GLOBAL INSANITY REDUX

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ABSTRACT: In our book *Global Insanity* we argued that the existential predicament faced by humanity is a predictable consequence of Western Enlightenment thinking and the resulting world model, whose ascendance with the Industrial Revolution entrained development of the global consumer Economy that is destroying the biosphere. This situation extends from a dominant mindset based on the philosophy of reductionism. The problem was recognized and characterized by Robert M. Hutchins. In 1985, Hutchins ideas were discussed by Robert Rosen in Chapter 1 of *Anticipatory Systems: Philosophical, Mathematical & Methodological Foundations*. Building on Hutchins' ideas, Rosen laid the foundation for an entire new, non-reductionist paradigm, which he called "complexity theory". This new paradigm is what we are further developing here. One has to recognize that a paradigm shift is needed to overcome the entrenched mindset and world model that reductionism has created.

Here we explore the myriad interconnected ways—psychological, social, cultural, political, and technological—that the Western world model and consumer economy works as a complex system to thwart, neutralize, or co-opt for its own ends any effort to bring about the kind of radical change that is needed to avert global ecological catastrophe and societal collapse. This resistance to change stems from the need, inherent in the Western model, to continually grow the consumer economy. The media's continued portrayal of consumptive economic growth as a good thing, the widely held belief that the Economy is paramount, and current political and technological trends all manifest the system's active resistance to change. From the perspective of the mature economic system, any work that does not serve to grow the Economy is counterproductive, and viewed as unnecessary, a luxury, or subversive. The potential for real change (i.e. toward creation of a better system) is thus inversely related to the viability of the Economy, which will eventually decline as the system develops into senescence. To the extent that the fragile metastability of senescence affords opportunity for radical change, economic decline can be viewed as a hopeful sign. But taking maximum advantage of that opportunity will be extraordinarily difficult, as it will require widespread recognition of the problem, major voluntary sacrifice by the relatively large numbers of people who still benefit from the system (including what remains of the "middle class"), and concerted "grassroots" efforts. It can be expected that the system will resist those efforts until the end, becoming increasingly reliant on media-enabled distraction and divisive politics, as well as violent coercion, to maintain itself.

Investment in education and science is widely touted as necessary for improving our situation, but this is misguided as long as the educational system and scientific enterprise continue to work in collusion with the larger system, as they currently do. Until the reductionist mindset and world model that drives the system is effectively challenged, there can be little hope for the kind of change needed to avert the catastrophic collapse of civilization.

KEYWORDS: Global Insanity; Robert Rosen; Complexity Theory; Ecological Catastrophe

INTRODUCTION

Despite the ever-optimistic prognostications of those with an abiding faith in technology, the outlook for humanity is not good. The prospects for conditions on Earth remaining conducive to the existence of civilization are rapidly diminishing. In our book *Global Insanity* we argued that this dismal state of affairs is a predictable consequence of the socioeconomic development entrained by the reductionist Western mindset, and the resulting world model embodied by the industrialized global consumer economy.[1] We discussed how that mindset and world model is disconnected from reality, insofar as it disregards the brute fact, epitomized by the second law of thermodynamics, that no *ideal* is (or can ever be) fully compatible with the real world. The pervasive belief to the contrary constitutes pure fantasy. As a result of this widespread delusion, activities that are strategically *designed* (typically based on an ideal) to improve the human condition via technology and industry very often cause as much if not more harm than good, in the form of unintended ("entropic") consequences resulting from ignored and/or unperceived realities that are incompatible with the intended ideal.

The roots of this situation extend into ancient human history (and beyond that, deeply into our animal ancestry), emerging from the co-development of large-scale agriculture as a means of subsistence and written language as a medium for thought, which worked to insulate human culture from the harsh (never-ideal) realities of nature and thus sever of our connection to the real world. In the real world life entails death and growth entails decay. But Western culture developed in defensive reaction to that reality, and so perpetuates the dangerously delusional myth that death and decay are problems that can be solved with technology and/or faith.

[1] James A. Coffman and Donald C. Mikulecky, *Global Insanity: How Homo sapiens Lost Touch with Reality while Transforming the World* (Litchfield Park, AZ: Emergent Publications, 2012).

