well-being itself is ill-defined. There are, as of yet, no clear, well-accepted definitions of “well-being” or common descriptions of what constitute minimal, viable per-capita draws on ecosystem services in different regions of the planet.

In my view, sustainable well-being can be conceptualized in at least three, potentially overlapping ways: (1) as the *summum bonum* of our species, (2) as a collection of philosophical and normative theories for thinking about the “good life” and characterizing well-being (these include a broad range of perspectives that span from Utilitarianism to good governance and mindfulness to capabilities, to name a few), and (3) as a set of methods – or abstract structures – for “measuring” sustainable well-being that operationalize one or more of these theories. Since we cannot observe or measure sustainable well-being directly (McGillivray and Clarke 2006), we construct methods that include at least one proxy dimension (subjective or objective) and at least one corresponding metric or index for evaluating progress toward sustainable well-being.

While sustainable well-being is an intrinsic good in my conceptualization, it can be operationalized in many ways and in terms of many constituents some of which are also intrinsically good – happiness and virtue, some which are instrumentally good – money and work-life balance, and others which fall somewhere in-between – knowledge, friendship, and capabilities. Sen’s capabilities approach (1993) is particularly interesting because it does not focus on what people have, how they live, or how they feel. It focuses on what they are able to do and be – their capabilities to function, such as working, resting, being literate, being healthy, etc. The *sine qua non* of Sen’s approach (1993) is that people have the freedoms (capabilities) to lead the kinds of lives they want, to do what they want, and to be who they want to be. Other objective measures include GNP, life expectancy, educational attainment, ecological footprint, and biological and cultural diversity, to name a few. While “objective” measures can be gauged with minimal reference to a person’s feelings or opinions, their inclusion (or lack thereof), how they are measured and weighted, and the level of aggregation that is employed is significantly influenced by the people designing the assessment method. Subjective measures such as life satisfaction, happiness, and positive emotions such as joy and pride or negative emotions such as fear and pain suffer from related assessment design challenges, but they are usually acquired by asking people to assess their own lives in surveys (Kahneman et al. 1999; Seligman 2011). Since they do not require the level of *a priori* selection of relevant indicators to cover what constitutes sustainable well-being, they have some significant benefits. Rigid distinctions between subjective and objective measures should not be drawn too literally, however, as there can be significant overlap (Huppert et al. 2007).

Table 1 offers a sampling of ten well-being characterizations and the dimensions they employ to measure and assess progress. The diversity of dimensions and the combinations in which they are employed highlights the manifold ways in which well-being is conceptualized and measured. Table 1 also demonstrates that progress is being made towards expanding characterizations of well-being to reflect sustainable well-being.¹² Robert Prescott-Allen deserves significant credit for helping to initiate this trend (2001). The UN Millennium Development Goals and the more recent UN Sustainable Development Goals suggest that momentum is building (UN 2015), albeit slowly.

This list of 22 well-being dimensions is not exhaustive. More methods for measuring well-being exist and these incorporate other dimensions such as mindfulness (Sachs 2016), opportunity (Matson et al. 2016), and biodiversity abundance levels (WWF 2016). In addition, the Millennium Ecosystem Assessment correlated four main ecosystem services (Supporting, Provisioning, Regulating, Cultural) and their fifteen constituents to four main dimensions of well-being (Security, Basic material for lives, Health, Good social relations) and their thirteen constituents (MEA 2005: iv). It’s also important to note that all of these dimensions are usually further divided into one or more constituent metrics or indices when well-being characterizations are operationalized into formal measures.

Following the categorization of Costanza et al. (2009), the ten well-being characterizations in Table 1 can be separated into four categories: (1) indices that employ GDP or other income-based measures (Gross National Happiness, GDP, OECD’s Compendium, Prescott-Allen’s Human Well-being Index, Rath and Harter’s Five Essential Elements, UN HDI, World Happiness Report); (2) indices that attempt to correct GDP, such as the Genuine Progress Indicator; (3) composite indices that include GDP or other income-based measures (all of

those in 1 except GDP); (4) composite indices that do not employ GDP or other income-based measures (Happy Planet Index, Prescott-Allen's Ecosystem Well-being Index, Seligman's Flourishing). It should be noted that some overlap will exist among these categories. In addition, not all indices are equally accurate or robust and not all composite indices incorporate environmental and sustainability considerations. While the same labels are often used for the dimensions of different well-being characterizations, it is not clear that they are always used in the same ways or mean the same things. In fact, when it comes to specifying the detailed, disaggregated indices that represent a given dimension, they often look quite different, mean very different things, and are measured differently. These challenges are further exacerbated when it comes to the questions of whether or not and how to normalize, weight, and aggregate the various indices.

Table 1. Ten Selected Well-being Characterizations and Their Dimensions

| CHARACTERIZATIONS → | Bhutan's Gross National Happiness, 2016 | Gross Domestic Product | Happy Planet Index, 2016 | OECD's Compen- dium of Well-being Indicators, 2011 | Prescott- Allen's Ecosystem Well-being Index, 2001 | Prescott- Allen's Human Well- being Index, 2001 | Rath and Harter's Five Essential Elements, 2014 | Seligman's Flourishing, 2011 | UN Human Develop- ment Index, 2016 | World Happiness Report, 2016 |
|---|---|------------------------------|-----------------------------------|---|---|---|--|------------------------------------|---|---------------------------------------|
| DIMENSIONS ↓ | | | | | | | | | | |
| Career / Employment / Meaningful and dignified work | | | | ✓ | | | ✓ | ✓ | | |
| Community A—personal security, livability, vitality | ✓ | | | ✓ | | ✓ | ✓ | | | |
| Community B—frequency and quality of social connections / Social support | | | | ✓ | | | ✓ | ✓ | | ✓ |
| Cultural Diversity and Resilience—avenues for self-expression, creativity, and spiritual growth | ✓ | | | | | ✓ | | | | |
| Educational attainment and knowledge base | ✓ | | | ✓ | | ✓ | | | ✓ | |
| Engagement / Interest in learning new things | | | | | | | | ✓ | | |
| Environment A—Status of or demand on ecosystem support services | | | ✓ | ✓ | ✓ | | | | | |
| Environment B—Ecological Diversity and Resilience | ✓ | | | | | | | | | |
| Financial / Income / Living standards and Material comfort | ✓ | ✓ | | ✓ | | ✓ | ✓ | | ✓ | ✓ |
| Generosity (as measured by recent donations) | | | | | | | | | | ✓ |
| Good governance / Civic engagement / Absence of corruption | ✓ | | | ✓ | | ✓ | | | | ✓ |
| Health—physical and mental | ✓ | | | ✓ | | ✓ | ✓ | | ✓ | |
| Housing | | | | ✓ | | | | | | |
| Inequality of outcomes / Equity—household and gender | | | ✓ | | | ✓ | | | | |
| Life expectancy / Healthy years of life expectancy | | | ✓ | | | | | | | ✓ |
| Optimism | | | | | | | | ✓ | | |
| Perceived freedom or opportunity to make life decisions / Social freedom | | | | | | | | | | ✓ |
| Positive emotions / Psychological well-being | ✓ | | | | | | | ✓ | | |
| Resilience (individual) | | | | | | | | ✓ | | |
| Self-esteem | | | | | | | | ✓ | | |
| Subjective well-being / Overall life satisfaction | | | ✓ | ✓ | | | | | | |
| Time use / Work-life balance | ✓ | | | ✓ | | | | | | |

Under the Dominant Metanarrative, well-being is a reflection of progress that is measured solely by a particular socially constructed form of “income” – one that is detached from the environment and the larger ecocultural context, with its significant equity considerations (Stiglitz et al. 2010; Costanza et al. 2009; Glasser 2016). The main critiques of economic measures of well-being are that they: (1) reflect too narrow a view of human well-being – income is at best, only a means to well-being; it is not an intrinsic good in itself, (2) over estimate the role of growth in contributing to past improvements in material well-being (and under estimate the negative impacts of unrestrained growth), (3) underestimate the chasm between the environmental and equity challenges we face and the scale and character of our responses to them, (4) fail to recognize the hierarchy discussed above – that any possible sustainable human economies must be wholly owned subsidiaries of nature. As the noted British economist, E. F. Schumacher commented (1989: 61):

[The modern Western economist] is used to measuring the “standard of living” by the amount of annual consumption, assuming all the time that a man who consumes more is “better off” than a man who consumes less. A Buddhist economist would consider this approach excessively irrational: since consumption is merely a means to human well-being, the aim should be to obtain the maximum of well-being with the minimum of consumption.

Schumacher would, I think, resonate with the *summum bonum* I described in Figure 3. He is urging us to consider the point raised in (1) above, that human well-being is a multifaceted concept. It cannot be distilled into any single dimension as Rumi’s famous story about misperceiving the whole illustrates (Shah 1985). More than 700 years ago, Rumi told the tale of three men who sought to understand an elephant through touch alone. For the one that touched the ear, it was a fan; for the one that touched the leg, it was a pillar; for the one that touched the tail, it was a rope. This story shows, the sorts of blunders that can result from mistaking parts for the whole. To measure sustainable well-being robustly, we will need a diverse array of subjective and objective dimensions and indices. Metaphorically, we can’t create sustainable well-being societies unless we have living, flourishing elephants and this requires assembling the right pieces, in the right order, in the right ways – with openness, intention, and love. As Louis Mumford so wisely counseled (1956: 1152), “Of every invention, of every organization, of every fresh political or economic proposal, we must dare to demand: Has it been conceived in love and does it further the purposes of love?” Mumford goes on to say that much of what we do today would not survive this question and much of what we are capable of – much of what is tied to the highest goals of our species, to advancing well-being for all, to releasing our better angels – finally becomes possible when we do fully embrace it.

