Sketches of a Circular Economy

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Introduction

As we progress into the sixth mass extinction event of our global history, humanity increasingly considers the significance of our role in the planetary health which supports our own vitality. How can we live in better harmony with each other and the living systems that support life on Earth? What will guarantee not only our survival, but for humankind to thrive well into the future? Who is facilitating holistic economy, lifestyle and technology? How do we ignite popular passion, facilitating innovative enterprise at a massive scale? Will humanity adopt the principles necessary to survive?

Biodiversity is the basis for our existence. It is the complex assortment of species and organisms existing in Earth's habitats, creating unique and highly interlinked biological systems which generate and sustain life. Right now, species are disappearing at rates as high as 1,000 times that indicated over the span of the evolutionary fossil record. On average, one thousand known species disappear from existence each year. The biodiversity of our entire planet is threatened more severely than ever before. Without a healthy ecosystem, the biosphere that humans rely on to survive will fail – and humans are driving the destruction (Tuxill and Bright).

Circular Economies

Natural systems are built as interconnected wholes. Each part has an essential role in the overall health and stability of the system. From the atom to the universe, self-producing and self-sustaining trophic loops characterize Nature. Nothing is wasted. Every piece and element is necessary and dependent on the other parts for the system to function properly. Natural systems are versatile and resilient, resulting in a net positive effect on all components comprising the system (Dicks, Vanderbilt).

A single leaf produces energy for a tree through photosynthesis. The leaf could not exist without the tree and the tree could not exist without its leaves. But the leaf has other purposes, and the tree has other parts, like protective bark, which matter. The tree canopy provides shade, temperature control, and water regulation. The root system stabilizes the surrounding soil and seeks out water and nutrients to nourish the tree. When the leaf falls and decomposes, nutrients are added for the tree and other life. Eventually, the tree itself will die and return to the soil, adding an abundance of nutrients. Throughout the tree's life and death, a host of symbiotic relationships with other organisms are supported: health, habitat, reproduction strategies. The tree is connected to weather patterns, water systems, solar activity, soil quality, and the overall biodiversity that exists in its ecosystem. It is interconnected. It is interdependent.

We can look to Nature for ideas, but true sustainability requires that our technologies and ways of life be integrated into dynamic circular systems, like the tree. We can't copy one

element from a system and disregard the interconnected quality that characterizes it. A solar panel can create energy, for example, but if solar panel development relies on strip-mining for materials which are simply dumped into landfills once retired, we are not really behaving in a wholly sustainable system. While we may have a reduced carbon footprint in our building, we are ignoring the full impact of our design. Exploitive resource acquisition and disposal continue the work of environmental damage. Ideally, we can utilize *complete* systems inspired by Nature so that we may have a net positive effect overall (Dicks). How can a solar panel be created, used, and reclaimed without any waste, using materials we've already harvested, or which are available through regenerative means?

Connection and disconnect

Humankinds' relationship within Nature – as part of a circular natural ecology – is a deeply ingrained aspect of many indigenous cultures throughout the world. It is a truth that western culture and domination has systematically denied (Justice, Coulthard). Advances in science and religious theory have begun to challenge a rigid system of thought and construct which keeps our minds and world compartmentalized and fragmented (Maxwell).

Mankind's influence threatens Earth's life-supporting environment with over-exploitation, habitat loss and alteration, exotic species invasion and chemical pollution. As we disrupt 10,000 years of stability very quickly, we exponentially lose the ability to study and apply concepts of naturally functioning, highly efficient systems – systems we are just beginning to study, catalog and generally understand in the westernized frame of mind. And still, so much of what we're losing remains a mystery to us. A fragmented view separating humans from all other living things justifies market demands, technological development, and increasing population, pushing human-driven destruction further and further (Maxwell, Tuxill & Bright).

In his 2009 book, *Down to the Wire: Confronting Climate Collapse*, David Orr observes that the 'growth at all costs' attitudes of both capitalism and communism "have failed to account adequately for the value of natural and social capital assets, such as a stable climate, functioning ecosystems and successful human communities" (Costanza). We see this highlighted in political attacks on the Environmental Protection Agency (EPA) through proposed defunding and reorganization in favor of unsustainable, dirty energy (Worland, Patel). This was exemplified by the Trump administration's edits to the official White House webpage in 2017:

> President Trump is committed to eliminating harmful and unnecessary policies such as the Climate Action Plan and the Waters of the U.S. rule (White House: Trump).

