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Monotheism and Increased Entropy: A Short Essay on the Thermodynamics of Culture

Richard Preschel[1*]

[1]Independent. E-mail: preschelr@gmail.com

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Abstract

Living organisms are as much subject to entropy than in organic matter is. Human culture and its products are no exception. We show how ethological and psychological phenomena like mimetism, economic phenomena like monopolies, and belief systems like monotheism, follow the 2nd Law of Thermodynamics.

Keywords: *Anthropology, Christianity, Entropy, Islam, Judaism, Metabolism, Methane, Mimetism, Monopolies, Monotheism*

1. Introduction

In this little essay, I will try to explain the prevalence and resilience of monotheism and psychological and ethological phenomena like mimetism, and economical like monopolies, as the product of a basic and universal physical law known as the 2nd Law of Thermodynamics.

2. Definition of Entropy

The central concept of the 2nd Law of Thermodynamics is called entropy, from the Greek τροπη *tropē'*, meaning transformation. The most general version of this law is called cosmological entropy that applies to the whole universe and its parts and sustains that the universe evolves from an initial state of maximum order to a predicted final state of total disorder called thermal death.

There is nothing mysterious about entropy. It's not a force, like gravity[1]. Entropy is a concept that refers to the fact that disorder is more probable than order, for the simple mathematical reason that there are many more possibilities for things to be chaotic than to be organized.

In this theory, order means diversity and disorder means uniformity. The final state of the universe would be homogenous with low energy. This transformation from diversity to uniformity is not a perfectly linear process, there are *detours* in the road to entropy. Life is one of these *detours*.

3. Entropy and Life

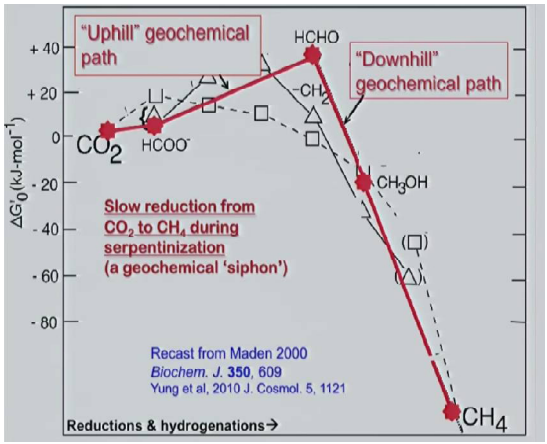
The metabolic theory of the origin of life (Russell, 2006) states that the movement towards entropy facilitated the formation of engines that hydrogenate CO_2[2]. These engines are proteins that feed energy to most

* *Corresponding author: Richard Preschel, Independent. E-mail: preschelr@gmail.com*

1 That science does not yet fully understand.
2 These engines are the protein ATP synthase.

eukaryotic [3] living beings, including us. As living beings, we have all the same function, which is to take in hydrogen and carbon dioxide and put out methane.

Hydrogen can't link directly to CO_2. The formation of organisms is the upward slope of the detour in the road to entropy, an organism has more order than its chemical components. The production of methane by the organism is the lower slope of the detour and has higher entropy than the initial state where hydrogen and carbon dioxide weren't linked.



The graphic[4] shows the *detour* ("uphill" geochemical path) in which life exists. The final result is always increased entropy ("downhill" geochemical path), a return from the detour to the main road.

This refutes the claim that science has nothing to say about the purpose of life. The purpose of life is to hydrogenate CO_2 to produce methane. That's what we do best, and we do it around the clock. Everything else is vanity.

The universe drifts from diversity to uniformity. The theory of cosmological entropy predicts that the final state of the universe would be homogenous with low energy. Life is no more than a detour in this drift, but its main function is to yield more entropy.

4. Mimetism

Many forms of life are mimetic. In camouflage, plants and animals take colors and shapes that imitate their surroundings or elements of it. Some butterflies take the shape and color of leaves, other insects take the shape of branches, the cuckoo bird lays eggs with the colors and patterns of other birds so that these nest them, the mimetic camouflage talents of the chameleon are proverbial, herd behaviors are mimetic. There are many more examples.

All animals capable of learning, that is changing or acquiring behaviors, are to some degree mimetic. This trait is more conspicuous in some animals. The verb to ape reflects the fact that primates in general are reputed for their imitative skills.

Among the primates, we humans are extremely mimetic. Girard (1972) formulated a mimetic theory of desire through which he tried to explain human psychology, societies, culture and history.

Learning is a basically mimetic process. As social animals, our need to belong to a herd, tribe, group is fulfilled through imitation.

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[3] Organisms whose cells have a nucleus. All animals, plants, fungi, and many unicellular organisms, are Eukaryotes. Certain species of fungi and protists don't produce ATP.