For Hellström et al., “Sustainable well-being refers to the pursuit of the ‘good life’ within the Earth’s carrying capacity” (2015: 2). This definition embodies an outlook that parallels the one outlined in my *summum bonum*. Unlike improving well-being for all and reducing the per-capita draw on ecosystems services, it poses some additional operational challenges by begging further questions: “What constitutes the ‘good life’?”; “What is the Earth’s ‘carrying capacity’?”; “How should we go about pursuing the ‘good life’ – how do we make tradeoffs between pursuing the ‘good life’ and staying within the Earth’s ‘carrying capacity’?”; and “How should we identify and address equity issues?” Since we can’t measure either the “good life” or the “Earth’s carrying capacity” directly, the devil is in the details of how we conceptualize, simplify, and make these decisions and tradeoffs. And this ultimately goes back to the age-old challenges of power distribution, participation, equity, opportunity, and governance, which are tied to our guiding metaphors. Daring to think about the welfare of the whole human race as a practical objective – and the human race in relation to the flourishing of all life – demands that we learn to develop rich and robust assessments of where we are and measure progress in relation to a *summum bonum* for our species. This section explored three key issues around creating sustainable well-being societies. The first two are conceptual. They revolve around clarifying what we mean by the term “well-being,” and how it morphs when we precede it by the term “sustainable.” The third is substantial, it revolves around identifying a rich and robust set of determinants and constituents of

sustainable well-being and characterizing how they intersect and come together in concrete methods for measuring sustainable well-being.

Sustainable well-being measures are increasingly seen as a fundamental building block of sustainable well-being societies (UN 2015 and 2014; McGillivray and Clarke 2006; MEA 2005; Costanza et al. 2009; Helliwell et al. 2016). The methods are also increasingly contested, because measuring sustainable well-being is a wicked problem that involves our subjective, culturally-mediated perceptions about the state of the planet, quality of life, its distribution, what constitutes progress – and how we achieve it, and unclear relationships between past and future cause and effect. Given the diversity of dimensions and plethora of methods for normalizing, weighting, and aggregating the various indices, I recommend that a diverse, international research team be created to explore, test, and evaluate collections of different indices with respect to the following six goals: (1) Relevance (robustness of data to reflect the two key dimensions of the *summum bonum* and their intersectionality around equity); (2) Breadth (ability to capture the broadest range of sustainable well-being concerns); (3) Measurability (data collection must be feasible, accurate, disaggregatable, time-bound, and facilitate the creation of national accounts); (4) Parsimony (capacity to reflect breadth with a small set of indicators); (5) Low cost (given competing interests, gathering and maintaining data must be cost-effective); (6) Scale (robust measures must function fluidly on a variety of scales: individual, community, state, nation, and planetary).

What we choose to measure is ultimately a manifestation of what we care about. When well-being measures embody a clear, compelling *summum bonum* centered around improving well-being for all while reducing our overall draw on ecosystem services, they can act as a powerful multidimensional compass or dashboard for advancing sustainable well-being. By giving us a baseline and opportunity to assess progress, they can impact what we learn, how we learn, the goals and targets we set, and the policies, choice architectures, rules, incentives, and disincentives we create to meet these goals and targets. When done well – with intention and deliberation – they afford our species an opportunity to get off the path of blundering about self-indulgently by leveraging opportunities for planning and anticipatory and adaptive decision-making. Creating and adopting robust and exemplary sustainable well-being measures would represent a quintessential example of what Kahneman refers to as “slow thinking” and serve as one of the highest accomplishments of our species.

IV. THE CHALLENGE OF TRANSFORMATIVE CHANGE: CHANGING THE WORLD BY CHANGING OURSELVES

I am increasingly inclined to surmise that we presently find ourselves in a time of “interregnum” – when the old ways of doing things no longer work, the old learned or inherited modes of life are no longer suitable for the current *conditio humana*, but when the new ways of tackling the challenges and new modes of life better suited to the new conditions have not as yet been invented, put in place and set in operation.

(Bauman 2012: vii)

B. F. Skinner, the father of Behavioral Analysis, presciently pointed out, “Most thoughtful people agree that the world is in serious trouble” (Skinner 1987: 1). He also asked, “Why is more not being done?” (1987: 1). As a Behavior Scientist, Skinner responded that the future does not exist; it can’t *act* on us. Yet humans, responding out of hope, fear, or just plain curiosity, have been creating surrogates with present day consequences – models, scenarios, experiments, games, utopian and dystopian narratives, choice architectures, codes of conduct, policies, pleas, and laws – to foster anticipatory behaviors for centuries. This section is an inquiry into Skinner’s question, “Why isn’t more being done?” and a probe into the role of learning and formal education in creating and establishing Bauman’s “new ways.” As such, it’s an exploration into learning how to think, plan, and act in more anticipatory and adaptive ways. I call this approach to unearth and face the root causes of

interconnected sustainability challenges, address their wicked nature, and usher in a new, Sustainable Well-being Revolution, skillful muddling.

Today, calls for new visions, revolutionary thinking, and transformative change that moves people and nations toward one form or another of sustainable well-being abound. Urgent appeals are not just coming from activists, academics, novelists, and NGOs. These calls are emerging from all walks of life – including the highest halls of governance – and they appear to be accelerating. Consider the following four statements from the United Nations (UN) and the United Nations Educational, Scientific, and Cultural Organization (UNESCO).

Let us face the facts: the old model is broken. We need nothing less than a revolution in our thinking about the foundations of dynamic growth and the well-being of future generations. . . . [W]e must unite around a shared vision for the future. A vision for equitable human development . . . a healthy planet . . . an enduring economic dynamism that will carry us far beyond the troubles of today.

(UN Secretary-General Ban Ki-moon in remarks to high-level thematic debate on The State of the World Economy and Finance and its Impact on Development 2012)

With our globalized economy and sophisticated technology, we can decide to end the age-old ills of extreme poverty and hunger. Or we can continue to degrade our planet and allow intolerable inequalities to sow bitterness and despair. Our ambition is to achieve sustainable development for all. . . . Transformation is our watchword. At this moment in time, we are called to lead and act with courage. We are called to embrace change. Change in our societies. Change in the management of our economies. Change in our relationship with our one and only planet.

(UN 2014: 3)

Political agreements, financial incentives or technological solutions alone do not suffice to grapple with the challenges of sustainable development. It will require a wholesale change in the way we think and the way we act – a rethink of how we relate to one another and how we interact with the ecosystems that support our lives. To create a world that is more just, peaceful, and sustainable, all individuals and societies must be equipped and empowered by knowledge, skills and values as well as be instilled with a heightened awareness to drive such change. . . . Education for Sustainable Development (ESD) is about shaping a better tomorrow for all – and it must start today.

(UNESCO 2014: 8)

The 17 Sustainable Development Goals and 169 targets which we are announcing today demonstrate the scale and ambition of this new universal Agenda. . . . [It] is a plan of action for people, planet and prosperity. . . . We are resolved to free the human race from the tyranny of poverty and want and to heal and secure our planet. We are determined to take the bold and transformative steps which are urgently needed to shift the world on to a sustainable and resilient path. As we embark on this collective journey, we pledge that no one will be left behind.

(UN 2015: 1)

What do these bold, pioneering, and earnest pleas have in common? They assert that the model driving the status quo is flawed. A revolution in thinking and acting is required. Transformative change of every form imaginable is necessary – to our societies, our economies, and our relationship with the planet – or we risk a degraded, intolerably inequitable, bitter, and desperate world. If, however, we unite around a shared vision of sustainable development for all, “scale up” efforts to integrate sustainable development into education and education into sustainable development as outlined in UNESCO’s 2014 Global Action Programme (GAP), and create a firm foundation for implementing the ambitious UN Sustainable Development Goals (SDGs), we can redirect the future of humanity and improve well-being for everyone.

What these communiqués clearly got right, as Frank Fraser Darling commented long ago, is that “[h]uman well-being is an immense resource which can be squandered or marvelously regenerated” (as quoted in Sears 1965: 137). They identified the “problem space” well: Progress is contingent! Improving quality of life for all, into the future, rests on major rethinking and substantive changes to every aspect of our societies. Where I believe UNESCO and the UN stand on shaky ground, however, is in how robustly their “solution space” – including grand schemes such as the GAP and the SDGs – reflects the scale, character, and urgency of the situation, as characterized by their own rhetoric. After forty-five years of UN environment and education meetings, declarations, and “years of this” and “decades of that” – with some significant progress and appreciable erosion – we must ask, are they digging deeply enough into the taken-for-granted assumptions that guide our choice architectures, institutions, production and consumption, development, economic, education, finance, and governance systems, and daily lives? If the UN and UNESCO are truly calling for a paradigm shift – a complete restructuring of what we stand for, how we function, and how we interact with each other – are they proposing to do the right things, in the right ways, at the right times and thereby apply appropriate leverage and pressure where it’s needed most? Are they releasing our better angels to leverage untapped capacities that invoke our highest aspirations?