In *Global Insanity* we also discussed, echoing arguments advanced by Stanley Salthe[2] and Robert Ulanowicz,[3] how *development* refers to a constitutive, predictable trajectory of change within any living system, or for that matter within any truly complex system that is far from thermodynamic equilibrium (as is this universe). Any living (or truly complex) system begins existence in a relatively vague or indeterminate state of immaturity, and then develops, via growth and self-organization into an increasingly powerful and well-defined entity, i.e. a mature system that, with continued development, becomes *habit-bound*, locked in to deeply entrenched (memorized) patterns of behavior, i.e. senescent. Being rigid and hence fragile, senescent systems are poised for collapse, and eventually do in response to perturbation. Senescence is the end-state of a system, and is resolved in one of two ways, both of which entail death of the senescent system: metamorphosis into a new immature system, or terminal extinction (death). In *Global Insanity* we provided many examples of this canonical trajectory in a variety of contexts and different kinds of systems, including cells, organisms, species, ecosystems, and human social systems. Then, after reviewing the historic arc through which the social system embodied by Western civilization developed to its present state, we argued that by way of its continued development it is now fast becoming, or has already become, senescent, an argument that we will flesh out further in this essay.

But first we need to review a key insight upon which our point-of-view is founded, an insight provided by Robert Rosen when he sought an answer to the question: what makes a living system alive, and how does it differ from a machine? In addressing that question, Rosen shed new scientific light on the nature of life itself, and what it is that makes a system truly complex, as opposed to merely complicated.[4]

Rosen's insight, in a nutshell, was that unlike a machine, a truly complex system (including any living system) is closed to efficient cause; i.e., it is *self-entailing*. In other words a truly complex system creates itself—no external agency is involved or required, except to provide material resources. Closure to efficient cause is achieved via mutual coupling between systems of metabolism (energy transformation) and repair (including replication), such that metabolism itself affords the means of repairing the material components that are needed for metabolism. Moreover, organisms are *anticipatory*, insofar as they engage in (via some form of stably encoded memory, for example that encoded in the nucleotide sequence of an organism's DNA) a modeling

[2] S.N. Salthe, *Development and Evolution: Complexity and Change in Biology* (Cambridge, MA: MIT Press; 1993).
[3] Robert E. Ulanowicz, *Growth and Development: Ecosystems Phenomenology* (New York: Springer-Verlag, 1986) and RobertE. Ulanowicz *Ecology, the Ascendent Perspective* (New York: Columbia University Press; 1997).
[4] Robert Rosen, *Life Itself: A Comprehensive Inquiry into the Nature, Origin, and Fabrication of Life* (New York: Columbia University Press, 1991)

relation with their environment that allows them to adaptively anticipate changes in the environment and work toward fulfilling their existential needs before those needs become a crisis.

Rosen's formal model of "anticipatory systems" provides insight into how organisms, and more generally, living systems, are able to maintain homeostasis (that is, remain stable) in a changing environment. To do that the system must contain or embody a model of its environment, wherein entailments of the model are congruent with causation outside the system. The system is anticipatory to the extent that the model creates entailments more rapidly than the corresponding causation occurs in the world at large.

For a system to adaptively anticipate change in its environment—that is, for a system to embody a modeling relation that allows it to work toward mitigating and thus surviving the effects of that change—it must have the capacity to *sense* the change; it must have a memory of similar change that occurred in its past; and it must have a means of using that memory to determine what the sensed *signs* of change *entail* (i.e., what they mean). Thus, anticipatory systems anticipate the future by recalling the past.[5] As a result they are often incapable of dealing with or surviving change that is unprecedented. But as long as environmental changes are slow enough and of a sort that the precursors of the current system experienced in the past, and hence congruent with what the model entails, the system is robust and remains stable.