[4] Slide extracted from Michael Russel: On the Emergence of Life Through "Negative" Entropy Trapping.

Culture consists of shared languages, customs, rituals, values, techniques… that are acquired trough and based on imitation.

There is a constant trend in civilization to uniformize, i.e., standardize juridical, political, financial, educational systems, among many others.

Almost a century ago, Henry Miller declared that all cities look the same, there are cars everywhere. Living today, he could have added McDonald's, Starbucks, Dunkin' Donuts, and much more.

Fashion is a mimetic phenomenon. It's easy to see to what time a film or TV show belongs by observing the hairstyles. Jeans, initially designed for miners in the 19th century California gold rush, have since the 1970s covered the planet and are worn by all social strata. Even if they are worn in multiple contexts and for different reasons and functions, they were only invented once by Jacob Davis and Levi Strauss in 1873, all that followed is imitation.

Imitation is fundamental in the understanding of human existence and societies. Its result is uniformity.

5. Diversity

Diversity can diminish at a fast rate:

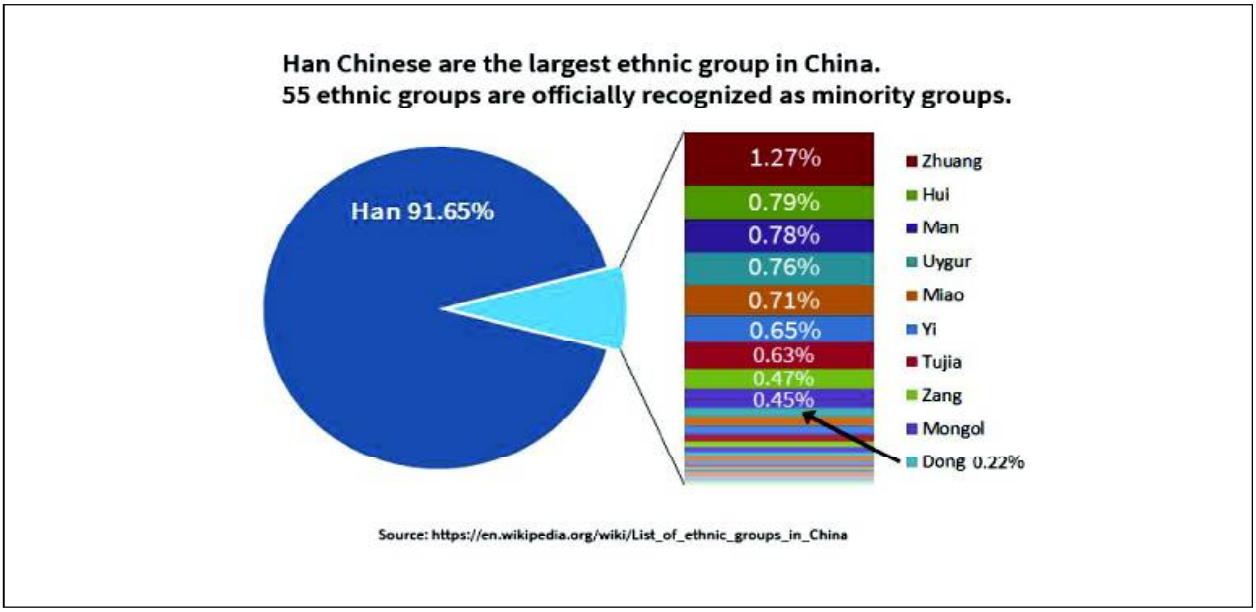
Each year 9 languages, or one every 40 days, cease to be spoken. By 2080, the rate will rise to 16 languages per year (Simons, 2019).

So do cheese varieties, except in France where there were 365 in the 60s and 1200 now. De Gaulle was reputed to say that a country with 365 varieties of cheese couldn't be ruled. In fact, even in France, the varieties of cheese available in the average supermarket diminish from year to year and one single variety, Camembert, has 60% of the market share.

The expansion of human populations and human activities and the habitat destruction that inevitably results is the primary cause of the decay of organic diversity.

Erlich (1988) warned that extrapolation of current trends in the reduction of diversity implies a dénouement for civilization within the next 100 years comparable to a nuclear winter.

Paradoxically, the increase in population leads to a diminution of diversity. For example, China is composed of 55 recognized ethnic groups, but more than 90% of the population belongs to one single ethnic group, the Han:



On an even larger scale, China as a whole and its neighboring countries, especially Japan, are drifting towards the Western Civilization. The whole Globalization phenomenon can be understood as loss of diversity and gain in uniformity.

As all roads lead to Rome, even more so do they lead to uniformity, i.e., entropy. Though the final destination is ineluctable, the road isn't straight and has many *detours*, that's where human and natural creativity happen.

