

We, the detritivores

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Since 1776, the use of the Newcomen's steam engine, later improved by James Watt, led to an increasing dependence on fossil fuels, which temporarily gave huge power to increasing fractions of human population. With the technological developments that followed, Homo colossus acquired, over the next nine generations, the illusion of being limitless.
Catton William R., Jr. (2009)

After the Industrial Revolution humans became a detritivorous species, ie we feed on detritus. This name comes from "Overshoot: The Ecological Basis of Revolutionary Change" by American sociologist William Catton (born in 1926), who has since the 1970s devoted himself to the study of environmental sociology and human ecology. That book in 1980 marked a milestone in the literature of ecological science with its pioneer warning that humanity was exceeding the carrying capacity of the planet. It had a sequel a few years ago (2009), entitled "Bottleneck: Humanity's Impending Impasse", which constitutes Catton's lucid and bitter intellectual testament, and wherein the professor emeritus at Washington State University no longer warns us, but merely notes how nothing was done since then to prevent or reverse the abuse, and analyses in detail how Homo colossus' arrogant exuberance (hubris) directly leads to an evolutionary bottleneck which can mean extinction of our species, or at least a brutal reduction in the number of human beings on the planet.

The detritus we feed on is none other than oil and natural gas, fossil treasures our species learned to exploit and which, in a range of just two hundred years (!) have enabled us to multiply world population sevenfold, when it had always remained below one billion people until nineteenth century. That amount is therefore seen as the maximum capacity (carrying capacity) the planet has in order to keep our species alive with constant energy input from the sun. The extra contribution by fossil energy (first coal, then oil and natural gas) has allowed us, temporarily, to greatly expand our ecological niche, and to dramatically exceed this number. Where we once fit one billion, we suddenly (in historical terms) went up to seven billion.

In 1920 we were still only two billion, so in the last century we more than tripled ourselves. The graph of human population since 1800 is a textbook example of what exponential growth is. And if we superimpose the graph of total energy consumption (or the per capita consumption), we'll understand how that growth was possible: correlation between both magnitudes is absolute. In fact, we can calculate where so many human beings came from, even in physical terms: nitrogen molecules contained in the human bodies who now populate the Earth in the form of DNA and amino acids forming the fabric of our muscle mass, for example, come largely —an estimated 50%— from natural gas, primarily methane, which is converted to nitrogen fertilizers through the so-called Haber-Bosch reaction, and these turned into food plants and animals through industrial agriculture and husbandry. It was this availability of methane and oil —prehistoric solar energy stored in chemical bonds over millions of years— which allowed us to

expand the capacity of our planet to sustain humans, exceeding our natural limit of one billion people.

The Green Revolution could have been more properly called the Black Revolution, after the color of the oil that made it possible and the future it condemned us to. Within decades hundreds of thousands of tractors, harvest machinery and other farm equipment spread throughout the world, tons of synthetic fertilizers were introduced in depleted lands, millions of transportation vehicles, processing industries complexes, food distribution chains and hundreds of supermarkets and malls became the mechanism created by our civilization to exploit that fossil energy and turn it into food for more and more human beings. Improvements in quality of life that emerged from this energy abundance —such as hypertech public health services, thousands of pharmaceutical synthesis products, all kinds of materials for the petrochemical industry, etc.— made possible not only for more and more people to be born and fed but for them to thrive in better material conditions, especially in countries belonging to the rich industrialized world. Of course all this was facilitated by a social and economic system oriented towards private, short-term benefit and embarked on a seemingly unstoppable economic growth period, measured quantitatively by the amount of goods and services produced with this extraordinary energy and consumed by the ever growing human mass of workers-consumers.

Tragically and yet predictably, this could not last long, as Catton tried to explain, and in 1980, before him, the Meadows and Jorgen Randers couple —authors of the "Limits to Growth" report (1972)— as well as a growing number of scientists, philosophers and environmentalists did in the decades that followed. Oil first, and then natural gas, would before long reach their extraction peak and thereafter diminish their availability leading to a collapse of the whole industrial system based on them, including the food system. This is what we know today as peak oil, peak gas, peak coal... and many other peaks or roofs for materials, energy and finite resources production. A species that stops feeding on its renewable energy sources (let's not forget food is endosomatic fuel) - ie those that are available thanks to each annual solar cycle and the photosynthetic base of the food chain- and starts to feed on hearty and rich nonrenewable detritus instead, will experience explosive (exponential) population growth, but in doing so, the species that becomes detritivore is doomed to a demographic collapse when the detritus reaches a certain point of exhaustion, just as it happens with some insect or other animal's populations: at the time they become a pest and after exhausting surplus food mass, they die.

