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Nature: A Teacher of Change, Where Environment and Society Intertwine

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Nature: A Teacher of Change

Where Environment and Society Intertwine

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Giant ground sloths, caterpillars, and pluripotent cells all eventually cease to be. Biology, the field of life, is a field of constant change, whether that change be through extinction, metamorphosis, or differentiation. Change occurs in life across various scales, from the geologic to the microscopic. Just like biology, society also undergoes continual change as people enter the streets, laws are passed, and natural disasters occur. As a collection of organisms, society's tendencies toward change, at times, may parallel those in the natural world. Additionally, indigenous knowledge, synergy, multi-level evolution and resilience thinking are instances where understanding the natural world can also provide a unique perspective for viewing our own society.

Traditional, indigenous, and local knowledge all tend to be used to describe the knowledge entwined within indigenous or local cultures. Unsurprisingly, the "traditional" knowledge of these groups tends to be gathered in stark contrast to what has been called "modern" or "scientific" knowledge. For instance, it is said that when looking at indigenous knowledge holism and intuition replace analysis and reductionism, subjectivism and qualitative analysis replace objectivism and quantitative analysis, oral traditions replace academic literature and peer review, and the sacred replaces empiricism. Specifically, valuing holism in addition to reductionism could facilitate change within the larger context of society.

Reductionism and holism contrast methodological and epistemological claims about the relationships between a layer of organization and the layer below. Reductionism tends to be described as viewing a layer as a summation of the parts of the layer below. This is in contrast to holism, which views a layer as greater than the sum of its parts because it is how these parts interact and the layer above that led to a given layer. Western science has begun to acknowledge holism through fields such as ecology and complexity science, but as developments in genetically modified organisms for agriculture demonstrate, considering the whole picture of genetic transmission, species interactions or ecosystem functioning is missing. American society is structured within this reductionist mindset, that the creation of distinct parts that do not need to be integrated in order to produce a functioning whole. This is apparent in some businesses, policies and schools. For example, the notion of prison, or pulling someone out of society discounts the interactions they had previously within society that would be impacted by their absence. The reductionist approach recognizes the crime and thus the punishment of an individual, the holistic approach would have to consider the family, community, in addition to the crime.

Western science is dedicated to understanding the underlying holistic tendencies of life that lies in complexity science. As its name suggests it is a field dedicated to understanding complex systems. Within this field, the concept of synergy provides both insight into biology as well as our own society. Synergy describes the cooperative effects that arise through the interaction of two components whether they be molecules, metabolic processes or organisms. Specifically, the self-organization and the emergence are synergistic behaviors that may result due to these interactions. While self-organization describes the parts that slowly increase in order, emergence is a novel behavior that results from the interactions. For example, putting a bunch of activist Obies in a room may allow them to self-organize into an activist group, but no new behavior develops — hence an example of self-organization. However, placing a collection of H_2O molecules in a glass produces a novel behavior, water — an example of emergence. These concepts are not only used to describe the origins of life, but also society. Life is simply an emergent behavior, but so is a functioning society. The interactions of parts produce the whole.

Through considering parts, wholes, and multiple levels of interaction scholars, such as Peter Corning, have proposed the Synergistic Hypothesis through considering multi-level selection. Synergistic hypothesis is claiming the cooperation of parts and the resulting effect are responsible for many of the major transitions, creating new layers of biological complexity such as multi-cellularity. However, small changes within evolution are due to the interaction across multiple different levels, which adjust to changes resulting in changes within the layers above and below. This tendency occurs within society as people discuss the differences of top-down or bottom-up change to a system. As people take to the streets, they are not only self-organizing into and produce an emergent crowd mentality, but they are also advocating for an alteration at the next scale up. The American government with local, state and national governmental offices attempts to facilitate multiple levels for change and adaptation. Demanding structural change through large protests such as Occupy Wall Street or the Women's March have yielded no tangible structural

transformations, however, this is the equivalent of a collection of cells gathering to produce a different organism. If the cells simply cease functioning but reproduce then that means the organism dies from cancer. This would be the equivalent of the discontentment of the country increasing the number of people on strike. However, if these cells begin altering their behavior through self-organization and potentially emergence, an alternate structure will take place. As policies are implemented from the top, which alter where money is allocated, people are simultaneously organizing from the bottom. This could be two methods for facilitating the same goal of change, but regardless the system is adapting, facilitating a larger structural transformation.

Adaptation and transformation are two critical terms in resilience thinking. Resilience is the ability of a system to recover after a disruption or disturbance, so resilience thinking is a way of reframing the world with change as the constant. Adaptation and transformation are two ways that systems can change. Adaptation means that the system is simply adjusting yet maintaining the same function, whereas transformation means that the system has reconfigured its structure to serve a new function. While resilience has been substantially discussed in ecology to prevent the complete transformation of an ecosystem after a disturbance, this concept has also been used within economics, psychology and sociology. The differentiation of adaptation and transformation in society is debated within America. Do we need a complete structural transformation such as removing capitalism or "draining the swamp" or do we simply need to adapt by changing legislature of who enters the country and who should be taxed?

Stemming from the biological conversations around indigenous knowledge, synergy, multi-level evolution and resilience thinking is ingrained in our society, which is highly interconnected to the biological world. Not only has science influenced the way we learn about life, but also the way we perceive it, parts that we can tinker with. While climate change is demonstrating the integration between the social and ecological world, there is a lot of wisdom western science has yet to learn from indigenous groups who have seen these two worlds as integrated for centuries. Nature can teach us about the importance of connectivity and information diffusing throughout society instead of being sequestered in academic journals or particular departments. Additionally, life demonstrates the importance of cooperation in creating major transitions within society instead of competition. Multiple levels of interaction allow for resilience over time through small adjustments and connections. Instead of the erection of a structure from the top down, social media and technology may allow for the emergence of a new resilient societal structure. This new structure may encompass people returning to small scale locally based farming, apps documenting the location of pollution, police brutality and ICE raids, communities developing their own transformative justice frameworks for handling harm and non-for-profits building their own sustainability instead of competing for grants.

Depending on where you look there are numerous solutions and insights into resilience, which can enable major transitions into a more collaborative, equitable, and locally rooted society.