

On Nature as a System with Distributed Intelligence

Tariq Khan

Department of Economics, University of Nebraska at Omaha, Omaha, Nebraska, USA

Abstract

Life on earth, Nature, is considered as a distributed intelligence. Recent research on systems with scarcity and transactions inherently leading to resource concentration, are used as an analogy to the possibility of death as a mechanism of Nature used to optimize lifespan turnover rate and to prevent the over-concentration of wealth and resources in gene pools. Speculation of additional observations of possible intent or intelligence driven activities in the natural world are also listed in this short informal essay.

The system of nature, of which man is a part, tends to be self-balancing, self-adjusting, self-cleansing.
-- E. F. Schumacher

He is the work of nature.—He exists in Nature.—He is submitted to the laws of Nature.—He cannot deliver himself from them:—cannot step beyond them even in thought.
-- Paul Henri Thiry, *The System of Nature*

Nearly all men can stand adversity, but if you want to test a man's character, give him power.
-- Abraham Lincoln

When is an area overpopulated? When its population can't be maintained without rapidly depleting nonrenewable resources.... By this standard, the entire planet and virtually every nation is already vastly overpopulated.
--Paul R. Ehrlich, *The Population Explosion*

I like mainly to be invisible, to sort of drift around unseen in the world.
-- Anne Rice

Let us consider life on earth, Nature, as a system. Specifically, let us view it as a system with algorithmic rules. Let us also speculate, along the lines of recent research with amoebae, bacteria, and plants, that Nature has something similar to microbial or distributed intelligence. With these assumptions, we can speculate on some fascinating conclusions.

Death

Note that on earth today there are organisms that live vastly longer lives than our common every-day mammal lifespans. Examples include:

- The “immortal jellyfish,” *turritopsis dohrnii*, that is considered biologically immortal via a cell development process of transdifferentiation, which alters the differentiated state of the cells and transforms them into new types of cells (Biological Bulletin). “Theoretically, this process can go on indefinitely, effectively rendering the jellyfish biologically immortal, although in practice individuals can still die. In nature, most *Turritopsis dohrnii* are likely to succumb to predation or disease in the medusa stage without reverting to the polyp form” (National Geographic). The capability of

biological immortality with no maximum lifespan makes *T. dohrnii* an important target of basic biological, aging, and pharmaceutical research (Singularity Hub).

- “Unlike literally every other mammal, naked mole rats don't become more likely to die as they get up there in years. For naked mole rats, *Heterocephalus glaber*, there is no increase in the risk of death even when the rats are 25 times older than the onset of sexual maturity. A 2009 study suggested that the animals also maintain the integrity of their proteins throughout their lives. Their bodies also seem to protect their genomes from damage and clear away cellular mutations rapidly” (LiveScience, 2018).

Quantum biology has demonstrated the amazing abilities that Nature has acquired over billions of years of evolution. Research on human death, originating from telomere shortening, further illustrates Nature as manipulating, or in control of, organism lifespan length i.e., death. Thus, might we consider death as merely another tool in Nature's arsenal to control a gene pool population? Nature, as a system, has a fundamental algorithm to reproduce and to reproduce with an optimal quantity or turnover rate. This leads to the average human lifespan lasting 68 years, i.e., the telomere shortening rate is evolved to produce an optimal turnover rate of organisms to maximize the aggregate human gene pool's level of variety to maximize our gene pool's ability to handle any and all external threats.

But what if, along the lines of a distributed intelligence, there is another role of death in organism gene pools where there are large populations and competition from resource scarcity. Might death be an endogenous mechanism to prevent gene pool stagnation in another scenario?

In the November 2019 edition of *Scientific American*, Bruce Boghosian's research is detailed in the article “The Inescapable Casino” (pgs. 72-77) that indicate that all economic systems, involving transactions between agents, inevitably result in oligopolies and, thus, must have an oversight mechanism akin to governmental intervention to prevent such suboptimal oligopoly systems in the form of taxation, redistribution etc....