What we are facing, therefore, is the risk of our species suffering, sooner or later, a terrible fall in population at grand scale, a die-off. Among the authors who have analyzed this situation there is no consensus on the extent of this fall after the disappearance of the temporary fossil energy carrier, but we can list some factors that will be relevant in this regard:

- 1.

Without synthetic nitrogen fertilizers we'll have enough nutrients for only half of existing human bodies: hence we can derive that when these are unavailable due to lack of natural gas, we cannot be more than 3,5 billion.

2.

Preindustrial human population always remained below one billion: that seems to be the natural top for our species, or at least the historically found roof.

3.

Advances in scientific knowledge in areas such as medicine, biology, chemistry, soil science, ecology, and even somewhat underground techniques like permaculture, associated with more knowledge we have about the efficiency and sustainability of the various traditional farming systems throughout history, could in theory compensate to some extent the decline in population, providing us with an expanded natural limit, but this would also require us to be able to retain that knowledge and collectively properly apply it in a context of rapid decline and collapse at multiple levels.

4. Unfortunately, excess (the overshoot Catton warned us about) has consequences upon the natural base that sustains our population (fertile soil, biodiversity, water, climate, etc.), and for (at least) several decades after collapse, it is possible that this resource base can not recover up to the level that allowed the planet to endure one billion humans... or even never recover, or be damaged by centuries because of pollution, loss of fertile soil, climate change and other destructive anthropogenic factors. That is, what could in principle be compensated by our current scientific knowledge (what we know how to do) may be canceled out by way of environmental degradation (which limits what we can do).

The likely collapse of industrial civilization associated with the fall in fossil energy resources will most likely have consequences that impact directly and negatively on the population level: war over the last remaining resources (whether it be energy, raw materials, water, fertile land...), social unrest, deteriorating living conditions, industrial disasters due to lack of maintenance and materials with serious environmental and health implications for millions of people (just remember the tragic events of Bhopal, Chernobyl, Deep Horizon, Fukushima ...), increased pollution in a vain attempt to pursue an unworkable system (eg through partial substitution of oil for coal in certain uses), loss of State's ability to regulate and control polluting activities and people's safety, and a long and gloomy etcetera. In short: it is not known how far the human population will fall, but we know it will certainly happen, since the one thing that permitted our rise above our natural limit during a brief historical period is going away. Nor do we know the rate at which this decline will occur, although the figures used by several authors suggest that the fall will be completed in less than a century. What does seem to be quite clear are the ways in which that population collapse will occur, as we have historical experiences of other human and animal populations in the past civilizations collapsing; and many of these pathways are associated with the 5th factor above.

1.

Lack of food is an obvious self-induced apocalypse rider, as we just discussed, since current industrial, fossil-dependent, intensive agribusiness will be rendered unfeasible.

2.

We know resource wars are a factor that our violent species is hardly going to avoid and in fact, we have been experiencing it in varying degrees since the beginning of the Industrial Revolution: two World Wars and innumerable local conflicts.

3.

The general deterioration of living conditions also result in increased deaths, something difficult to quantify a priori; pollution will undoubtedly be decisive in this population decline, through an extension of cancers, hormonal problems, poisoning and all kinds of diseases of environmental origin; as yeast in a bottle of wine, we will end up drowning in our own waste after an alcoholic sugary feast.

4.

Collapse of cities, which operate exclusively depending on continuous supply of nutrients and energy from outside, and which take in more than half of the world population, poses a serious demographic crisis with a chaotic exodus of thousands, probably millions of people going back to the countryside in search of food and work, with predictable conflicts of all kinds, however gradual we manage to make it, and this may involve death of a non-negligible part of ex-urbanites.

5.

Increased infections, disease, parasites, etc. —already happening due to pre-collapse factors such as climate change, resistance to antibiotics or mutating infection agents— will be increasingly difficult to tackle with bankrupt health systems and more lives will be charged for each year pass, thus also contributing to population decline.