What Rosen's insight does is provide a way out of the reductionist trap in which science and society have become ensnared, in which continued economic development for short-term gain, which ignores or dangerously downplays the importance of relational context, is encouraged, resulting in harmful unintended consequences that could have been anticipated were it not for the reductionist focus of the developmental work being done. But it is important to note that reductionism itself is not anything new, and is not solely a product of humanity or of science: rather, it is a natural expression of the evolutionary-developmental pull toward *specialization*. This tendency stems from the fact that all organisms, and in particular animals [a life-form including human beings (even in our currently technologically augmented form) defined by our inherent need to feed on other organisms], have a *limited capacity* to process sensory information. Because of this, *choices* must be made on what specifically to attend to within any given situation, and how much attention to *pay* any one thing. In the evolution of animals, competition creates selection pressure that favors attentional specialists, which makes for more efficient and/or effective (less *distracted*) use of a given

[5] J.A. Coffman and D.C. Mikulecky, *Global Insanity: How Homo sapiens Lost Touch with Reality while Transforming the World* (Litchfield Park, AZ: Emergent Publications; 2012).

resource, and hence an advantage over competitors who depend on the same resource.[6]

With development of a system around a specific resource base, specialization is highly favored, allowing the resource to become more finely partitioned within the system. Reductionism is merely a human manifestation of that biological phenomenology. And it takes many forms, most of which are not scientific. At its most basic, reductionism simply manifests the natural attraction, understandable from the perspective of a specialist seeking to avoid distraction from the focused task at hand, to finding simple answers, explanations, and solutions to complex problems. If a problem can be mentally *reduced* to a single direct cause (or source of blame) that presents a (typically short-term) solution, then the more costly work of attending to the actual (and more long-term) complexity of the world can be avoided. In the socio-political realm, this naturally leads to polarization, because different factions become specialized in reducing social problems to different "causes" and sources of blame. Ultimately, reductionism of any form is bound to fail, just as extreme specialization of any kind leads predictably to extinction (owing to the fact that the once abundant resources that fueled development of the specialist, and on which the specialist comes to increasingly depend for existence, are bound to eventually dissipate as the world changes, as it always inevitably does).

We submit that the global consumer economy upon which the vast majority of human beings now depend for their lives, together with its underlying world model and the various social networks that support it, is a well-developed (i.e. mature) living system that *like any other living system* is highly adept at extracting resources as fast it possibly can in order to advance its own ends and fuel its own growth. The problem however is that the model is a reductionist specialization based on the use of non-renewable resources (refined fossil fuels and rare earth minerals) that support a *biologically unprecedented* rate of energy flux and hence entropy production, and hence an unsustainable rate of growth. This model gave humans a leg up in the world that existed when the system began developing, and it remained tenable until quite recently. The world has changed however, in no small part owing to the entropic effects of industrial civilization, and the model (now deeply entrenched in cultural memory) is no longer adaptive or anticipatory.

In principle what has happened is no different than what happens with bacteria on a Petri dish, which affords virtually unlimited resources to the bacteria that are initially plated at low density. Like the bacteria, or any other living system, the global

[6] E. Bernays and W. Wcislo, "Sensory capabilities, information processing and resource specialization," *The Quarterly Review of Biology* 69(2) (1994):187-204.

economy will use whatever resources are at its disposal to grow, and will eventually collapse when such growth depletes the available resources. And more to the point of this paper, like any mature living system the global economy acts as a self-interested agent to thwart or neutralize any work directed toward replacing it with a different (better, healthier, potentially sustainable) system. In what follows we will provide arguments for each of these claims. We will then discuss how the system appears to have entered senescence (economic decline and functional extinction), and why that can be taken as a hopeful sign, as long as it is used in an anticipatory fashion to motivate work that takes advantage of the opportunities that senescence presents for radical transformation of the system, i.e. metamorphosis.

THE GLOBAL ECONOMY AS A LIVING SYSTEM WITH A MIND OF ITS OWN

Many will object to the notion that a social system has a "mind". But on what basis? To what does *mind* refer? Some will say that "mind" is synonymous with "brain", but that is reductionist sophistry that has been effectively rebutted by numerous authors (including Rosen), so we need not belabor the argument here. Suffice it to say that it is difficult if not impossible to disentangle the concept of mind from the concept of life.[7] It is reasonable to posit that *mind* simply refers to whatever it is that motivates anticipatory, intentional action. All living beings (including microbes and plants as well as animals) anticipate and work purposefully (i.e. with *intent*) to meet the existential needs that being alive demands. Thus, life itself, being by nature anticipatory, embodies mind.