In short, can the scale and character of change that the UN and UNESCO are calling for be accommodated by modifying existing choice architectures, institutions, production and consumption, development, economic, education, finance, and governance systems (1st-order change) or are these system structures themselves, conservative, resilient, and reproductive and thus a powerful barrier to transformative change. From this perspective, the system structures, or rather the metanarrative guiding them, are themselves the most powerful barrier to transformative change. Throughout this chapter, I have been arguing that the latter case holds. The only way these prescient calls for transformative change can be realized, I contend, is by re-visioning our story (Korten 2015: 1). The fundamental flaw of the UN and UNESCO approach is that they are committing what the philosopher Gilbert Ryle referred to as a “Category Mistake,” (1949: 16). They are ascribing the capacity to create transformative, 2nd-order change to 1st-order change strategies.¹³

As an example, consider how the approach to meeting the SDGs, which is embedded in chapter 36 of Agenda 21, still emphasizes basic literacy and education for all – “reorientation” instead of “re-imagination” of formal education. This approach falls into a trap identified by Donella Meadows (2014: 9). She commented that when we get involved in addressing big problems, with challenges around implementation, money, resources, explanatory models, information, and vision, we often go directly to implementation – and sometimes we get mired there. We ask “how do we...” questions before knowing that our information is accurate and our models are valid. And all too frequently, we embark on this process without knowing where we are going – without clear, well-articulated goals and a common, over-arching vision. In a related vein, John Dewey was concerned with leveraging the power and potential of education as a pathway for improving quality of life. Dewey saw education as the medium for creating social continuity through the renewal and “re-creation of beliefs, ideals, hopes, happiness, misery, and practices” (1916: 2). He argued that education – as a social process and function – can have no significant or profound meaning until we first clarify what kind of society we want (1916: 19). There simply are no shortcuts or silver bullets to replace effective visioning.

Realizing the kind of transformative, 2nd-order change that the UN and UNESCO are calling for requires 2nd-order system structure change and this, as I have tried to show, demands a new Life-Affirming Metanarrative. In a previous work, I have discussed this issue in the context of the distinction between Nominal and Robust Sustainability. Nominal Sustainability is ultimately limited to making the world less unsustainable, while Robust Sustainability, on first principles, is directed at catalyzing and nurturing a revolution in sustainable well-being for all (Glasser 2016). I am arguing that redirecting our species toward sustainable well-being for all rests on addressing the contingent nature of progress in the age of the Anthropocene. It rests on creating a new navigational compass for our species – one that earns *Homo sapiens*’ claim to wisdom and leverages our ingenuity and adaptability towards becoming a generous, creative, uplifting, and restorative force on planet

Earth. Learning how to create this external change, I contend, rests on learning to look inward first. As Tolstoy wrote, “Everyone thinks of changing the world, but no one thinks of changing himself.”

The challenge here is that deep change is deeply challenging. As I have discussed, it calls for an open, context-rich, long-view-focused exploration into the system structures and guiding metaphors that brought us to the present state – and drive the status quo. Changing the metanarrative also calls for exploring and cultivating interbeing. These explorations are fundamentally emotional, spiritual, or moral endeavors. As the Dalai Lama councils (2006: 1, 2, and 9):

There is so much bad news nowadays, such an awareness of fear and tension, that any sensitive and compassionate being must question the “progress” we have made in our modern world. . . . There is no doubt about our collective progress in many areas – especially science and technology – but somehow our advances in knowledge are not sufficient. Basic human problems remain. We have not succeeded in bringing about peace or reducing overall suffering. . . . A spiritual approach may not provide an overnight solution to all political problems caused by our present self-centered approach, but in the long run it will address the very basis of the problems that we face today, removing them at the root.

Daniel Goleman, in his book on the Dalai Lama’s vision for our world, argues that to get the human family on track, we need a new story that embodies this life-affirming, “spiritual approach” – “one that no longer incessantly repeats the tragedies of the past but faces the challenges of our time with the inner resources to change the narrative” (2015: 4). The next quotes, from the editors of a book by the Karmapa, one of the highest-ranking Tibetan Buddhist leaders,¹⁴ and Pope Francis, reiterate the flawed nature of the existing model, while speaking to the fundamental importance of three factors in creating sustainable well-being societies: (1) having a clear vision of our ultimate, species-scale goals, (2) breaking long-standing destructive patterns, and (3) having personal transformation provide a firm foundation for large-scale social transformation.

People all around the globe are deeply concerned about the state of the world and wish to change it, yet many feel unsure how to do so or where to begin ... His Holiness the Karmapa ... urges us to rigorously consider human goodness as the basis for our work to transform the world. . . . Even as the Karmapa calls on us to build the world that we want to inhabit, he consistently reminds us that the renovation work actually starts within. He traces the very real problems that we see in the world – including rampant consumerism, religious intolerance, world hunger, and the degradation of the environment – to destructive emotions and habitual attitudes such as greed, anger, and selfishness. In this way, he points out that real social transformation is only possible when it includes personal transformation.

(Derris and Finnegan 2013: xv-xvii).

In this Encyclical, I would like to enter into dialogue with all people about our common home. In 1971 . . . Pope Paul VI referred to the ecological concern as “a tragic consequence” of unchecked human activity . . . and stressed “the urgent need for a radical change in the conduct of humanity”.¹⁵ . . . Every effort to protect and improve our world entails profound changes in “lifestyles, models of production and consumption, and the established structures of power which today govern societies”.¹⁶ Authentic human development has a moral character. It presumes full respect for the human person, but it must also be concerned for the world around us and “take into account the nature of each being and of its mutual connection in an ordered system”.¹⁷

(Pope Francis 2015: 4-6)

To safely pass through the “interregnum” and exit the quicksand of Bauman’s state of “liquid modernity” – a sort of purgatory where conventional practices no longer fit and the “new ways” haven’t fully arrived – we need to get our story right. To do this, we must acknowledge – and respond to – the gaping discrepancy between where we are and where we want to be. Leon Festinger (1957) proposed cognitive dissonance theory

to explain how our motives to maintain cognitive consistency can give rise to irrational and sometimes maladaptive behavior. According to Festinger, we hold many cognitions about the world and ourselves; when they clash, a discrepancy is evoked, resulting in a state of tension known as cognitive dissonance. As the experience of dissonance is generally unpleasant, we are motivated to reduce or eliminate it, and achieve consonance (i.e. agreement). The alternative to maintaining cognitive consistency through irrational and maladaptive behaviors is using the desire for it to face up to the cascading negative consequences associated with excessive levels of production and consumption, especially in economically rich countries and the growing inequality and abject poverty, nearly everywhere (Wilkinson and Pickett 2011). Cognitive dissonance can also be used in a positive way to catalyze a “tipping point” around creating a fourth revolution that advances sustainable well-being for all. Understanding how we got on the present trajectory, I have been arguing, is fundamentally important to supporting the personal transformation that is at the core of helping our species become a generous, creative, uplifting, and restorative force on planet Earth.

The designer Jessica Helfand contends that while we are “the architects of our collective future,” we must “embrace the hard-won capacities of the human soul” to truly advance civilization (2016: 206). I agree. It’s high time that we own this responsibility for changing ourselves with joy, intention, dignity, and grace. In the closing section, I sketch a series of heuristics for learning to skillfully muddle with the wicked nature of creating sustainable well-being societies and suggest that we may already be amidst the Sustainable Well-being Revolution.

V. CARE-FULL LEARNING: CREATING ROBUST FOUNDATIONS FOR SUSTAINABLE WELL-BEING WITH PAPER CUTS, PIN PRICKS, AND POSITIVE DEVIANTS

You never change things by fighting the existing reality. To change something, build a new model that makes the existing model obsolete.

(R. Buckminster Fuller)

I started this chapter off with a reference to the “better angels of our nature.” Learning how to release them and our untapped capacities for advancing well-being for all starts with engaging Kahneman’s System 2 to acquire a rich understanding of the existing reality and the outmoded perceptions and entrenched, maladaptive habits and beliefs that brought us to the present. Fuller’s statement brings us back full circle to Quinn’s epigraph, which started the chapter. Today’s globalized, digitized, violent, inequitable, wasteful, and degraded world is driven by an outdated and faulty System 1. While I wholly concur with the insights of Fuller, Quinn, and Bauman about changing peoples’ minds by offering them more meaningful and compelling “modes of life,” I also recognize that the existing reality, the Dominant Metanarrative, is deeply entrenched. The people that benefit from it, the rich, well-connected elite, are not going to let their comfort slip away without a fight. That’s why I have been arguing that to build a secure foundation for the Sustainable Well-being Revolution, we must simultaneously dismantle the Dominant Metanarrative – slowly and steadily, paper cut by paper cut – while replacing it with a more relevant and appropriate Life-Affirming Metanarrative.

Today, *Homo sapiens* are finally in a position to become successful architects of our collective future. This effort rests – perhaps now more than ever – on giving people something more meaningful and compelling than what they will lose. The new System 1, with its overarching vision centered around affirming life and advancing well-being for all and its four guiding metaphors provides a promising start. It’s missing, however, more practical heuristics that can serve as a loose guide for synchronizing and supporting everyday behavior around sustainable well-being. While Daniel Kahneman (2011), his colleague Amos Tversky, and others like Dan Arieli (2010) have done brilliant work outlining System 1 biases and our rampant misuse of heuristics, they have yet to provide an alternative for updating and improving outmoded, biased, and faulty heuristics. System 2 cannot rethink every decision – there is simply too much information to process and System 1, not knowing what it

doesn't know, is in no position to spontaneously create new heuristics that better fit the state of the planet and our highest aspirations. To function effectively in our information dense world, humans rely increasingly on fast thinking. We desperately need effective simple rules and short-cut strategies that save time and effort by focusing our attention on what matters most today.