6.

Climate change will be an indirect way in which our waste (in this case greenhouse gases) deteriorate the planet's ability to support our species: less livable places, less drinkable water, increased forest fires and extreme weather events, biodiversity loss, destruction of ecosystems, problems for growing agricultural species... Not to mention the possible positive feedbacks that could accelerate global warming (eg melting of Arctic permafrost and consequent massive release of methane into the atmosphere) that could sharply make the planet uninhabitable to humans and many other species.

7.

Accidents at facilities like nuclear power plants or hydroelectric dams, due to atmospheric phenomena, earthquakes, geomagnetic storms or simple age-bound deterioration of structures not compensated by maintenance will become increasingly costly in economic and energetic terms.

8.

General deterioration of economic and social structures, with millions of new people excluded each year, unable to adapt, trapped in unsustainable places and lifestyles, which is already leading to suicide for not few people, and general deterioration of physical and mental health for almost everyone.

9. Birth rate decrease caused by the poor economic prospects and also due to chemical pollution, although this trend could be partly compensated due to increasingly difficult to access contraception methods and the tendency to returning to extended families to compensate for the lack of State support (social benefits, retirement pay...) and of the fossil energy needed for mechanized land cultivation.

In this perspective our survival instinct and our sense of ethics require us to find a solution, a way out, something that minimizes this massive die or at least prevent the total extinction of our species. However, it seems very hard to be hopeful. In any case, first thing should be to recognize the situation in their real terms and fight gigantic and multiple deception that keeps us blocked. This deadly deception enters our perception at several levels:

1.

Political-economic level. The holders of power are trying to keep it at all costs through this civilization shipwreck, and for this they need to keep the rest of the population looking the other way as long as possible, while they put in place measures for the post-capitalist stage and secure all possible resources for themselves at the expense of those below, or of other countries. So we must interpret the current plundering of money and public services, massive land grabbing worldwide as attempts to control water or seeds, and all the geopolitical maneuvering around energy-exporting countries.

2.

Semiotic and cultural level. Mass culture created in the 1950s from that monstrous machinery called ubiquitous advertising, and inserted into the brains of most of the seven billion through television, which promises continuity and continuous improvement, promoting values ??such as suicidal irrational consumption, individualism and hiperspecialization.

3. Psychological-genetic level. Our own mental strength, cognitive dissonance prevents us from accepting anything that conflicts with our mental model representation of the world, which contradicts our expectations, disproving the children stories we got inserted into our brains from semiotic-cultural level, and which have convinced us of the continuous and irreversible progress, infinite growth, the exceptional nature of our species and its separation and domination of the rest of the natural world, the magic power of science and technology, the infinity of resources... What's more, our genetics is the result of millions of years of individual and collective struggle against dangers that are palpable

and immediate (a predator, an invading tribe, fire, flood...) and therefore we are neurally wired to react very well to these kinds of threats and adapt to the changing conditions we have before us. Unfortunately that means we do not know how to react to the unexpected, invisible threats or to conditions that have not changed yet... Evolution has not enabled us to anticipate, to prevent, and our genes keep us paralyzed by telling us: every thing's alright, do not react.

Without getting rid of these delusions (external and internal, social and psychological) it is naive to think of another end different than our absolute disaster story. Anyway, if we have to start somewhere, it should be at the basis of this colossal error of our species: if we have any chance of avoiding the fate of detritus-eaters, we have no choice but to stop eating oil with the utmost urgency. This does not just mean switching to consuming only fossil-energy-free, fertilizer-free local food, but drastically and massively reduce our consumption across the board, ie, our total energy footprint. Still, no single solution would ensure survival: this reduction must be made jointly by all our species, in a coordinated, organized manner and redistributing the remaining resources as fairly as possible to meet the material living standards of all human beings, in order to satisfy the basic needs of the maximum number of people worldwide without discrimination. If not, it would mean to stop using so that others might consume more or longer, which is perhaps what some are surreptitiously aiming at. Of course we're talking about a policy of democratically managed downshift, versus an omnicidal policy directed by savage capitalism stuck in chaotic decomposition. Of course we're talking utopia here, but an essential utopia if we are to avoid our extinction as a species.