The text above replaces the previous administration's content, which is much more in line with the near-unanimous consensus of international scientists regarding the urgency of climate change:

> …[N]o challenge poses a greater threat to our children, our planet, and future generations than climate change (White House: Obama).

It is debatable that the previous administration created enough effective legislation and culturally relevant, lasting shift to make an incredible difference, though (Hickman). The systems that have enabled corporate control of government regulations in favor of private industry have been in place a very long time. The issues we are confronting are systemic characteristics of a capitalist economy (Chomsky).

> [David Orr] describes three essential categories of radical change, in increasing order of difficulty. The first and most easily achievable is a redesign of the infrastructure for producing food, energy, water and other commodities so that it is powered by renewable sources. Second is an overhaul of education systems to develop ecological literacy and encourage creative, real-world problem solving. The third is to reform our political systems from the current corporate plutocracies to true democracies with real leaders (Costanza).

These are essential components for humanity to thrive. Beginning at a local, immediate level is the most pragmatic way to progress a regenerative agenda. While Orr ends in large-scale reform, he echoes the words of Steven Cohen: "Environmentalism is less a political perspective than a way of understanding how the world works… The drive for a renewable economy housed on a sustainable and not-deteriorating planet is a key part of... cultural shift".

Fragmentation

We can see the connectivity of systems in all aspects of life. In the way our blood regulates, maintains and nourishes our bodies; in the way the tree grows and lives; in the way water cycles from the sky to the Earth and back again. Observe the way our body, mind and spirit converge, defining our human condition. However, we tend to experience ourselves as fragments. A mind with different types of functions and uses, each considered more or less practical. A body with different independent organs and parts. A social personality interfacing with an outside world of other personalities and objects. And so, it goes. But we are entities of an interconnected system of biology, a mind which generates meaning, and an awareness of spirit creating a whole. Each aspect depends on the others for alignment and existence. Because of this fragmented mindset, we also view the observed world as a series of individual things rather than a complete and whole system of interrelated parts.

"It is becoming increasingly clear that the major problems facing humanity – overpopulation, poverty, inequity, resource depletion, biodiversity loss, ethnic conflicts, environmental degradation, crime, and social decay – are interconnected and interdependent. They are systemic problems that are impossible to address in isolation" (Maxwell). Major issues facing the world today are symptoms stemming from a root cause. Viewing humans and our technology as existing outside of nature is an extension of our fragmented worldview. The way we develop our living spaces, psychology, culture and technologies is out of alignment with overall natural systems because we no longer identify with the natural world (Maxwell, Dicks).

Rachel Carson was one of the first western scientists to observe what many indigenous peoples have always inherently known – that humans are a part of a greater system. She was a key figure in popular American consciousness in the mid-twentieth century, igniting public interest and dialogue with her passion and accessibility. A leading voice in the demand for the creation of the EPA, she knew that we must safe guard our environment against those that would put profits above the long-term survival of our own vitality. She saw the necessity for humankind to integrate more harmoniously with the natural world from which we belong (DeMarco).

Sustainability

True sustainability requires that technology and development be integrated into dynamic circular systems. The most intelligent systems are somewhat simple and suit multiple needs and outcomes. Thriving systems are native to the functions they serve. In other words, the characteristics and functionality of the system is inherent and specific – and typically versatile as well. A tree provides climate regulation, air filtration, food, habitat and so on because it is perfectly designed to do those things in the system that it is plugged into. The tree is native to its function. The tree system behaves in a highly intelligent manner serving many needs in a multitude of ways while being wholly sustained by a larger ecological system. We must utilize these complete negentropic circuits in our own design, incorporating needs beyond material economics, expanding features to encompass and connect in broader, smarter ways.

It should not be our intention to replace nature, but to integrate and sustain it while drawing insight into what will work long-term and what will not. Not to imitate, but to coalesce from both directions, for Nature holds knowledge spanning well beyond our own species' existence. In fact, its systems and structures are the product of about 3.8 billion years of research and development. Parameters for our design framework are already determined. Guides and markers are here for us to find and use (Dicks).

Biomimicry is the development of technologies modeled after systems and entities found in nature. It's inspired inventions as famous as Velcro and as strange as saltwater irrigation modeled after camel noses. It seeks not to replicate Nature, but to take inspiration and create new innovations and technologies from examples we find there (Vanderbilt). "'Biomimicry uses an ecological standard to judge the 'rightness' of our innovation… [N]ature has learned: What works. What is appropriate. What lasts'" (Dicks). Nature's laws are unnegotiable (DeMarco). Limitations promote creation by forcing things to stand out and come forth. By referring to Nature's parameters, we create within the laws of Nature.