The below bullet points are taken directly from the article:

- Today Oxfam estimates that 26 individuals possess as much household wealth as the lower half of the world's population combined, approximately 3.5 billion people.
- Papers this decade describe the affine wealth model where there is an inherent mathematical structure of economic transactions that they inexorably concentrate wealth, resulting in oligarchy. This is seen over and over in tests using numerical simulations and comparing models to the real-world economy.
- In 2017, a team at Tufts University modified the model slightly to more closely resemble reality including changes equivalent to adding a flat wealth tax to the wealthy and a complementary subsidy for the poor. These changes showed that oligarchy no longer resulted.
- The wealthy enjoy systemic economic advantages such as lower interest rates on loans and better financial advice, whereas the poor suffer systemic economic disadvantages such as payday lenders and a lack of time to shop for the best prices. Whenever the influence of wealth-attained advantage exceeds that of redistribution a very small fraction of people will possess a large fraction of societal wealth. The onset of partial oligarchy is in fact a phase transition akin to the same in physics parlance. This type of phase transition was apparent following the breakup of the Soviet Union in 1991 where formerly communist countries became partial oligarchies almost overnight. 10 of these 15 former Soviet republics are oligarchies.
- In conclusion, they demonstrated that their hyper accurate models gave rise to economies that were anything but free and fair, something that should be a cause for alarm and a call for action. After a large number of transactions, one economic agent ends up as an oligarch holding practically

all the wealth of the economy and the other 999 agents in the test end up with virtually nothing. The lower someone's wealth ranking, the faster the decrease. In the long run, all participants in this economy, except for the very richest one, will see their wealth decay exponentially. Inequality inevitably grows more pronounced because of the collective effects of enormous numbers of seemingly innocuous, but subtly biased, transactions.

- These mathematical models demonstrate that, far from wealth trickling down to the poor, the natural inclination of wealth is to flow upward, so that the "natural" wealth distribution in a free-market economy is one of complete oligarchy. It is only redistribution that sets limits on inequality. Only a carefully designed mechanism for redistribution can compensate for the natural tendency of wealth to flow from the poor to the rich in a market economy. Redistribution, separate from taxation, is best thought of as the flow of wealth from people to people to compensate for the unfairness inherent in market economies.

But let us extend this incredibly detailed analogy to life on earth. In a complex gene pool like human beings, the result of era upon era of having wealth and resources concentrated in a single individual, family, or dynasty will inherently lead to stagnation in terms of the critical metrics of variety and diversification needed for any healthy gene pool. Thus, might Nature, akin to a natural development of term-limits or resource redistribution, applied destructive techniques (telomeres, cancers, etc.) to eliminate resource concentrating parties to ensure gene pool diversification? In short, could death be a literal equivalent of wealth inequality arbitration.

Any system with scarcity and transactions will always end up in oligopoly - akin to a gravitational law of economics. Again, consider human life. Without individual organism death, what would stop a pharaoh from maintaining power for eons upon eons. Without death, in this context, we have stagnant life e.g., lack of gene pool variation. The optimal way to prevent over-concentration of existential resources or power (thus gene pool stagnation) is the elimination of the most powerful. This is not quite the Buddhist mantra of the elimination of want to lead to the end of suffering, but, rather, in any system of scarcity there will be want and thus accumulation and hyper-concentration that will require death as an optimization arbiter.

We can speculate that the "rich" in any society might never live longer as long as there are any "poor" in the population. It is fascinating how the Japanese Okinawa islands, with their isolation and lack of tremendous wealth, competition, and inequality, have so many centenarians. This quantity of long living humans is likely not due to diet (fish oils, less meat, etc.) but rather due to the reduced scarcity driven competition (and associated stress) and perhaps actually due to the impact of the lack of resource concentration on the aggregate isolated gene pool.

Thus, unless humanity can truly "hack" nature, i.e., control telomere shortening or cure cancer, it is possible that humanity must reduce population growth and the net population to reduce net scarcity if we desire to increase overall or average human life span.

Speculations

There are additional observations in the natural world that reinforce the view of Nature as an algorithmic system if not a distributed intelligence. Beyond the incredible efficiency of photosynthesis, via quantum mechanical path optimization, we have the speculative possibility of:

- The male gender created as a "throttle" used to control birth rate for gene pool optimization and to slow down reproduction to allow longer child development permitting the creation of intelligence, e.g., 18-year-old humans with the focus of parents for all of those years.
- Large pandemics, like covid19, as possible "circuit breaker" responses to spikes in the growth rate of the population size of non-reproducing population subsets (older individuals) relative to other the

younger reproducing subsets. This can occur via dramatic increases in lifespan from medicine, diet, technology (e.g., 1917), or via a large drop in the global birth rate (e.g., 2019).

- Pollen levels, that have been shown to increase serotonin levels and thus risky or sexual behavior, used by Nature as a literal lever to control birth rates.
- If we imagine Nature as extending beyond just Earth or life on Earth, then we can imagine:
 - large planets like Jupiter as located via “intention” or design to prevent cometary bombardment damage to planets in goldilocks zones to permit the development of life via complex chemistry.
 - the “goal” of Universes to be more than just defragmenting bits of data to actually instilled with “programmatic intent” to lead to complex chemistry, biology, life, and consciousness.
 - to fine-tuning of the constants of the Universe as not merely random but set a priori.