Lucky for us, Gerd Gigerenzer and his colleagues (2011, 2007, 1999, 1996), Gary Klein (2013), and others have devoted their lives to researching how people can use heuristics and gain insights to make valid judgments and good decisions. Gigerenzer (2007: 18) sees heuristics as simple rules of thumb that draw on our brains' evolved capacities. Klein argues that the key to improving decisions is to increase our good insights. For Klein, insights are shifts in understanding that can change perceptions, feelings, goals, and behaviors (2013: 23-24). We increase insights by identifying new connections, coincidences, curiosities, contradictions, and through creative desperation (2013: 30). Overall performance in decision-making results from increasing insights while reducing errors and uncertainty (2013: 156). The Dalai Lama (2006, 2005), The Karmapa (2013, 2009), and Daniel Goleman (2015) center their recommendations for improving decision-making around expanding compassion, reducing suffering, and internal transformation. When considering global unsustainability, the Dalai Lama attributes the absence of effective action to a lack of awareness about the deep roots and systemic causes of global unsustainability and lack of vision. His recommendation is to get a much better handle on the range of possibilities, to "think, plan, act" (Goleman 2015: 220).

Donald Sull and Kathleen Eisenhardt (2015) suggest four guidelines for developing successful heuristics. They should: (1) be small in number, (2) be tailored to the situations of users, (3) ideally apply to a single, well-defined activity, and (4) give concrete advice without being overly prescriptive. As an example, Michael Pollan (2007), a journalist who focuses on the intersection of nature and culture around food, condensed his dietary insights into three simple rules: "Eat food. Not too much. Mostly plants." Like the Dalai Lama's, these simple rules are neither exhaustive nor overly prescriptive, but they are direction setting. They clearly can't be used to answer every dietary question we face, but they do quickly and easily help focus our attention on three things that matter most: eating real, unprocessed food; eating in moderation; and eating low on the food chain.

My approach to addressing the challenge of creating sustainable well-being societies as a wicked problem focuses on what I call "skillful muddling." It draws on the insights above by developing heuristics that blend reason and emotion to cultivate both honed intuition and care-full analysis. A key inspiration comes from Donella Meadows (2013: 11), who argues that holding on to the vision reveals the path; there's no need to judge the vision by whether the path is apparent. In this spirit, I offer the following very tentative and preliminary heuristics for skillful muddling to address challenges around creating sustainable well-being societies:

1. Honor Life: Create a clear and compelling vision of the sustainable world we'd love to live in.
2. Use the four Life-Affirming guiding metaphors to screen for inconsistencies and contradictions.
3. Confront the most brutal facts of our current reality – employ creative desperation.
4. Plan for one-planet living: do more with less, do better with less, and elevate the common good.
5. Have fun – employ a playful approach to questioning, reasoning, and analysis.
6. Be open to making new connections, spotting coincidences, and serendipity.
7. Learn and work with others and nature – there's strength and resilience in diversity.
8. Embrace "failure" – take risks, experiment, prototype rapidly, assess honestly, learn constantly.
9. Develop meaningful, robust indicators for measuring sustainable well-being – and use them!
10. When considering any decision, ask if it honors and cultivates love.

11. Celebrate corrective action: align choice architectures and institutions with these heuristics.
12. Be bold, fearless, and humble in carrying out these commitments.
13. Act now!

If we apply these heuristics to a field such as education, for instance, I imagine that we would get a very different formal learning edifice. Consider the following perspective on education, as outlined by Hannah Arendt (2006: 193).

Education is the point at which we decide whether we love the world enough to assume responsibility for it, and by the same token save it from that ruin which except for renewal, except the coming of the new and the young, would be inevitable. And education, too, is whether we love our children enough not to expel them from our world and leave them to their own devices, nor to strike from their hands their chance of undertaking something new, something unforeseen by us, but to prepare them in advance for the task of renewing a common world.

In contrast to authors like Harold Bloom, who argue that education should be about cultural reproduction – about transmitting the great ideas and values of the past to the young – Hannah Arendt thought that education had a higher purpose. It should prepare young people for a life of engagement, transformation, action, and responsibility for themselves and the world.

When we apply these heuristics to learning for sustainability challenges, we are directed to confront our cognitive dissonance head on by seeking out high-leverage, disruptive, and transformative changes that get at the deep roots of the challenges. We focus on first trying to better to understand the problem of why sustainable well-being societies are not ubiquitous before outlining a solution or we try to develop what we mean by a “care-full” approach to learning that emphasizes appropriate content, effective pedagogy, and conspicuous modeling of the behaviors we seek. This approach results in learning how to change by changing what and how we learn. We might also initiate an effort to create Regional Centers of Expertise in Education for Sustainable Development (Glasser 2008) or a global collaborative to identify and explore Learning for Sustainability Core Competencies (Sterling et al. 2017; Glasser 2016) or develop a framework for re-imagining and revitalizing formal education (Glasser 2004). We might also develop silo breaking, cross-institutional spaces for community members to learn and collaborate to rapidly develop, prototype, and test promising social and technological innovations that address real-world problems while reducing the demand on ecosystem services.¹⁸ Judy Wicks refers to such efforts, which improve conditions for people and the planet, as “doing well by doing good” (2013).

Meadows (2014) wisely counseled that when we envision, we must imagine, state, and articulate what we really want, not limit ourselves to what we think we can get. She urged us to create visions of the sustainable world we would love to live in, ones that could fulfill our deepest hopes and dreams (2014: 11). This idea of using compelling stories to extrapolate from the present to new, better – but as yet unrealized – worlds of our highest aspirations has been at the nucleus of what I refer to as Eutopian “imagineering” for thousands of years.¹⁹ It has also been at the heart of dystopian visioning, which is directed at helping us to avoid the possible worlds of our worst fears and nightmares. Constructing a new, life-affirming metanarrative, clarifying what we mean by sustainable well-being societies and how to measure them, and learning how to use broad heuristics to rapidly develop, prototype, and test promising social and technological innovations is also at the heart of this work. The chapter concludes with sanguine examples that illustrate how meaningful, lasting change is already resulting from using these sorts of heuristics to create powerful new models that are displacing the existing model of reality, not by fighting it, but by making it obsolete – thus ushering in a new, sustainable well-being revolution.

All over the world, in every corner of life, positive deviants – people who arrive at better, more inspiring solutions than their peers, despite facing the same resource constraints, obstacles, and challenges – are creating real-world laboratories for sustainable well-being (Costanza and Kubiszewski 2014; Estill 2013; Hawken 2007; Parkin 2010; Steffen 2008; Senge et al. 2008; Suzuki and Dresser 2002). Millions of them are turning unsustainability challenges into opportunities – in ways that build on and support each other’s efforts. I cannot begin to do justice to this revolution-making work in a survey paragraph. The citations that follow are superb examples of positive deviance to advance sustainable well-being. It must be noted, however, that they represent the tiniest tip of the iceberg of the superb work that is happening all over the planet.

Some people are using Jaime Lerner’s concept of urban acupuncture (2014) to create strategic, pinprick-like interventions to shift behaviors and catalyze positive change with minimal effort. Others are employing the field of social entrepreneurship, where the value proposition is centered around using innovation to improve quality of life for all, not advance profit (Bornstein and Davis 2010; Nichols 2006; Wicks 2013). Regardless of the approach people use, system structure shifting changes are being proposed and developed in every arena imaginable: biodiversity protection (Wilson 2016; Wuerthner et al. 2014), biomimicry (Benyus 1997), business (Anderson 2009; Chouinard and Stanley 2012; Honeyman 2014), climate change response (Hawken 2017), collective management of common property (Poteete et al. 2010; Ostrom 1990), cradle to cradle production and consumption (McDonough and Braungart 2002), cultural diversity protection (Davis 2009), economics (Felber 2012), energy planning (Lovins 2011), food and farming (Barber 2014), improving the resilience, prosperity, and sustainability of our communities (People’s Liberty 2017; The Oberlin Project 2017), living buildings (Thomas 2016; Kellert et al. 2008), microfinance (Yunus and Jolis 2008), permaculture (Hemenway 2015), public health (Farmer 2013), sustainable urbanism (Farr 2008; Lerner 2014), teacher education (Hicks 2014), transition communities (Hopkins 2014), transportation (Foreman and Sperling 2014), urban rewilding and carbon sequestration (Sanderson 2013). In the language of Anwar Fazal, the pioneering developer of progressive, sustainability-oriented NGOs, “these islands of integrity, wells of hope and sparks of action must be welcomed, multiplied and linked...” (2017).

Much of what I have been arguing throughout this chapter is that a credible, widely shared vision of sustainable well-being societies has been in process and gathering momentum for a long time. The “new model” Fuller, Quinn, and Bauman are speaking about has been forming before our eyes, slowly and deliberately, all over the world in diverse, diffuse, and democratic pockets of resistance. Because it is developing before our eyes, however, no single individual can have the experience, perspective, or insight to see it as a vivid, coherent image.

I have attempted to outline an approach for increasing and accelerating the Sustainable Well-being Revolution’s probability of success, but as with all wicked problems there are simply too many moving pieces to speak with optimistic authority. The obvious truth is that I have no crystal ball. I have no way to assess or predict the viability of the Sustainable Well-being Revolution, but neither does anyone else. So how are we to deal with such uncertainty? Following the wisdom of Vice Admiral Stockdale, the highest-ranking U.S. Vietnam War prisoner, I have been arguing that we freely embrace the paradoxical duality of our situation (Collins 2001: 83-85). We must never lose faith, never waiver in the belief that we will find a way to prevail and turn this situation into the defining moment of our species while simultaneously exercising the discipline to honestly and openly confront the most brutal facts of our current reality. From this perspective, as Václav Havel so wisely counsels (1985: 96),

... the real question is whether the “brighter future” is really so distant. What if, on the contrary, it has been here for a long time already, and only our blindness and weakness has prevented us from seeing it around us and within us, and kept us from developing it?