> "The greatest challenge is to manage the use of technical capabilities with the wisdom to recognize the limits to growth and the limits to the ecosystem that support all life on Earth" (Dicks).

As we witness more super-disasters in response to human-driven climate change, we begin to understand the cost we pay for trying to negotiate the unnegotiable.

Incorporation and opportunity

Nature "produces in abundance by co-operating with the beings around it… [Competition occurs, but it is] sustainable thanks to the self-productions of the basic whole in which the competing parties reside… [otherwise,] trophic loops on which all life ultimately depends would not exist" (Dicks).

Variety is needed in any living system. Divergent parts drive resiliency, creativity, and robusticity (Holliday). The way these varying parts converge into an overall system creates a harmony. After all, music isn't made with a single note. The 'edge effect' is an ecological concept referring to several habitats converging, resulting in changes and typically a boost in biodiversity and vitality (Depiano). In a sense, this concept can be applied to human habitat meeting that of other creatures and illuminate the level of possibility within that meeting when approached from a holistic and integrated point of view.

Homo sapiens are characterized by the tendency to use technology to adapt our surroundings to support fragile bodies and specific needs. As transportation technologies have developed and we advance our ability to transform places to make them more hospitable to our comfort, we seep into previously less-inhabited places and conform them to suit our specific ways of life (Heyes).

The idea that we can set aside land that is unoccupied and wild in an idealistic construct of conservation isn't truly sustainable and reinforces a fragmented mindset, inferring that we are separate from the natural whole instead of intrinsically part of it. Conservation strategies must be brought into our communities and civic structures more; Self-sustaining systems must permeate our daily lives. The fate of complex and rich ecosystems "depends less on what happens in parks than on what happens where we live, work and obtain the wherewithal for our daily lives" (Tuxil & Bright).

Permaculture is the practice of applying Nature's own methodologies to develop land and grow food. It is modeled on intuitive, resourceful and holistic systems and phenomenon. Social permaculture uses these concepts to build communities and programs or projects that encourage sustainable and healthy relationships at a local level. A tenet of this philosophy is the axiom 'the problem is the solution' (Depiano).

The city of Arcata, CA addressed their water purification needs while also rehabilitating a problematic and overused industrial site into a marsh and wildlife reserve. The city's wastewater now enters a marsh system at the edge of Humboldt Bay. Through a series of lagoons and ponds, wastewater is cleaned, natural organisms repopulate, and biodiversity builds. The marsh now supports a vital wildlife reserve hosting hundreds of bird species. The treatment plan not only cleans wastewater but returns it to a natural and beneficial state by utilizing ecologically based systems. The Arcata Marsh also serves as a community hub with trails, a boat launch into the bay, bird blinds and an interpretive center teaching the local population about ecology and other sciences (Arcata Marsh). This is an excellent example of a circular system embedded into a modern civic structure. Environment, community, quality of life and the basic needs of waste management and clean water were included in the interpretation of the land problem. The marsh area could have remained a landfill fated to be capped due to pollution issues if the citizens lacked the initiative and foresight to install this

more comprehensive and beneficial project, pointing to the localized and cultural nature of progress toward regenerative systems. As Janine Benyus, a key figure in the development of Biomimicry, proffers, “our transition to sustainability must be a deliberate choice to leave the linear surge of an extractive economy and enter a circulating, renewable one” (Dicks).

Modern obstacles to general awareness

Unfortunately, Rachel Carson’s fear that the strength of public engagement in the interest of environmental viability would diminish over time (DeMarco) has been all too true. What’s more, the attributes that won her energetic popular support still have merit, but are no longer as effective. Steven Cohen, Executive Director of Columbia University’s Earth Institute, observes, “people in the developed world like their lifestyles and do not want to lose them. The notion of progress and improvement is being replaced by the more conservative sentiment to retain or sustain what we have.”

So, in an era of low public interest and well-ingrained cultural aspects of consumerist structures and economies, how can we shift the narrative to one rooted in environmental ethic and a sense of connectedness with our own selves, each other and the planet that necessitates and facilitates our existence? Convenience lifestyles and perceived normalcy in our social constructs need to be disrupted to make way for the technology of circular economics to be built in integral ways… and that takes focused effort and the lens of a new paradigm.