The reason that many people feel that human beings and perhaps other sentient species are the sole beneficiaries of *mind* is that we imagine that we know our own minds. But most of us do not. As discussed in *Global Insanity*, much of what we (think we) know about our own minds amounts to *ex post-facto* rationalization. Our minds motivate our actions, but that occurs largely unconsciously. We then use our unique linguistic facility after the fact to construct conscious rationalizations that ostensibly explain and/or justify our prior actions. But the mental motivation comes before the rationalization, and even before consciousness. Given that, is there any reason to believe that mind is not something manifest by any living system?

The question then is whether a social system can be considered to be alive. It would seem that it must, given that it is a complex system that by definition is composed of living entities. Yes, those entities are individuated, each with minds of their own. But to become socialized, the individual minds must collectively engage in

[7] E. Thompson, *Mind in Life: Biology, Phenomenology, and the Sciences of Mind* (Cambridge, MA: Belknap Press; 2007).

cooperative work that requires "like-mindedness", i.e. culture, which encodes the memory of the social system, as well as its means of interpreting signs. To achieve "like-mindedness", individuals must become enculturated, which typically happens during childhood development via familial care, language, education, and (of late) the media. A society can be considered a system only to the extent that it is stable, that is, to the extent that it coheres and persists. Whatever coherence and persistence a social system has comes from its common memorized and inter-generationally transmitted culture. Culture entrains individual minds, which in turn, by working cooperatively within a socio-cultural system, comprise the mind of that system.

The globally industrialized and capitalized consumer economy (hereafter referred to as "the Global Economy" or simply "the Economy") that entrains and dominates most contemporary human affairs is a social system defined by a common culture. The culture emerged in the West (in no small part in ancient Greece) and its ascendance was enabled by the technological power afforded by reductionist science. Everyone who participates in the Global Economy—the majority of human beings now alive—is "like-minded" to the extent that they are voluntary participants in the system and its culture. Anyone who is not of such a mind is met with resistance and must suffer the consequences, which can be quite brutal (just ask the Native Americans). Insofar as that is true, the Economy has a mind of its own. Unfortunately, the collective mind of the system is deeply entrenched, and far more powerful than any of the individual minds that comprise it. Hence the probability that any individual, or even small groups of individuals, can change the system is small.

How resistant a system is to change depends on how well-developed it is. Immature systems are robust to perturbation, but this is in large part because they are plastic and hence able to adapt to changing circumstances by changing their behavior or way of being in the world, which is not yet habitual. Mature systems are more powerful owing to development of self-sustaining habits, and hence robust to perturbation, but the increased power entails greater resistance to change. Senescent systems are rigidly "set in their ways", and hence are even more resistant to change, but are no longer robust to perturbation. That is why senescence is a hopeful sign—it is far easier to overcome a senescent system than a mature one. But before searching for signs of senescence in the Global Economy, we will explore the myriad interconnected ways that that system works with "a mind of its own" to actively resist change.

MECHANISMS THAT THE SYSTEM EMPLOYS TO RESIST CHANGE

Our thesis is that the Global Economy embodies a mature living system that actively employs whatever means it has at its disposal to resist the kind of change that is needed to prevent its own demise. This resistance is deeply analogous to the phenomenon of addiction in individual human beings. An addict may be fully cognizant of the fact that he is destroying himself with his addiction, but he is nevertheless highly resistant to making the changes that are needed to end the addiction. Most of us in the developed Western world are addicted to the short-term benefits and privileges afforded by the Global Economy, and as a result of our active participation therein, the system itself manifests addictive resistance to change. But this resistance is amplified to a global scale. That is why movements to change the system rarely gain any traction, and are typically either squashed out of existence or co-opted by the system and entrained toward its own ends. The election to the presidency of Barack Obama can be interpreted as exemplifying this phenomenon (although there are other interpretations; no one but Barack Obama himself knows why he did not follow through with his original plan and elected mandate to change the system). While it is true that past socio-cultural movements have produced long-term change for the better (e.g. the emancipation of slaves, women's rights, etc.), this change has been painfully slow (and is still far from complete!) over the course of many generations. The problem now however is that the pace of change normally afforded by long-term cultural evolution is nowhere near what is needed to save us from the much more rapid and still accelerating pace of destruction being wrought by industrial technology in the service of the Economy.

