



## RESEARCH ARTICLE

### ECOLOGICAL THINKING AND RECIPROCAL ALTRUISM MAY PROMOTE WORLD PEACE, CREATIVE COLLABORATION AND SUSTAINABLE DEVELOPMENT

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Target Audience: Registered Nurses in New York City

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#### ABSTRACT

In the name of economics, many political decisions are made with little attention to detrimental consequences for human and environmental ecology. By describing indelible links between economics and ecology, the authors hope to engage university professors toward developing concept documents that could be utilized by non-Profit Foundations advising international diplomats and governmental policy making professionals.

## INTRODUCTION

From John Stuart Mills to Maynard Keynes, the history of concepts that fuel economic thought (Galbraith, 1994) is known to many. The words 'economy' and 'ecology' are both derived from the Greek word "Oikos", which implies, "home and hearth sustainable within the estate or local environment." This is the same concept as "Stewardship" echoed in the Bible, and "Right Livelihood" from Gautama Buddha's Dhammapada scripture. The ancient Greek conception recommended "Economizing with a sound mind," in other words, distinguishing between *needs* and *desires* to ensure a limit to the pursuit of desire gratification—leading to an ethical "oikonomia" that generates surplus (Leshem, 2016). At a deeper level, both economy and ecology refer to the same concept. To a squirrel, wealth is measured mostly by oak trees, oak acorns, and the edible flowers in the undergrowth. To most of us humans, however, the difference between economy and ecology appears substantial, especially following our widespread practice of exchanging money instead of goods and services, and our general lack of appreciation of the elements of national and international land, labour, intellectual, ecological, and possibly "holistic" (e.g. cultural, organizational, or spiritual) resources that comprise production of goods or knowledge services that we depend upon.

Perhaps the relation between economics and ecological sciences is comparable to the relation between astronomy and astrophysics.

**Commodity Versus Resource:** Whereas astronomers have traditionally been concerned with the identification, naming, and classification of planets, moons, asteroids, comets, stars, nebulae and constellations; astrophysicists have been devoted to working out "why" and "how" these celestial bodies exist, translate, and organize in the manner observed. If there were no astronomers, we may not know the difference between Venus and Sirius for they move differently and have been classified appropriately as planet and star respectively. In a similar vein, economics teaches us that a "pork belly" is a renewable *commodity* (provided pigs are given food, shelter, opportunity to reproduce, and perhaps, freedom to roam) while "petroleum" is a diminishing *resource* on account of limited pre-historic reserves of subterranean biological material.

**Ecological Coexistence:** A little further digging from ecology to paleontology and biological classification reveals that pigs are mammals of the Suidae family of even-toed ungulates — hoofed animals who can bear their weight on the tips of their toes. Even-toed ungulates are generally herbivorous, but the domestic pig is an omnivore—resembling its wild relative, the Eurasian boar. Like three other known mammalian species (mongoose, honey badger and hedgehog), pigs possess mutations in the nicotinic acetylcholine receptor that protect against poisoning by snake venom.

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Like other hairless mammals (e.g. elephants, rhinos, and moles-rats), pigs do not cool their skin by thermal sweat glands. Unlike dogs, they are unable to dissipate heat using wet mucous membranes in the panting mouth. They appear to be comfortable in a thermal zone of 16 to 22 degrees C (61 to 72 °F). At higher temperatures, pigs wallow in mud or water to enable evaporation cooling, and to protect from sunburn. Wallowing in mud also reduces skin parasite load, and marks territory with scent to attract a mate. It has been suggested that pigs that are stressed due to environmental variables are driven into behavioural responses that lead them into resource sharing conflict with humans (Allwin, Jayathangaraj, Palanivelrajan et al. 2015). Pigs were first domesticated by humans between 9000 and 7000 B.C. in the Aegean peninsula, close to modern day Greece, and have been transported thereafter to various islands and semi-tropical habitats. Their strange behavior of wallowing in mud and omnivorous habits gave them a poor reputation documented in historical writings of the Mediterranean peoples. It is likely that we humans and pigs (since divergence from ancestral species about 500,000 years ago) inhabited the same ecological niche (like modern day squirrels and mice in oak forests) and co-existed peacefully, sharing Nature's resources, prior to the advent of agriculture.

A transition from economic thinking to ecological thinking may be difficult for some people, but is often imbibed when an individual is economically challenged and learns from the necessary limitations offered by limited local resources. The word "local," here is critical because the ability of a species or individual to find resources depends on how far they are willing to travel to find and acquire those resources. The story of human migrations from the regions surrounding the Caspian Sea over to the banks of the river Maeander in the former Anatolia, is a historic record of the nomadic settler hominid: our cherished ancestor. It is important to recognize that the birth of probably all known settled and stable ancient civilizations depended on locating near lakes and river basins where fresh water and fertile soil (and associated vegetation), and salt reserves could readily be utilized (Kurlansky, 2002). Evidence suggests that geographic isolation of a group of biological organisms may lead to the development (whether by natural selection or by unknown intrinsic self-directed processes) of features that are incrementally or radically different from their progenitor (Moore, 1964). Although ecologically-based divergent selection has been implicated in the evolution of reproductive isolation in a number of cases, a detailed understanding of the process remains to be elucidated (Rundle and Nosil, 2005).