ENDNOTES

¹Abraham Lincoln made the concept of “our better angels” famous in his First Inaugural Address. Its origins date back at least to Shakespeare, who in *Othello* used a remark by Gratiano, a Venetian nobleman, to refer to the enlightened and restrained human impulses that would keep him from seeking bloody revenge on Othello who had recently slain Desdemona. Twenty years before Lincoln’s Address, Dickens, in chapter 29 of *Barnaby Rudge* wrote about how the “shadows of our own desires” stand between “our better angels” and eclipse them. This chapter, in many ways, is an exploration into opportunities and strategies for liberating our better angels by shining a bright light on the “shadows of our own desires.” I owe these insights about the origins of the phrase “our better angels” to a blogpost by Gene Griessman, “The Better Angels Of Our Nature.” URL: <http://whatyousay.com/a-quotation-you-can-use-in-writing-charles-dickens-and-abraham-lincoln/> (accessed May 19, 2017).

²For the purposes of this chapter, “quality of life” and “well-being” are treated as synonyms.

³As an example, consider the early Sumerian version of *Gilgamesh in the Cedar Forest*, which predates the full Gilgamesh epic (Shaffer 1983). In this story, after exhibiting tremendous hubris slaying the forest protector Humbaba with his friend Enkidu, the gods, in an effort to protect nature from the rapaciousness of humans embrace a democratic, decentralized model by returning the powers of protection to the trees, streams, and grasses. It is notable that in the full epic, Gilgamesh is also punished severely for this and other transgressions. Emperor Asoka’s conversion to Buddhism after his violent conquest of the Kalingas in 264 BCE, and his preaching of the Dharma through moral precepts such as doing good deeds, respecting others (including nonhumans), and practicing generosity, truthfulness, and purity – as documented in the Edicts of Asoka – provides another example (Nikam and McKeon 1966).

⁴The recent crisis in Flint, Michigan over domestic water distributed to homes with frightening lead levels and the generally slow, ad hoc response by government officials, makes it all too clear that we have yet to adequately heed Vitruvius’ warning. For more details on the Flint water crisis, see (Sellers 2016; Flint Water Study Updates 2016). On the positive side, the relatively rapid response by independent teams of scientists and activists to test water, identify the source of the problem, and identify practical, short-term solutions is quite hopeful.

⁵For a rich discussion on the concept of ecological utopias, see (de Geuss 1999). For a more general discussion of utopian thought grounded to real-world improvement in quality of life on this planet, see (Glasser 2011; Schaer et al. 2000; Moos and Brownstein 1977; Sears 1965; Mumford 1959).

⁶In their classic description of “wicked problems,” Rittel and Webber (1973) argued that “In a wicked problem, there is no opportunity to learn by trial and error. Every solution is a one-shot operation.” While I agree with Rittel that every wicked problem is novel, and thus there is limited potential for generalizing, wicked problems do have common characteristics that lend themselves to skillful muddling via heuristics.

⁷This work builds on a much earlier and less sophisticated effort I began to approach wicked problems, which I referred to as “strategic muddling” (Glasser 1998).

⁸For an introduction to social learning that explores the meanings and purposes of learning broadly conceived and its connection to sustainability, see (Glasser 2007).

⁹The idea of learning interdependence and developing interbeing through the formal education system – and its pressing importance for our species – has been stated eloquently by Mihaly Csikszentmihaly (1994: 275): “Perhaps the most urgent task facing us is to create a new educational curriculum that will make each child aware, from the first grade on, that life in the universe is interdependent. It should be an education that trains the mind to perceive the network of causes and effects in which our actions are embedded, and trains the emotions and the imagination to respond appropriately to the consequences of those actions.” I concur and have built interdependence and interbeing into my work on Learning for Sustainability Core Competencies.

¹⁰For details on the impact of the paleoclimate on human evolution and the concept of variability selection, see (Vrba et al. 1995; Potts 1996, 1998).

¹¹I owe this insight to a statement by William D. Ruckelshaus (Head of the U.S. Environmental protection Agency from 1970-1973), which is cited in Meadows et al. (2004: 265).

¹²McGillivray and Clarke (2006: 5) note that the effort to integrate well-being and sustainability measures has a significant history that dates back to the late 1960s.

¹³For a detailed discussion of first- and second-order change in relation to sustainability challenges, see (Glasser 2004). For a deeper look into the meanings and origin of first- and second-order change, see (Watzlawick et al. 1974).

¹⁴The Seventeenth Karmapa, Ogyen Trinley Dorje, is the spiritual leader of the Kamtsang Kagu tradition of Tibetan Buddhism and one of the highest-ranking lamas in Tibetan Buddhism. Born in 1985, he escaped from Chinese occupied Tibet at the age of fourteen and now lives near his mentor the Dalai Lama, in Dharamsala, India.

¹⁵Quote from Pope Paul VI, Address to FAO on the 25th Anniversary of its Institution (16 November 1970), 4: AAS 62 (1970), p. 833, as quoted in the *Laudato Si'*.

¹⁶Encyclical Letter Centesimus Annus (1 May 1991), 38: AAS 83 (1991), p. 863, as quoted in the *Laudato Si'*.

¹⁷John Paul II, Encyclical Letter Sollicitudo Rei Socialis (30 December 1987), 34: AAS 80 (1988), p. 559, as quoted in the *Laudato Si'*.

¹⁸I refer to these “do tanks for thinkers” or “Sustainable Well-being Accelerators” as Community Sustainability Incubators. They are an idea that I have been developing for several years but have not published on yet.

¹⁹Eutopia refers to a place of ideal well-being as a practical aspiration as opposed to utopia, which generally refers to a place of ideal well-being as an impossible concept.

REFERENCES

- Abdallah, Saamah, Sam Thompson, Juliet Michaelson, Nic Marks, and Nicola Steuer. 2009. *The Un-Happy Planet Index 2.0: Why Good Lives Don't Have to Cost the Earth*. Forward by Herman Daly. London: New Economics Foundation.
- Al-Rawi, F. N. H., and A. R. George, 2014. Back to the Cedar Forest: The beginning and end of Tablet V of the Standard Babylonian Epic of Gilgameš. *Journal of Cuneiform Studies* 66: 69-90.
- Anderson, Ray C., and with Robin White. 2009. *Confessions of A Radical Industrialist: Profits, People, Purpose – Doing Business by Respecting the Earth*. New York: St. Martins Press.
- Arendt, Hannah, and Jerome Kohn (Introduction). 2006 (1961). *Between Past and Future: Eight Exercises in Political Thought*. New York: Penguin.
- Ariely, Dan. 2010. *Predictably Irrational: The Hidden Forces That Shape Our Decisions* (revised and expanded edition). New York: Harper Perennial.
- Balint, Peter J., Ronald E. Stewart, Anand Desai, and Lawrence C. Walters. 2011. *Wicked Environmental Problems: Managing Uncertainty and Conflict*. Washington, DC: Island Press.
- Barber, Dan. 2014. *The Third Plate: Field Notes on the Future of Food*. New York: Penguin Books.
- Bauman, Zygmunt. 2012. *Liquid Modernity*. Cambridge, UK: Polity Press.
- Benyus, Janine M. 1997. *Biomimcry: Innovation Inspired by Nature*. New York: Morrow.
- Bornstein, David, and Susan Davis. 2010. *Social Entrepreneurship: What Everyone Needs to Know*. New York and Oxford: Oxford University Press.
- Brand, Stewart. 2010. *Whole Earth Discipline: Why Dense Cities, Nuclear Power, Transgenic Crops, Restored Wildlands, and Geoengineering Are Necessary*. New York: Penguin.
- Carson, Rachel. 1962. *Silent Spring*. Boston: Houghton Mifflin.
- Chouinard, Yvon, and Vincent Stanley. 2012. *The Responsible Company: What We've Learned from Patagonia's First 40 Years*. Ventura, CA: Patagonia Books.
- Churchman, C. West. 1967. Wicked Problems. *Management Science* 14 (4): B-141-B142.
- Cohen, Joel. 2010. Video Interview: How Many People Can the Earth Support? Environmental Change and Security Program, Woodrow Wilson International Center for Scholars. URL: <https://www.youtube.com/watch?v=gmALGtDTQWo> (accessed May 5, 2016).
- Cohen, Joel E. 1995. *How Many People Can the Earth Support*. New York: W.W. Norton.
- Collins, Jim. 2001. *Good to Great: Why Some Companies Make the Leap and Others Don't*. New York: HarperBusiness.
- Costanza, Robert, Maureen Hart, Stephen Posner, and John Talberth. 2009. *Beyond GDP: The Need for New Measures of Progress*, Pardee Paper No. 4. Frederick S. Pardee Center for the Study of the Longer-Range Future: Boston University. URL: <mailto:https://www.bu.edu/pardee/files/documents/PP-004-GDP.pdf> (accessed June 5, 2016).
- Costanza, Robert, and Ida Kubiszewski, eds. 2014. *Creating A Sustainable and Desirable Future: Insights from 45 global thought leaders*. Singapore: World Scientific.
- Csikszentmihaly, Mihaly 1994. *The Evolving Self: A Psychology for the Third Millennium*. New York: Harper Perennial.
- Dalai Lama. 2006. *How To See Yourself As You Really Are*. Translated and edited by Jeffrey Hopkins. New York: Atria.
- Davis, Wade. 2009. *The Wayfinders: Why Ancient Wisdom Matters in the Modern World*. Toronto: House of Anansi Press.
- de Geus, Marius. 1999. *Ecological Utopias: Envisioning the Sustainable Society*. Translated by Paul Schwartzman. Utrecht, The Netherlands: International Books.
- de Waal, Frans. 2013. *The Bonobo and the Atheist: In Search of Humanism Among the Primates*. New York: W.W. Norton.
- Dewey, John. 1916. *Democracy and Education*. New York: The Free Press.
- Diamond, Jared. 1997. *Guns, Germs, and Steel: The Fates of Human Societies*. New York and London: W.W. Norton.
- Diamond, Jared. 1992. *The Third Chimpanzee: The Evolution and the Future of the Human Animal*. New York: Harper Perennial.