What are the mechanisms employed by the Economy to resist change? For each of us as individuals, they are most proximally psychological, as might be surmised from the above discussion. But the psychological mechanisms extend and are inseparably connected to social, cultural, political, and technological mechanisms, all bound together in a self-entailing complex system. Here we will briefly describe our impression of how it works, in an effort to better delineate what we are up against.

In *Global Insanity* we discussed how denial and rationalization are psychological defense mechanisms that addicts employ to resist change. We submit that denial is widespread in if not endemic to the developed Western world. It is most obvious on the ultra-conservative or "far-right" end of the political spectrum, whose adherents, clinging to a fantasized idyllic past (that which they wish to "conserve"), vehemently and proudly deny objective realities such as climate change and evolution. But a more subtle form of denial is used as a defense mechanism across the political spectrum (including by many liberals and progressives), as evinced by anyone who thinks that,

despite all evidence to the contrary, there is nothing inherently wrong with the Economy, or that technology alone will prevent its collapse.

Denial manifests most commonly in the fact that very few people are even willing to entertain, much less seriously discuss, the possibility that barring radical changes in our way of life, our civilization faces imminent collapse (how long do you think you can sustain a serious conversation on that subject?). Many, perhaps most, westerners tend to view and treat such claims as histrionics, a sign that the claimant is mentally unsound. After all, hasn't every generation had its doomsayers reacting to the deterioration of social norms by proclaiming that the end of the world is near, and are we not still here and evolving more rapidly than ever? Yes and yes; but the fact remains that the rate and nature of the anthropogenic changes occurring in the world are *biologically* (not just socially) unprecedented. Moreover, some past doomsayers, e.g. those who announced the imminent demise of the Roman Empire during the early part of the last millennium, were spot on.

So denial (and related psychological defense mechanisms such as rationalization) is a person-proximal mechanism employed by the Global Economy to resist change. It allows people to serve the system and carry on business as usual, relatively unperturbed, even though business as usual is precisely what is destroying the biosphere and humanity. But the denial does not occur in isolation; it is abetted by system-intrinsic mechanisms at higher social and cultural levels. At the social level these mechanisms emerge from the many privileges conferred by gender, race, economic class, etc. Despite the American myth of equality of economic opportunity and a classless society, the reality is that economic privilege is still inherited, largely along patriarchal lines, as it always has been. The system resists changing this way-of-being by way of legal protections for the economically privileged. It is important to note that defense of genealogical privilege is a natural phenomenon with deep biological roots (all biological systems naturally defend their own genealogy, and in vertebrate animals testosterone generally enhances the defense mechanisms); the systemic defends its structures of conferred privilege because is at base a biological system.

But what of the American Middle Class, a dwindling phenomenon that nevertheless still wields a good deal of socio-economic-political power? The Middle Class arose in the 20th century, especially after the Second World War, and has been celebrated as the fulfillment of the "American dream" of prosperity for all (or at least many) irrespective of genealogy. The emergence of the Middle Class was accompanied by socio-cultural changes that raised the expectations of a large (and with the baby boom, burgeoning) segment of the population. In a few short

generations, the stark realities of the Great Depression were forgotten, and the unrealistic expectation that economic privilege (the ownership of significant capital) is the birthright of anyone who works hard and plays by the rules, one that comes without any long-term cost to society or the biosphere, became engrained in cultural memory. As a result, psychological denial is further abetted by relatively recent social systems that were founded on, and which perpetuate, the idea that there are no limits to economic growth, sustainment of which through profligate consumerism has the potential to lift everyone out of poverty. It is a delusional idea that is still widely championed by those who work within the system (still the majority). The system actively resists change by way of the idea's persistence within its social institutions (e.g. via official policy and peer-pressure in schools, churches, clubs, corporations and media) and cultural memes.