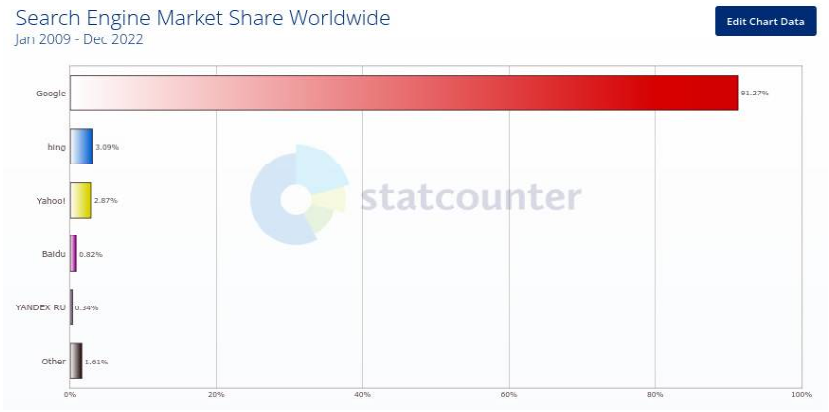
Even with globalization at is full speed, tendencies to regionalisms, minority rights and gender diversification, among others, emerge. But in the big picture, these tendencies are small detours from the road of entropy that leads everything to uniformity.

6. Monopolies

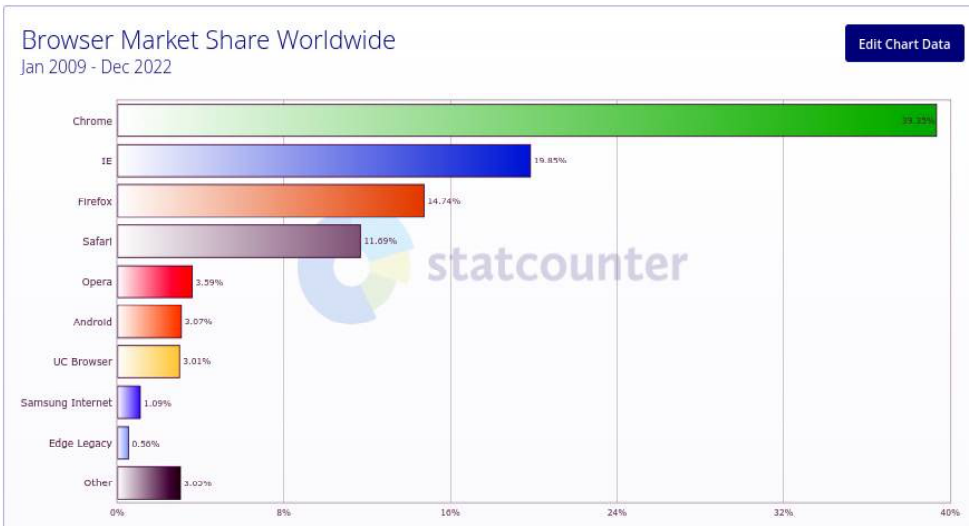
"Free competition", so exalted by business schools professors, in many instances lead to the formation of oligopolies and monopolies. That's the reason for most developed economies to have **a**ntitrust laws or its equivalents.

The free competition principle was, more or less, adapted to markets that are much smaller than those created by the internet revolution. Paradoxically, the much larger and extended digital markets are more prone to the formation of monopolies.

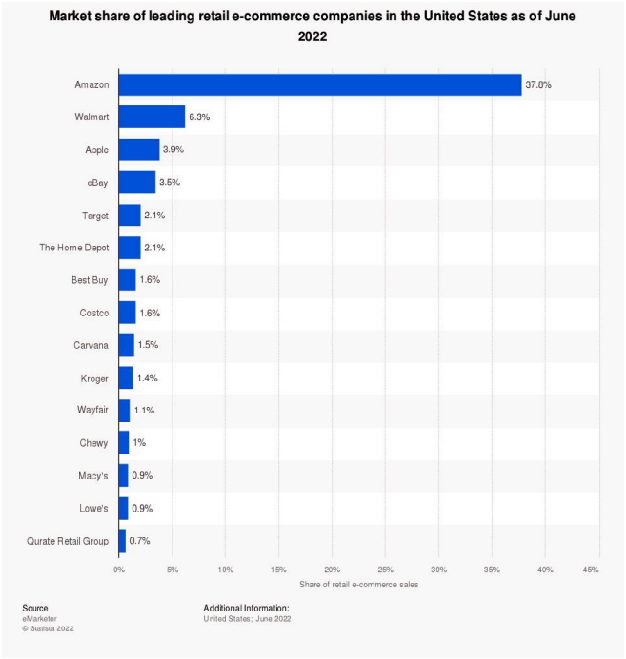
In the late 90s there still were more than a dozen of competing search engines. Today, one single search engine has a more than 90% market share:



We see the same evolution in the web browser market:



And, of course, in e-commerce:



Monopolies can be understood as entropic uniformity from the perspective of consumer behaviors and of the economical landscape.