- Dorje, Ogyen Trinley (The Karmapa), Karen Derris, and Damchö Diana Finnegan, eds. 2013. *The Heart is Noble: Changing the World from the Inside Out*. Boston: Shambhala.
- Dorje, Ogyen Trinley (The Karmapa). 2009. *The Future is Now: Timely Advice for Creating a Better World*. Carlsbad, CA: Hay House.
- Estill, Lyle, ed. 2013. *Small Stories, Big Changes: Agents of Change on the Frontlines of Sustainability*. Gabriola Island, BC.
- Farmer, Paul, and Jonathan Weigel (editor). 2013. *To Repair the World: Paul Farmer Speaks to the Next Generation*. Berkeley, CA: University of California Press.
- Farr, Douglas. 2008. *Sustainable Urbanism: Urban Design with Nature*. Hoboken, NJ: John Wiley & Sons.
- Fazal, Anwar. 2017. "Homepage." URL: <http://www.anwarfazal.net/> (accessed March 11, 2017).
- Felber, Christian. 2012. *Change Everything: Creating an Economy for the Common Good*. London: Zed Books.
- Festinger, Leon. 1957. *A Theory of Cognitive Dissonance*. Stanford: Stanford University Press.
- Flint Water Study Updates. 2016. URL: <http://flintwaterstudy.org> (accessed June 8, 2016).
- Foreman, Richard T. T., and Daniel Sperling. 2014. The Future of Roads: No Driving, No Emissions, Nature Reconnected. In *Creating A Sustainable and desirable Future: Insights from 45 global thought leaders*, edited by Robert Costanza and Ida Kubiszewski, pp. 143-170. Singapore: World Scientific.
- Gardner, Howard. 2006. *Multiple Intelligences: New Horizons in Theory and Practice*. New York: Basic Books.
- Gardner, Howard. 2004. *Changing Minds: The Art and Science of Changing Our Own and Other People's Minds*. Boston: Harvard Business School Press.
- Gigerenzer, Gerd. 2007. *Gut Feelings: The Intelligence of the Unconscious*. New York: Penguin.
- Gigerenzer, Gerd. 1996. On Narrow Norms and Vague Heuristics: A Reply to Kahneman and Tversky (1996). *Psychological Review* 103 (3): 592-596.
- Gigerenzer, Gerd, Ralph Hertwig, and Thorsten Pachur, eds. 2011. *Heuristics: The Foundations of Adaptive Behavior*. Oxford and New York: Oxford University Press.
- Gigerenzer, Gerd, Peter Todd, M., and The ABC Research Group. 1999. *Simple Heuristics That Make Us Smart*. Oxford and New York: Oxford University Press.
- Glasser, Harold 2016. Visions of Sustainability. *Sustainability the Journal of Record* 9 (2): 56-64.
- Glasser, Harold. 2011. Naess's Deep Ecology: Implications for the Human Prospect and Challenges for the Future. *Inquiry* 54 (1): 52-77.
- Glasser, Harold. 2008. An Interview with Hans van Ginkel: On the Vision, History, and Status of the Regional Centres of Expertise in ESD Programme. *Journal of Education for Sustainable Development* 2 (2): 109-117.
- Glasser, Harold. 2007. Minding the Gap: The Role of Social Learning in Linking Our Stated Desire for a More Sustainable World to Our Everyday Actions and Policies. In *Social Learning: Toward a More Sustainable World*, edited by Aren E. J. Wals, pp. 35-61. Wageningen Academic Publishers: Wageningen, The Netherlands.
- Glasser, Harold. 2004. Learning Our Way to a Sustainable and Desirable World: Ideas Inspired by Arne Naess and Deep Ecology. In *Higher Education and the Challenge of Sustainability: Problematics, Promise, and Practice*, edited by Arjen E.J. Wals and Peter Blaze Corcoran, pp. 131-148. Dordrecht: Kluwer.
- Glasser, Harold. 1998. On the Evaluation of "Wicked Problems:" Guidelines for Integrating Qualitative and Quantitative Factors in Environmental Policy Analysis. In *Evaluation and Practice and Urban Interplay in Planning*, edited by D. Borri, A. Barbanente, A. Khakee, N. Lichfield and A. Prat, pp. 229-249. Dordrecht: Kluwer.
- Glasser, Harold and Jamie Hirsh. 2016. Toward the Development of Robust Learning for Sustainability Core Competencies. *Sustainability the Journal of Record* 9 (3): 121-134.
- Goleman, Daniel. 2015. *A Force for Good: The Dalai Lama's Vision for Our World*. New York: Bantam.
- Gresh, Alain, Philippe Rekacewicz, Dominique Vidal, Jean Radvanyi, and Catherine Samary, eds. 2006. *Planet in Peril: An Atlas of Current Threats to People and the Environment*. Arendal, Norway: UNEP/GRID-Arendal.
- Grober, Ulrich. 2010. *Sustainability: A Cultural History*. Totnes, UK: Green Books.
- Gyatso, Tenzin (The Dalai Lama). 2005. Our Faith in Science. *New York Times*. URL:

- http://www.nytimes.com/2005/11/12/opinion/our-faith-in-science.html?_r=0 (accessed April 17, 2016)
- Hall, Jon, Enrico Giovannini, Adolfo Morrone, and Guilia Ranuzzi. 2010. *A Framework to Measure the Progress of Societies*. Paris: Organization for Economic Co-operation and Development (OECD).
- Hanh, Thich Nhat. 2009 (1988). *The Heart of Understanding: Commentaries on the Prajnaparamita Heart Sutra*. Berkeley, CA: Parallax Press.
- Honeyman, Ryan. 2014. *The B-Corp Handbook: How to Use Business as a Force for Good*. Oakland, CA: Berrett-Koehler.
- Harari, Yuval Noah. 2015. *Sapiens: A Brief History of Humankind*. New York: Harper.
- Havel, Václav et al., and John (ed) Keane. 2015 (1985). *The Power of the Powerless: Citizens against the state in central-eastern Europe*. New York and London: Routledge.
- Hawken, Paul, ed. 2017. *Drawdown: The Most Comprehensive Plan Ever Proposed to Reverse Global Warming*. New York: Penguin.
- Hawken, Paul. 2007. *Blessed Unrest: How the Largest Social Movement in the World Came into Being—and Why No One Saw it Coming*. New York: Viking.
- Hazeltine, Barrett, and Christopher Bull. 2003. *Field Guide to Appropriate Technology*. Cambridge, Massachusetts: Academic Press.
- Helfand, Jessica. 2016. *Design: the Invention of Desire*. New Haven and London: Yale University Press.
- Helliwell, John, Richard Layard, and Jeffrey Sachs. 2016. *World Happiness Report 2016, Update (Vol. I)*. New York: Sustainable Development Solutions Network. URL: mailto:http://worldhappiness.report/wp-content/uploads/sites/2/2016/03/HR-V1_web.pdf (accessed March 21, 2017).
- Hellström, Eeva, Timo Hämäläinen, Lahti Vesa-Matti, Justin W. Cook, and Julia Jousilahti. 2015. Towards a Sustainable Well-being Society: From Principles to Applications. Sitra Working Paper. Helsinki: Sitra.
- Hemenway, Toby. 2015. *The Permaculture City: Regenerative Design for Urban, Suburban, and Town Resilience*. White River Junction, VT: Chelsea Green.
- Hicks, David. 2014. *Educating for Hope in Troubled Times: Climate change and the transition to a post-carbon future*. London: Institute of Education Press, University of London.
- Hopkins, Rob. 2014 (2008). *The Transition Handbook: From oil dependency to local resilience*. Cambridge, UK: Green Books.
- Hughes J. Donald. 1989. Mencius' prescriptions for ancient Chinese environmental problems. *Environmental Review* 13: 15-27.
- Huppert, Felicia, Nick Baylis, and Barry Keverne, eds. 2007. *The Science of Well-Being*. Oxford and New York: Oxford University Press.
- IPCC. 2014. Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Field, C.B., Barros, V.R., Dokken, D.J., Mach, K.J., Mastrandrea, M.D., T.E. Bilir, T.E., Chatterjee, M., Ebi, K.L., Estrada, Y.O., Genova, R.C., Girma, B., Kissel, E.S., Levy, A.N., MacCracken, S., Mastrandrea, P.R. and L.L. White. (eds.)]. Cambridge, UK and New York: Cambridge University Press.
- Johnson, Eric J., Suzanne B. Shu, Benedict Dellaert, G. C., Craig Fox, Daniel G. Goldstein, Gerald Häubl, Richard P. Larrick, John W. Payne, Ellen Peters, David Schkade, Brian Wansink, and Elke U. Weber. 2012. Beyond nudges: Tools of a choice architecture. *Marketing Letters* 23: 487-504.
- Kahneman, Daniel. 2013. *Thinking Fast and Slow*. New York: Farrar, Straus and Giroux.
- Kahneman, Daniel, Ed Diener, and Norbert Schwartz, eds. 1999. *Well-Being: The Foundations of Hedonic Psychology*. New York: Russell Sage Foundation.
- Kellert, Stephen R., Judith Heerwagen, and Martin Mador. 2008. *Biophilic Design: The Theory, Science, and Practice of Bringing Buildings to Life*. Hoboken, New Jersey: Wiley.
- Klein, Gary. 2013. *Seeing What Others Don't: The Remarkable Ways We Gain Insights*. New York: PublicAffairs.
- Klein, Richard G. 2009. *The Human Career: Human Biological and Cultural Origins*. 3rd edition ed. Chicago: University of Chicago Press.
- Klein, Richard G. (with Blake Edgar). 2002. *Dawn of Human Culture: A Bold New Theory of What Sparked the "Big Bang"*