#### **Culture, empathy, civilization, fair-exchange, valuation:**

That capitalism need not be a failing conception is well documented (Hawken Lovins and Lovins, 1999). Our human "culture" is a functional aesthetic (or "meme"—an element of memory) built in part by geographic isolation. However, when we isolate ourselves from learning about or appreciating people of other geographies, our so called "cultural identity" may lead to misunderstanding, or intolerance (Sen, 2006), exacerbated especially when we are required to share our talents and resources with strangers—even if they are genuinely cooperative. The narrative of a nation, ethnic or professional group, can be based on a politically motivated view of the past, producing a "heritage" that has as much to do with remembering as with forgetting. It is not yet known whether

the neural correlates of empathy are modified significantly by communicative contact, nonetheless, the functioning of our brain's "mirror system" is subject to modulation by social variables. All human societies contain inventive people, but some environments may provide more favourable conditions for utilizing inventions than others, and such incubation capacities may change over a generation or two (Eisler, 1987). Problems such as unprovoked aggression, wanton crimes, alcohol and drug abuse, and clinical depression, may be amenable to behavioural neuroscience case studies and natural ethology experiments to help determine their associated social and environmental variables. Not every habitation of humans can be termed as a mature civilization. It is probably just as likely that an alien from outer-space would feel incapable of boarding a bus in New York City as a New Yorker will likely feel incapable of negotiating a "fair exchange" of goods for services in a Polynesian tribe. Geographically isolated populations have the advantage of growing together and supporting each other, but they may be faced with seemingly insurmountable problems when challenged to accommodate the needs of assimilating immigrants or invading "foreigners." In less fortunate circumstances, a peace loving community may be decimated, tortured, disenfranchised, forced to flee, or be captured and transported away from their homeland on account of war, genocide, corporate hegemony, religious persecution, coup-d'etat, slave trade or famine.

Often times, earned or inherited prosperity of a formerly persecuted people can erase the wounds of the past, but the choice to forgive and not to forget remains a decision of the victims alone. Sometimes present day victims may not recognize their unconscious past actions that precipitated frustration or righteous rage in the collective unconscious of their perpetrators. "Fair exchange" is a notion that has often not generally been subscribed to by invaders of past centuries—whether in the Old World or in the New World, and is not necessarily utilized in modern times by business magnates with regard to employee wages, following the industrial revolution. When an individual, business or corporate entity, village, town, city, district, county, state, country, or union of Nations plans strategy based on a traditional "economic" or "mathematical game theory" point of view, surely there are winners and losers. Winners may not be compassionate, and losers, need not forgive. It is noteworthy that "fair exchange" is NOT the same as "valuation based on competitive analysis" of conventional economic thinking. For instance, if there were a patent for cotton clothing, the first person who weaved cotton plant fibers into a fabric would have intellectual property rights to the method for binding cotton fiber as strands, and for the method to weave the strands as resilient fabric. This could reap enormous profits for the inventor or company that licenses or brings the invention to local or global markets.

#### **Social Responsibility, Creative Cooperation, Reciprocity:**

The entity that reaps huge profits from innovation might choose to share its fortune by generating employment, providing healthcare and housing to employees, contributing to charity (with or without tax deductions), reinvestment into research and development, or other such admirable ventures. Conversely, fortunes from innovation may be used to hoard hundreds of vintage wine bottles in a private cellar, to support multiple annual vacations in exotic resorts, to purchase a fleet of automobiles, yachts, or private jets, or to deploy chemical,

biological and nuclear weapons instead of using capable diplomatic missions geared toward conflict resolution. Trading partner Nation States that have an established history with America can be supported as a *Professional Reciprocity* (Aggarwala 2020), by financial, environmental and technical empowerment of the workforce in the exporting country (paraphrasing Warren Christopher, April 1996 speech addressing Stanford University; cited by Paul Hawken). Instead of permitting such monopolies arising from innovation, it may be possible to conceive of various scenarios that could reward the inventor and entrepreneurial business partners with wealth sufficient to compensate for their years of sacrifice, giving them a meaningful and comfortable working career, and a quiet, health promoting retirement and legacy that is consistent with their emotional, intellectual, spiritual needs and for leaving an inheritance to their loved ones or favourite charities. Such "*temperate compensation mechanisms*" may potentially reduce business monopolies that tend to make the price of products and services outside the budget of the modest income earning majority, in the absence of interventions by governments, insurance, or philanthropy. A popular notion that feeds competition in modern human societies and market economies is the perception that it is "us" against "them."