Creative focus

Focusing on what we want to create – instead of only fighting what we don’t want – diverts vital energy into innovation and progress while reframing the work and mindset of sustainability. Instead of relying only on legal caps and other (necessary) tools of monitoring and calibrating degradation, we can approach development and lifestyle in a positive way, aiming not to limit harm, but to build with a complete vision of interconnectivity and sustainability out right. “Following [Rachel] Carson’s principles, for example, would guide choosing to build a housing development based on ground sourced heat pumps, passive solar design and photovoltaic electricity for a net zero energy design as opposed to natural gas and coal fired electricity supported buildings.” We should – and hopefully will – only build to meet an ideal for positive future outcomes, rather than building out of necessity or only profit and trying to subsequently combat the damage as if it’s inevitable. Our choices and values inform our methodology, possibility, needs and outcomes (DeMarco).

Fortunately, there has been a large amount of work in the areas of sustainability and alternative technologies. Individuals and groups are constantly developing projects, ideas, discussion and resources. As we change the technologies that inform our economies and therefore our cultures, the politics, rules and norms we live by are shifted. Encouraging trends in popular thought and lifestyle choices are beginning to be more and more noticeable. The work of sociologist Paul H. Ray and psychologist Sherry Ruth Anderson defines modern American culture in three categories:

> '[T]raditionals', who include the religious right and others who hark back to the past; 'moderns', who are the current dominant group and include the 'growth at all costs' type; and 'cultural creatives' (which facilitate innovation and change) ... The percentage of cultural creatives in the United States increased from almost nothing in the 1960s to 25% by the year 2000, and [by 2009 was] close to 30% by some estimates. *A political tipping point will occur when this percentage is large enough to begin to radically change the political dynamics of the country and, by extension, the world* (emphasis added, Costanza).

Facets of an American cultural shift

Cultural creatives are a vital component to the realization of sustainability culture as a normative way of life. They are who creates, tests, adapts, promotes and teaches new systems and technologies. Creating a clear vision and tangible tools – in the form of technologies – are vital processes in the long-term work of realizing something new. Applying and popularizing these tools, so that the technology leads economic trends, is just as vital as their development. Tools only make a difference if they're used (Costanza, Cohen).

> The technology of transportation, information, and communication has helped create a global, interconnected economy… These technologies bring enormous benefits, but also carry significant costs. Traditional community life is endangered, as is a sense of place, replaced by a homogeneous world culture. And of course, the natural resource base of the world economy is also threatened by the wanton destruction of relentless, non-renewable material production.
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> Technological change results in economic change that in turn causes social change. Social change forms the boundaries for political legitimacy and the political agenda and that creates the context for political change (Cohen).

Counterculture, arts and activism have long been areas of experimentation and innovation. These are key nodes hidden just beneath the structure of a mainstream society. It is here that members of a community develop and test systems and cultivate ideas. This is the sector that radical notions are conceived and nurtured, where the new things that will take the place of the old are formed. It is where inventions are initiated before they turn into product development projects and where normative constructs are first questioned and challenged. As alternative lifestyles and trends catch on in popular culture, more and more discussion and cultural shift begins to take place, eventually permeating into what is known as the mainstream and changing a larger cultural narrative informing values (Webb, Roszak, Kozinets and Handelman).

Because of their unique position of power, commerce, community and culture, businesses have a potent influence over their employees, customers and affiliates. In turn, businesses can serve as cultural pollinators, disseminating creative change. Company culture

has become a strong area of interest as popular books such as *Delivering Happiness* by Tony Hsieh, the founder of Zappos.com, and *The 7 Habits of Highly Effective People* by Steven Covey focus on mindset/logic and employee climate as tools to drive profitability and creative product development, marketing, service and operations. While many executives can see the appeal in higher profits, and at a surface level seem to understand that employee happiness is tied to performance, it is often difficult for them to invest in the types of sustainable and holistic infrastructure needed for this to take hold (Holliday). We are still at a cultural turning point as values are being analyzed and checked against profitability and resource needs. However, the work of evolving business concepts continues and expands. Striving to stay abreast of budding popular interest in sustainability and to find more meaning in their company cultures, a host of various online resources, has populated the internet coaching enthusiastic employers on sustainable company management and philosophy. There is an entire industry rooted in sustainable business practices now in full swing. In fact, a friend of mine works with corporations to determine their biggest areas of environmental damage then uses this information to create and execute strategies to turn those areas into net zero or net positive environmental impacts. These projects are then used to rebrand and market the company as a conscientious steward of both the planet and their customer's assets. Another friend of mine travels throughout the nation designing and building large solar panel projects that completely redesign entire towns' energy resources.