Thus, if you listen to the nightly business report on the radio you will typically hear news of economic growth cast in positive rather than negative terms—that is, it is portrayed as a *good* news, owing (for example) to the jobs that the growth will create. Similarly, the Economy is viewed as the most important political issue ("it's the Economy stupid!"), owing to the opportunities it affords for employment and social advancement. Any politician who would dare take a stand *against* economic growth would have no chance at all of being elected, even if that politician were charismatic and able to eloquently articulate the reality that growth of the Economy (as it currently exists) is the very thing that is bringing about our demise. The reason for this gets back to the psychology—the same denial mechanisms that prevent people from engaging deeply in discussions about the insanity of our lifestyle prevent them from giving serious consideration to politicians who dare point that insanity out. The system actively resists change by casting a negative light on anyone who points out what actually needs to change to ensure long-term survival.

As a result, what we now have in the political arena and government (in the United States at least) amounts to theater, a tragicomedy of shouting matches addressing every issue *except* that which is most critical to our long-term survival. While politicians on the left and right disagree on most issues, they all agree that we need to do everything we can to keep the Economy growing. In essence, that (largely tacit) agreement removes the issue from the table, and in so doing enforces systemic resistance to change. The system, via its effective deployment of psychological, social, cultural, and political mechanisms, ensures that whoever gets elected, liberal or conservative, progressive or reactionary, will work tirelessly to grow the Economy.

Perhaps the most insidious mechanisms that the system employs to resist change are technological. The biggest growth in technology over the past two decades has

been in computerized electronic devices. In the developed world, and in much of the developing world, nearly everyone now has access to some kind of device that allows them to access vast amounts of information and connect to one another via social media, affording unprecedented opportunity for interpersonal communication and learning. Concomitantly, powerful organizations such as the US Government's NSA now have access to personal information about anyone who uses such devices—personal privacy is largely a thing of the past. Unfortunately, the technology has evolved far more rapidly than the biology, so we engage with it as animals, unconsciously acting out on our animal instincts. And as a result, despite the immense opportunity it affords to unite us, computer linked social media is in many ways driving us apart. Interpersonal engagement over electronic media is very different than face-to-face engagement, and has a distancing, disconnecting effect. Shy people who in public would never say a bad word about anyone become venomous trolls in cyberspace. It is not uncommon to see couples sitting together but not talking to each other, instead each tuned into their own devices. Within social media people are attracted to like-minded networks, and the computer obliges by feeding them just what they want to hear. So instead of being a means of mind-expansion, electronic media is as often as not a means of deepening the entrenchment of mindsets that are already well-developed (one need only read most any online "discussion" on a political thread to see this), as well as of increased distraction from reality via endless entertainment. And our very plastic brains are becoming adapted (and addicted) to this as a way of life. To the extent that this is so it is a very effective mechanism that the system uses to resist meaningful change.

ECONOMIC DECLINE AS A (HOPEFUL) SIGN OF SENESCENCE

Active, entrenched resistance to change is a sign of systemic senescence, and senescence is a sign of impending collapse. While the term "collapse" tends to connote rapidity, the pace of change is relative to the scale of the system. So, collapse of our civilization would be expected to occur at a pace that is far slower than the senescent decline and death of an individual human being, and may take place over multiple human generations. It might even be so slow as to not be apparent to but the most discerning observer. But when it is happening it presents signs that can be read. One of them is economic decline.

The usual response to economic decline is to direct all effort toward recovery, and indeed, that has been the focus of efforts since the great recession precipitated by the market collapse of 2008. But from our perspective, a better response would be to view economic decline as a sign of senescence, and to act accordingly. When senescence is

recognized as not only an end state, but also as a *transition state* affording potential for metamorphosis, then the sign can be taken to be hopeful. The problem then becomes the following: (how) can the transition state—with the increased uncertainty that characterizes any transition state—be negotiated to minimize the inevitable suffering brought about by the collapse while maximizing the chances that whatever emerges from the collapse will be widely desirable?

At this juncture it is worth recapping the argument for our assertion that the Global Economy is, or is fast becoming, senescent. The argument is based on the idea that *development* constitutes the canonical trajectory of change through which any given system uses resources to come into being and then sustain and maintain itself (including its developed way of being). With development a system becomes *informed*, that is, it accumulates information (i.e. memory). In essence this information constitutes the paths along which the activities of the system move. The more mature a system is, the more well-worn those paths become. The more well-worn or entrenched a path is, the more it becomes favored by the system over alternative paths as a guide to activities; as a result, alternative paths tend to become abandoned and lost. As a system matures and continues developing new paths are opened up, but these tend to be tributaries that spring off the entrenched ones that had developed previously. As a result, with continued development a mature system favors and accumulates certain *kinds* of information, without increasing its capacity for substantial change (which would require openness to new kinds of information, which requires completely different paths than those that were created with development of the system). As Stanley Salthe has argued, senescence occurs when a system becomes overburdened with information—a state of "information overload" that reduces the system's capacity to undergo adaptive change. Due to their increasing informational burden, senescing systems are increasingly sluggish, with a progressively decreasing mass-specific rate of energy flow.