## INTERPRETING SURVIVAL

Survival is not the same as flourishing. Genetic equivalence of the squirrel and the rat make a mockery of the science of chromosomes. Ecological studies of plants, insects, microbes, birds and animals within an ecological niche (defined as a useful activity profile within a resource-endowed environment) have demonstrated that ruthless competition for resources (in the manner of a zero-sum game) is not a primary motivator of the individual organism. Creative cooperation is well-established as a principle of business management, but little attention is given to cooperative game-theory by mathematicians and political governance and economic policy-makers. Examples of cooperation within members of the same species, as well as between members of disparate species are abundant in the annals of vertebrate, invertebrate, plant, fungus, and microbe ecology. For example, if a grocery store represents the resources of Nature, your role as "chief of culinary execution," utilizing edibles of the pantry and tools and appliances of the kitchen, represents your ecological niche. Following study of Darwin's *Origin of Species* (1859), Herbert Spencer (1820-1903) coined the term, "survival of the fittest," presented in *Principles of Biology* (1864), by which he begrudgingly acknowledges Darwinian "natural selection". It is noteworthy that Spencer believed in Lamarckian concepts that posit development of organs (including cognition, faculties of reasoning, and the social mind) based on use or disuse and transmission of acquired traits to future generations. Spencer postulated the existence of "Physiological Units" associated with but not local to body parts, similar to Darwin's "Gemmules," and perhaps similar to Asian concepts of "Chakras" and "Meridians" or "Extraordinary Vessels." However, any endorsements to the practice of yoga, meditation, acupuncture and holistic medicine cannot be universal. Whereas the interpretation of the concept of "Survival of the Fittest" has motivated great strides in individual and team achievement for athletes, Olympic, national and state level sports teams, Charles Darwin did not intend to implicate that only the fastest and the strongest

survive. Instead, his work is best understood to propose that the species (or individuals) that survive are those *best adapted to their ecological niche*. From this it follows that a person with a minor to moderate intellectual or physical disability may become an excellent chef and dinner host— or even a notable mathematician or physicist or activist—such as John Nash, Stephen Hawking and Helen Keller, in that order— and there are numerous other examples.

A disturbing consequence of the misinterpretation of the phrase "survival of the fittest" is its ubiquitous influence on modern society. Hiring managers, school and college examinations, academic and religious search committees, popular communication media, recreation and sports, and legislative processes often perpetuate the myth that only "champion performers" are desirable while those who may be highly skilled, effective, empathetic and ethical do not adequately serve the financial, academic, evangelical or prestige targets of the institution. At universities of higher learning, only those members of faculty who secure significant grant funding and repeated peer reviewed publications may be employed year after year, especially those whose research is consistent with established practice (even if it is not sound or sustainable), or those whose science or innovation or teaching can be funded by industry or government.

**ILLUSORY LOGIC OF EXCLUSION:** Optical illusions are well-known to the educated public, but cognitive illusions make fools of the best scientists, economists and diplomats. Fallacies of dichotomous logic and other cognitive illusions tend to fuel political and managerial will, leading to dysfunctional democracies and corporations. Although dichotomy (such as ON and OFF switches) and polarized thinking (such as confirmation bias) may be useful in computer programming or cheering for spectator sport events, their usefulness in generating congenial human relations in the presence of diversity, is not easy to demonstrate. With some exceptions, when two entities are presented as though they were mutually exclusive, often there is a broad middle ground— a gray area subject to varied interpretation. If philanthropy remains merely a tax deduction, all scripture from Mencius, Maimonides, Gautama, the Christian Gospels, and the Holy Koran, may just as well be shelved indefinitely.

As the fossil remains of dinosaurs remind us, and as evolutionary biologists (Dawkins, 1993) have suggested, Nature challenges individuals and species to either "change" or "die." However, gracious cooperation and symbiotic strategies (Margulis and Sagan, 1987) including reciprocal altruism have enabled survival and biodiversity of plants, insects, microbes, invertebrates and vertebrates, despite competition for resources, including survival of human ethnic groups despite lack of understanding by a majority group. If we humans truly believed in the doctrine of "survival of the fittest," we should harbor disdain for the medical profession, and other healing and rehabilitation arts that enable "weak" individuals to live a meaningful life. If the fastest and strongest were the only desirable species worthy of emulation and adoration, why don't we enjoy having sharks and piranhas in our aquariums and shallow waters? Clearly, the weak, the meek, and the vulnerable have a quality that invokes our concern, empathy, and nurturing instinct, that can lead to a lifetime of appreciation, service, and assimilation— as in the devoted lives