Regenerative business and embodiment are also becoming hot-button topics. Titus Kahoutek at Heroics Training Systems in Seattle, WA works with companies to accomplish holistic systems that embrace health in the company, the planet and the lived experience of each individual. He begins with body-based awareness practices rooted in physical and mental health, known as embodiment. These trainings are then used to jump off into business structure planning from how materials are developed to conscious employee culture (T. Kahoutek, personal communication, November 4, 2017). Michelle Holiday, a pioneer in the Thrivability industry boasting both a marketing and biology background, describes business as a living organism. Business follows the same patterns as other living systems and using this knowledge she promotes a competitive cooperation within the commercial realm. Applying living system concepts – such as divergence and convergence – to business structure goes beyond consistent sales and enters an ideology of practical integration and continuous growth. Looking at business as a living system promotes more holistic company culture regarding infrastructure, public interfacing, materials sourcing, purpose, and employee well-being. Holiday promotes "Thrivability" as opposed to simple sustainability and argues that we are now exiting the age of divergent industrialization and into a new one of convergent thriving.

Beyond business, we are seeing more and more complete programs within communities. These might look like greenspaces in cities, low-income housing built with more energy efficiency, early learning centers utilizing Montessori techniques, or even public health programs. A defining characteristic of thriving civic programs is an element of integrated proactivity and direct community feedback loops during planning. In 2012, Walton County, FL found many root causes related to ongoing chronic conditions through community engagement and polling. Specific strategies and projects were designed and implemented. For example, access to fresh produce and increased nutrition was encouraged through a "garden in a bucket" initiative and later implemented throughout the county. In Indian River County, FL an

environmental health project was developed and informed through simultaneous public input, resulting in the identification of specific issues to build initiatives around. Environmental health became a key feature of greater public health planning. In both projects, citizens were asked, listened to and served in proactive ways. Health was not only defined by access to medical care, it was also about direct access to fresh foods, empowering individual actions and a beneficial environment. Embedding circular economics into civil services is a beautiful and necessary way to take care of people in all areas (Price et al).

Physical communities are often where sustainability projects really take root and begin to spread. Community-based models are seen by the public and can be adopted by other communities with similar or parallel needs. Public projects increase the 'edge effect', so that more perspectives and ideas influence their development and progress. Basing projects within communities also gives the community direct power instead of relying on government regulations and programming. This gives the general population more ability to refuse to participate in government-enforced structures that may not be in alignment with the values of circular economies. It also strengthens community bonds, expands other resources as networks expand and gives people basic resources and tools for more self- and direct community-reliance.

Childhood experiences through family, culture and education form world perspectives that set the tone for those who eventually drive society. Young people now have grown up with a degree of environmental awareness, even if their ethic doesn't always match.

> [T]he facts of global interconnectivity are increasingly hard-wired into our culture and values. The importance of environmental quality and sustainability is an inescapable part of our shared understanding of how the world works. The political manifestation of that understanding has begun, even though its specific trajectory is difficult to predict.
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> We do know that people like to breathe, drink water and eat. Preserving the resources needed to ensure sustenance is a requirement of all political processes and governing regimes. (Cohen)

People care about things that directly affect them and are clear and present dangers. Sustainability must be *personal*. Starting at local levels, we help people engage with systems and networks that matter to them. This is a first step in a long road of awareness cultivation and systemic restructuring. As people recognize their ties to the local land and environment, a greater worldview can be cultivated. Over time, it is hopeful that humanity will come to embrace the extent of our deep relationship to the spectacular systems we are inherently ingrained within.

Conclusion

The future stability of our biosphere is in jeopardy and that the issue must be addressed quickly, though we do not currently have the economic, cultural or political wherewithal to do it at this time. The technologies needed to sustain life rely on concepts of trophic loops incorporated into the natural world. These are just beginning to bud and take form. Shifting

economic viability and cultural attitudes are urgent necessities for this to occur. Creating a sense of personal involvement and value at a local level is a first step, though the change must escalate at a more rapid pace than it currently is, or the degradation of our planet will be too far advanced to reverse. New methods and concepts must be developed and applied to facilitate the rapid and sustainable culture shift that will empower humanity to save ourselves from ourselves.

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