Libertarian and contrarian (Thiel, 2014), one of the founders of PayPal, has the inverse perspective, where free competition, i.e. market diversity, lead to entropy, and monopolies oppose it:

> *"Whatever your views on thermodynamics, it is a powerful metaphor* [5]*. In business, equilibrium means stasis, and stasis means death. If your industry is in a competitive equilibrium, the death of your business won't matter to the world; some other undifferentiated competitor will always be ready to take your place.*
>
> *Perfect equilibrium may describe the void that is most of the universe. It may even characterize many businesses. But every new creation takes place far from equilibrium. In the real world outside economic theory, every business is successful exactly to the extent that it does something others cannot.*
>
> *Monopoly is therefore not a pathology or an exception. Monopoly is the condition of every successful business."*

7. Monotheism

Monotheism is such an unquestioned and pervasive idea in our world that we take for granted that it represents a great advance, a progress in the evolution of humanity.

The idea of the existence of a single God, with a capital "G" appears to be so normal and self-evident that nobody is asked if he believes in gods, in the plural form.

Monotheism has this undeserved prestige despite going against the liberal values we most cherish, such as tolerance, openness, pluralism, diversity and decentralization, among others.

Monotheism also goes against logic and scientific knowledge. There are four basic forces in nature: the strong force, the weak force, the electromagnetic force, and gravity. No one is more fundamental than the other. These forces "act" conjointly, but are independent of each other.

There are no more reasons to believe that there is one god than there are two or four or many. Infact, there are many reasons not to believe in gods or supernatural beings in general.

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5 We don't use thermodynamics as a metaphor. Our hypothesis is that nature and culture are subjected to its laws.

Despite all that goes against it, the fact is that monotheism is a persistent and prevalent belief, and as such it needs to be explained.

Renan (1866) thought that monotheism became a strong idea only after Rome transformed in an empire. The idea of one god only became plausible when the known world was ruled by one man: the Roman emperor.

Renan's idea that is good at explaining why monotheism had a successful start, but it doesn't explain why it prevails in a world where the Roman Empire is no more, and that is ruled by several leaders in different places.

That monotheism ultimately leads to atheism is almost a trite idea:

polytheism → monotheism → atheism

This movement is effectively entropic, and could be described as:

diversity → uniformity → maximum entropy

The universality of Buddhism, Christianity, Islam… is also a movement towards **uniformity**. Catholicism comes from the Greek καθολικος *katholikos* meaning *universal*.

Jewish monotheism, the first one, is trapped in a conundrum: God is supposed to be the God of a single nation and, at the same time, be the only God that really exists.

This aporia incited Paul of Tarsus to open the Jewish faith to gentiles who had long been visiting synagogues (Frediksen, 2017) because polytheists were open to other cults and the piety and beauty of the synagogue rituals attracted many of them.

The movement from monotheism to atheism is well attested. Jews are reputed to be predominantly agnostics or atheists, so are the peoples of Western Europe. In the Maghreb the tendency to atheism increases even if the laws of the Muslim countries consider it a crime.

Inside Judaism, there is the tendency to disincarnate God, to make Him transcendent instead of immanent. We see this evolution, in chronological order, from Philo to Onkelos, from Ibn Pakuda to Maimonides and to Hermann Cohen. The same evolution can be, less clearly traced, in Christianity from Aquinas to Hans Küng. In Islam Sufism goes in the same direction.

These tendencies can be understood as a movement toward atheism. Instead of completely abandoning the idea of God, they instead strip Him of His immanent qualities.

We will only accept that monotheism is progress for humanity the day that there'll be more polytheistic than monotheistic terrorists, and the day where more wars will be fought in the name of a coalition of gods instead than in the name of a single one. But we cannot deny the fact that monotheism is progress toward increased entropy.

8. Conclusion

From anthropology to entropology.

"In the long run we are all dead"

–Keynes (1923)

No matter how exceptional we may feel, humans are not more or less than any other life form. We and all our products, material and immaterial, are subject to the same laws of nature.

We may resist this process of destruction, but in the long run increased entropy will always prevail.

Lévi-Strauss, pessimistically, understood this in his 1955 concluding remarks to his memoir Tristes tropiques:

> *... civilization taken as a whole, can be described as an extraordinary complex mechanism, which we might be tempted to see as offering an opportunity of survival for the human world, if its function were not to produce what physicists call entropy, that is inertia. Every verbal exchange, every line printed, establishes communication between people, thus creating an evenness of level, where before there was an information gap and consequently a greater degree of organization. Entropology , not anthropology, should be the word for the discipline that devotes itself to the study of this process of disintegration in its most highly evolved forms.*

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