of Albert Schweitzer, Mother Teresa, Jane Goodall, and perhaps a handful others known, and countless unknown. Extracellular and cytoplasmic biochemical processes are multifarious and highly complex (Garrett, Grisham and Sabat 2010), and impervious to predictive modeling. Survival of an organism depends on its ability to sustain inter-dependent processes over the foreseeable long term against the challenges of physical entropy (random chaos), and from threats within and external to its ecological niche (Capra, 1996). If biological cells are modeled on principles of physics, one of their key properties is that the cytoplasm sustains chemical processes in a state of dynamic order that is complex but not randomly chaotic, with a sensitive yet selectively permeable cell membrane. A state of dynamic order is NOT equal to a state of physical equilibrium—in fact far from it. In a state of physical equilibrium, all local regions of an enclosed gas have similar pressure, temperature and molecular density and their laws are easily described by a single set of formulae. What makes a biological cell so difficult to model by physical formulae is the unknown internal cytoplasmic metabolism. The organization of chemicals into intra-cellular organelles, of cells into tissues, and tissues into organs, makes multi-cellular organisms a marvel and wonderment of Nature, and its unknown "Vendor of Rainbows," that is expressed in natural formations on Earth, and the cosmic mystery of Creation.

**Regulating ecosystems do not regenerate:** While biological organisms attempt to eliminate entropy (magnitude of disorder of an interactive system) by staying away from a state of equilibrium, intuition and available evidence suggests that biotic (e.g. agro-forestry), business, educational, social, and governance ecosystems may not spontaneously self-organize into their optimal forms. It is difficult to say whether the "fittest" social processes are the only ones that survive in the long term. To imagine that all social and ecological processes are entirely self-regulating and self-organizing may be irresponsible, wishful thinking. An illustration of this maxim is that an active agent (e.g. a professional chef with organizational abilities) is necessary for converting foods, condiments, and beverages from a grocery store, and appropriate silverware serving dishes, into a banquet for the Royal Family. Perhaps the good news is that since September 1962, following the publication of Rachel Carson's *Silent Spring*, there has been increased awareness about the challenges faced in producing food for humans with concern for the biotic community. The view of planet Earth from outside the atmosphere as photographed by the astronauts aboard the Apollo mission to the moon in July 1969 gave birth to a new conception of "spaceship Earth," yet ecological thinking in the collective unconscious of humanity continues to be hampered by difficulties in sharing talents and resources with our neighbors.

Advances in astrophysics have enabled us to conceive that stellar fusion of hydrogen and helium in the bowels of our own "Sun" and other stars, generated carbon—the basis for our food and fuel, and hemoglobin-based life forms were possible on account of a heavy metal—iron, as its primary mineral component. We humans and all other species are the substance of supernova dust, nourished and evolved in the oceans of planet Earth, modulated by alternating lunar tides, migrated to the banks of river beds and accessible earthen reserves of rock salt.

Today, in a world that accesses and exchanges financial and technical information, goods, services, and wealth, as well as cultural memes across continents, we may need to evaluate our roles and responsibilities—as individuals and organizations—toward the co-development of our near and distant neighbours on spaceship Earth—especially those with whom we share a desire for sustainable mutual exchange. It is difficult to predict what may be the fate of human societies as we approach an accelerating rate of development in various manufacturing booms since October, 1908 when the model "T" Ford motorcar rolled into production. While "readiness for war" was one impetus for manufacturing in the two World Wars of the 20<sup>th</sup> Century, in peaceful times the "psychology of consumer marketing" creates a "demand" for manufactured products that are built for planned obsolescence. The unbridled pursuit of "happiness" by way of consumption at the expense of national debt and irreversible depletion of natural resources—along with an unsustainable competitive advantage enforced by a top-heavy military-industrial complex—was not conceived of by the Founders of the American constitution—now emulated around the world regardless of civic or governance structure.

**Limiting Personal Consumption:** Mohandas Gandhi and Mother Teresa did commendable work from a selfless personal ethic. However, the extreme limits to personal consumption that they silently advocated are not conducive to effective living. The Founder-President of IKEA Corporation, a Swedish National, has a remarkable personal and professional profile with regard to philanthropy and conservation of wealth. While limiting consumption as a personal value ethic may be difficult to implement across a large populace (Røpke, 2009), when the ball starts rolling, a "domino effect" may be expected. It is important to identify the processes and practices that demand considerable unsustainable resources and to find alternatives. Some of these alternatives could become policies supported by legislation. Changes in production technologies, modes of provision, supply chains, transport infrastructure, exchange institutions, retail outlets, and other inter-dependent systems could be configured to include environmental aspects. Such a perspective may lead to collective efforts supported by responsible business strategy and enforceable public policy.

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