- of Human Consciousness*. New York: John Wiley and Sons.
- Korten, David. 2015. *Change the Story, Change the Future: A Living Economy for a Living Earth*. Oakland, CA: Berrett-Koehler.
- Kovacs, Maureen Gallery (translator and editor). 1989. *The Epic of Gilgamesh*. Stanford, California: Stanford University Press.
- Kramer, Samuel Noah. 1981 (1956). *History Begins at Sumer: Thirty-Nine Firsts in Man's Recorded History*. Philadelphia: University of Pennsylvania Press.
- Lerner, Jamie. 2014. *Urban Acupuncture: Celebrating Pinpricks of Change that Enrich City Life*. Washington, DC: Island Press.
- Louv, Richard. 2005. *Last Child in the Woods: Saving Our Children from the Nature-Deficit Disorder*. Chapel Hill, NC: Algonquin Books.
- Lovins, Amory, and The Rocky Mountain Institute. 2011. *Reinventing Fire: Bold Business Solutions for the New Energy Era*. White River Junction, VT: Chelsea Green.
- Lumley, Sarah, and Patrick Armstrong. 2004. Some of the Nineteenth Century Origins of The Sustainability Concept. *Environment, Development and Sustainability* 6: 367-378.
- Martin, Paul S. 1990. 40,000 Years of Extinctions on the Planet of Doom. *Global and Planetary Change* 82 (1-2): 187-201.
- Martin, Paul S., and R.G. Klein, eds. 1984. *Quaternary Extinctions: A Prehistoric Revolution*. Tucson: University of Arizona Press.
- Maslow, Abraham. 1993 (1971). *The Farther Reaches of Human Nature*. New York: Penguin Arcana.
- Matson, Pamela, William C. Clark, and Krister Andersson. 2016. *Pursuing Sustainability: A Guide to Science and Practice*. Princeton, NJ: Princeton University Press.
- McDonough, William, and Michael Braungart. 2002. *Cradle to Cradle: Remaking the Way We Make Things*. New York: North Point Press.
- McGillivray, Mark, and Mathew Clarke. 2006. Human well-being: Concepts and measures. In *Understanding Human Well-Being*, edited by Mark McGillivray and Mathew Clarke, pp. 3-15. Tokyo, Japan: United Nations University Press.
- MEA (Millennium Ecosystem Assessment). 2005. *Ecosystems and Human Well-being: Synthesis Report*. Washington, D.C.: Island Press.
- Meadows, Donella. 2014. Envisioning a Sustainable World. In *Creating A Sustainable and Desirable Future: Insights from 45 global thought leaders*, edited by Robert Costanza and Ida Kubiszewski, pp. 9-14. Singapore: World Scientific.
- Meadows, Donella, Dennis L. Meadows, Jørgen Randers, and William W. Behrens III. 1972. *The Limits to Growth: A Report for the Club of Rome's Project on The Predicament of Mankind*. New York: New American Library.
- Meadows, Donella H., Dennis Meadows, and Jørgen Randers. 1992. *Beyond the Limits: Confronting Global Collapse, Envisioning a Sustainable Future*. Post Mills, VT: Chelsea Green.
- Meadows, Donella, Jørgen Randers, and Dennis Meadows. 2004. *Limits to Growth: The 30-Year Update*. White River Junction, VT: Chelsea Green.
- Moos, Rudolf, and Robert Brownstein. 1977. *Environment and Utopia: A Synthesis*. New York: Plenum Press.
- Mumford, Lewis. 1959 (1922). *The Story of Utopias*. Gloucester, MA: Peter Smith.
- Mumford, Lewis. 1956. Prospect. In *Man's Role in Changing the Face of the Earth* (In Two Volumes), edited by William L. Jr. Thomas, with the collaboration of, Carl. O Sauer, Marston Bates and Lewis Mumford. Chicago: University of Chicago Press.
- Nichols, Alex, ed. 2006. *Social Entrepreneurship: New Models of Sustainable Social Change*. New York and Oxford: Oxford University Press.
- Nikam N. A., and McKeon Richard (eds.) 1966. *The Edicts of Ashoka*. Chicago: University of Chicago Press.
- Ornstein, Robert, and Paul R. Ehrlich. 2000 (1989). *New World, New Mind: Moving Towards Conscious Evolution*. Cambridge, MA: Malor Books.
- Ostrom, Elinor. 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge, U.K.: Cambridge University Press.

- Parkin, Sara. 2010. *The Positive Deviant: Sustainability Leadership in a Perverse World*. London: Earthscan.
- Pearce, Joshua M. 2012. The case for open source appropriate technologies. *Environment, Development, and Sustainability* 14 (3):425-431.
- People's Liberty. 2017. URL: <https://www.peoplesliberty.org> (accessed May 31, 2017).
- Perlo-Freeman, Sam, Aude Fleurant, Pieter Wezeman, and Siemon Wezeman. 2016. Trends in World Military Expenditure, 2015. Solna, Sweden: Stockholm International Peace Research Institute. URL: <http://books.sipri.org/files/FS/SIPRIFS1604.pdf> (accessed March 11, 2017).
- Plato. 1989. *Critias*. In *Timaeus, Critias, Cleitophon, Menexenus, Epistles*, pp. 255-307. Cambridge, Massachusetts: Harvard University Press.
- Plato. 1925. *Republic of Plato*, Translated into English with Introduction, Marginal Analysis, and Index by Benjamin Jowett. Oxford: Oxford University Press.
- Pollan, Michael. 2007. Unhappy Meals. *New York Times Magazine Section*, January 28, 2007. URL: <http://www.nytimes.com/2007/01/28/magazine/28nutritionism.t.html> (accessed May 7, 2017).
- Pope Francis. 2015. Encyclical Letter, *Laudato Si'*, of the Holy Father, Francis on Care for our Common Home. Rome: Vatican Press.
- Poteete, Amy R., Marco A. Janssen, and Elinor Ostrom. 2010. *Working Together: Collective Action, the Commons, and Multiple Methods in Practice*. Princeton, NJ and Oxford: Princeton University Press.
- Potts, Rick. 1998. Variability Selection in Hominid Evolution. *Evolutionary Anthropology* 7: 81-96.
- Potts, Rick. 1996. *Humanity's Descent: The Consequences of Ecological Instability*. New York: Avon.
- Prescott-Allen, Robert. 2001. *The Wellbeing of Nations: A Country-by-Country Index of Quality of Life and the Environment*. Washington, D.C.: Island Press.
- Protzen, Jean-Pierre, and David J. Harris. 2010. *The Universe of Design: Horst Rittel's Theories of Design and Planning*. London and New York: Routledge.
- Quinn, Daniel. 1992. *Ishmael: An Adventure of Mind and Spirit*. New York: Bantam.
- Rath, Tom, and Jim Harter. 2010. *Well Being: The Five Essential Elements*. New York: Gallup Press.
- Raworth, Kate. 2012. A Safe and Just Space for Humanity: Can We Live Within the Doughnut? Oxfam Discussion Paper: Oxfam GB. URL: <https://www.oxfam.org/sites/www.oxfam.org/files/dp-a-safe-and-just-space-for-humanity-130212-en.pdf> (accessed April 17, 2016).
- Rescher, Nicholas. 1998. *Predicting the Future: An Introduction to the Theory of Forecasting*. Albany: State University of New York Press.
- Rilling, James K., David A. Gutman, Thorsten R. Zeh, Giuseppe Pagnoni, Gregory S. Berns, and Clinton D. Kilts. 2002. A Neural Basis for Social Cooperation. *Neuron* 35 (2): 395-405.
- Rittel, Horst W., and Melvin M. Webber. 1973. Dilemmas in a General Theory of Planning. *Policy Sciences* 4: 155-169.
- Rockström, J., W. Steffen, K. Noone, Å. Persson, F. S. Chapin, III, E. Lambin, T. M. Lenton, M. Scheffer, C. Folke, H. Schellnhuber, B. Nykvist, C. A. De Wit, T. Hughes, S. van der Leeuw, H. Rodhe, S. Sörlin, P. K. Snyder, R. Costanza, U. Svedin, M. Falkenmark, L. Karlberg, R. W. Corell, V. J. Fabry, J. Hansen, B. Walker, D. Liverman, K. Richardson, P. Crutzen, and J. Foley. 2009a. Planetary Boundaries: Exploring the Safe Operating Space for Humanity. *Ecology and Society* 14(2): 32 pages. URL: <http://www.ecologyandsociety.org/vol14/iss2/art32/> (accessed April 17, 2016).
- Rockström, J., W. Steffen, K. Noone, Å. Persson, F. S. Chapin, III, E. Lambin, T. M. Lenton, M. Scheffer, C. Folke, H. Schellnhuber, B. Nykvist, C. A. De Wit, T. Hughes, S. van der Leeuw, H. Rodhe, S. Sörlin, P. K. Snyder, R. Costanza, U. Svedin, M. Falkenmark, L. Karlberg, R. W. Corell, V. J. Fabry, J. Hansen, B. Walker, D. Liverman, K. Richardson, P. Crutzen, and J. Foley. 2009b. A Safe Operating Space for Humanity. *Nature* 461 (282): 472-475.
- Ryle, Gilbert, and with an Introduction by Daniel C. Dennett. 2002 (1949). *The Concept of Mind*. Chicago: University of Chicago Press.
- Sachs, Jeffrey 2016. Happiness and Sustainable Development: Concepts and Evidence. In *World Happiness Report 2016, Update (Vol. I)*, edited by John Helliwell, Richard Layard and Jeffrey Sachs, pp. 56-65. New York: Sustainable Development Solutions Network.

- Sambira, Jocelyne 2017. Peacekeeping budget one half of 1% of global military spending (remarks from UN Secretary General, Antonio Guterres). United Nations Radio, April 6, 2017. URL: <http://www.unmultimedia.org/radio/english/2017/04/peacekeeping-budget-one-half-of-1-of-global-military-spending-guterres-2/- .WQ9zXLSOrIZ>. (accessed May 7, 2017).
- Sahlins, Marshall. 1972. *Stone Age Economics*. New York: Aldine de Gruyter.
- Sanderson, Eric W. (author), and Markley Boyer (Illustrator). 2013. *Manahatta: A Natural History of New York City*. New York: Abrams.
- Schaer, Roland, Gregory Claeys, and Lyman Tower Sargent, eds. 2000. *Utopia: The Search for the Ideal Society in the Western World*. New York: The New York Public Library and Oxford University Press.
- Schumacher, E.F. 1989 (1973). *Small is Beautiful: Economics as if People Mattered*. New York: HarperPerennial.
- Shah, Idries. 1985. *The Elephant in the Dark*. London: Octagon Press.
- Sears, Paul B. 1965. Utopia and the Living Landscape. In *Utopias and Utopian Thought: A Timely Appraisal*, edited by Frank E. Manuel, 137-149. Boston: Beacon Press.
- Seligman, Martin E. P. 2011. *Flourish: A Visionary New Understanding of Happiness and Well-being*. New York: Atria.
- Sellers, Christopher. 2016. The Flint Water Crisis: A Special Edition Environment and Health Roundtable. Edge Effects. University of Wisconsin, Madison: Center for Culture, History, and Environment, Nelson Institute for Environmental Studies. URL: <http://edgeeffects.net/flint-water-crisis/> (accessed June 8, 2016).
- Sen, Amartya. 1993. Capability and Well-Being. In *The Quality of Life*, edited by Martha C. Nussbaum and Amartya Sen, pp. 30-53. New York: Oxford University Press.
- Senge, Peter, Bryan Smith, Nina Kruschwitz, and Joe Laur, Schley, Sara. 2008. *The Necessary Revolution: How Individuals and Organizations Are Working Together to Create a Sustainable World*. New York: Doubleday.
- Shaffer, Aaron. 1983. Gilgamesh, The Cedar Forest, and Mesopotamian History. *Journal of the American Oriental Society* 103: 307-313.
- Shepard, Paul. 1973. *The Tender Carnivore and the Sacred Game*. New York: Scribners.
- Sivard, Ruth Leger. 1996. *World Military and Social Expenditures*. 16th ed. Washington, DC: World Priorities.
- Skinner, B. F. 1987. Why We Are Not Acting to Save the World. In *Upon Further Reflection*, pp. 1-14. Upper Saddle River, New Jersey: Prentice-Hall.
- Smil, Vclav. 2011. Harvesting the Biosphere: The Human Impact. *Population and Development Review* 37 (4): 613-636.
- Snyder, Gary. 1969. *Turtle Island*. New York: New Directions.
- Steffen, Alex, and Al (Foreword) Gore, eds. 2008. *Worldchanging: A User's Guide for the 21st Century*. New York: Abrams.
- Steffen, W., K. Richardson, J. Rockström, S.E. Cornell, I. Fetzer, E.M. Bennet, R. Biggs, S.R. Carpenter, W. De Vries, C.A. De Wit, and et al. 2015. Planetary boundaries: Guiding human development on a changing planet. *Science* 347 (6223): 17 pages. URL: <http://www.ramanathan.ucsd.edu/files/pr210.pdf> (accessed March 12, 2017).
- Steffen, Will, Angelina Sanderson, Peter Tyson, Jill Jäger, Pamela Mateson, Berien Moore III, Frank Oldfield, Katherine Richardson, H. John Schellnhuber, B.L. Turner II, and Robert J. Wasson. 2005. *Global Change and the Earth System: A Planet Under Pressure*. Berlin: Springer.
- Sterling, Stephen, Harold Glasser, Marco Rieckman, and Paul Warwick. 2017. "More than scaling up": a critical and practical inquiry into operationalizing sustainability competencies. In *Envisioning Futures for Environmental and Sustainability Education*, edited by Peter Blaze Corcoran, Joseph P. Weakland and Aren E.J. Wals, pp. 153-168. Wageningen, The Netherlands: Wageningen Academic Publishers.
- Stiglitz, Joseph H., Amartya Sen, and Jean-Paul Fitoussi. 2010. *Mis-measuring Our Lives: Why GDP Doesn't Add Up*. New York: The New Press.
- Sull, Donald, and Kathleen M. Eisenhardt. 2015. *Simple Rules: How to Thrive in a Complex World*. Boston and New York: Houghton Mifflin Harcourt.
- Suzuki, David, and Holly Dressel. 2002. *Good News For A Change: How Everyday People Are Helping the Planet*.

- Vancouver, Canada: Greystone Books.
- Thaler, Richard H., and Cass R. Sunstein. 2009. *Nudge: Improving Decisions About Health, Wealth and Happiness*. New Haven: Yale University Press.
- The Oberlin Project. 2017. URL: <http://www.oberlinproject.org> (accessed May 31, 2017).
- Thomas, Mary Adam. 2016. *The Living Building Challenge: Roots and Rise of the World's Greenest Standard*. Portland, OR: Ecotone Publishing.
- Thomas, William L. Jr., with the collaboration of, Carl. O Sauer, Marston Bates, and Lewis Mumford, eds. 1956. *Man's Role in Changing the Face of the Earth* (In Two Volumes). Chicago: University of Chicago Press.
- Toynbee, Arnold. 1947. *A Study of History: Abridgement of Volumes I - VI* by D.C. Somervell. New York: Oxford University Press.
- UN. 2014. The Road to Dignity by 2030: Ending Poverty, Transforming All Lives and Protecting the Planet. Synthesis Report of the Secretary-General On the Post-2015 Agenda. New York: United Nations.
- UN. 2015. Resolution adopted by the General Assembly on 25 September 2015. Transforming our world: the 2030 Agenda for Sustainable Development. New York: United Nations. URL: <https://sustainabledevelopment.un.org/content/documents/21252030%2520Agenda%2520for%2520Sustainable%2520Development%2520web.pdf> (accessed April 23, 2017).
- UNDP. 2016. Human Development Report 2016: Human Development for Everyone. New York: UN Development Programme. URL: http://hdr.undp.org/sites/default/files/2016_human_development_report.pdf (accessed April 27, 2017).
- UNESCO. 2014. Roadmap for Implementing the Global Action Programme on Education for Sustainable Development. Paris: UNESCO.
- UNESCO. 2015. Rethinking Education: Towards a global common good? Paris: UNESCO.
- Vitruvius. 1983, 1985 (1931, 1934). *De Architectura*. Translated by edited and translated by Frank Granger. Two Volumes, Loeb Classical Library. Cambridge, Massachusetts: Harvard University Press.
- Vrba, Elisabeth S., George H. Denton, Timothy C. Partridge, and Loyd H. Burckle, eds. 1995. *Paleoclimate and Evolution, with Emphasis on Human Origins*. New Haven: Yale University Press.
- Watzlawick, Paul, John Weakland, and Richard Fisch. 1974. *Change: Principles of Problem Formation and Problem Resolution*. New York: W. W. Norton.
- Weisman, Alan. 1998. *Gaviotas: A Village to Reinvent the World*. White River Junction, VT: Chelsea Green.
- Wells, Spencer. 2003. *Journey of Man*. New York: Random House.
- Wicks, Judy. 2013. *Good Morning, Beautiful Business: The Unexpected Journey of an Activist Entrepreneur*. White River Junction, VT: Chelsea Green.
- Wilkinson, Richard, and Kate Pickett. 2011. *The Spirit Level: Why Greater Equality Makes Societies Stronger*. New York: Bloomsbury.
- Wilson, Edward O. 2016. *Half-Earth: Our Planet's Fight for Life*. New York: W. W. Norton.
- Wilson, Edward O. 1994. *Naturalist*. Washington, D.C.: Island Press.
- Wilson, Edward O. 1984. *Biophilia: The Human Bond with Other Species*. Cambridge, Massachusetts: Harvard University Press.
- WWF (World Wide Fund for Nature). 2016. Living Planet Report 2016. Risk and resilience in a new era. Gland Switzerland: WWF International. URL: http://assets.worldwildlife.org/publications/964/files/original/lpr_living_planet_report_2016.pdf?1477582118&_ga=1.90001563.1816548374.1489349667 (accessed March 21, 2017)
- Yunus, Muhammad, and Alan Jolis. 2008. *Banker to the Poor: Micro-Lending and the Battle Against World Poverty*. New York: PublicAffairs.