With this in mind, is there evidence that the Global Economy is senescing? As suggested above, economic decline (decreasing specific rate of energy flow) is one sign. Although the economy has supposedly begun to recover from the recession of 2008, the specific (e.g. per capita) rate is still certainly lower than it once was. But are there other signs? There appear to be: senescence is a condition of entrenched rigidity, and by all appearances the system rigidly entrenched, with government in the United States (and elsewhere in the Western world) as politically polarized as it has ever been, and the polarized factions showing few signs of flexibility. As for information overload, the system certainly is more burdened with information than it has ever been, in the form of digital information of all kinds being exchanged and stored on the

internet and the "cloud", and in buildings holding banks of energy-consuming, entropy-(i.e. heat)-producing servers. This digital informational burden is also evinced in widespread distraction and short attention spans among the populace. So, by three indicators of senescence—economic decline, sociopolitical inflexibility, and information overload—the global economic system appears to be senescing.

The silver lining to the dark cloud of senescence is that it is a stage of development that signifies impending radical change, owing to the imminent collapse of the system. That change can either be purely destructive, as in death, or it can be transformational, as in metamorphosis. The latter (obviously preferred) outcome requires that the seeds of transformational change be planted early enough that when the system finally does die, a new system, initially nested within and nourished by the old system, has developed to a stage that is self-sufficient. In other words, metamorphosis requires that a new system begin developing within the senescing system, the former using the latter to fuel its own growth.

How can this be accomplished? "Grassroots" back-to-the-earth movements fueled by youthful energy and idealism within economically privileged societies are necessary, and there are many of those that are growing. But it remains to be seen whether these will have enough momentum, knowledge, and cohesion to continue developing after the Global Economy collapses. Moreover, the emergence of a new biosphere- and human-friendly system requires widespread willingness to sacrifice material privilege. The necessary seeds of change in that direction would be evinced by people simplifying their lifestyles and foregoing conspicuous consumption. Again, that is happening at a low level among segments of the population, but whether it has gained enough momentum to sustain itself after the collapse remains to be seen. The failure of similar movements advanced by the counterculture of the 1960s might seem to suggest that back-to-the-earth movements emerging now are doomed to a similar fate; however, the senescence of the system may actually afford the latter better chances. However—and this is perhaps the biggest hurdle—successful metamorphosis will ultimately require significant downsizing of the human population. The only way to accomplish this without inflicting suffering on people who are already alive is to significantly reduce the birth-rate.

It is impossible to predict what will emerge following the collapse of the Global Economy, and with it civilization as we know it. Immature systems are by definition underdetermined, and are therefore difficult to predict, especially in their incipience. Therefore the best we can do is work to plant the seeds of change and hope that they give rise to something good. Senescent systems on the other hand are over-determined and hence very predictable, so we can make some predictions about what

the global system will do before its demise, based on its past behavior. We can expect it to resist all efforts directed at implementing the kinds of change that are needed, up to the end, and to do so using whatever means it has at its disposal. Within those nations that benefit most from the Global Economy (e.g. and especially the United States) this would include the use of state-sponsored violence (against both foreign and domestic populations), propaganda, political divisiveness, and media-enabled distraction. We are already seeing these things, and they will predictably get worse as long as the system remains viable.

CONCLUSION

With our extraordinarily refined mental and technological prowess, human beings continue to do what any (immature) living system does: use all available resources to grow in an unregulated fashion. In that regard we really are no different than (ostensibly mindless) bacteria on a Petri dish. It remains unclear whether it is even possible to use our anticipatory brainpower to overcome or regulate the biological imperative to grow; available evidence is not encouraging. The only way the growth imperative is countered in nature is through a ruthless ecological balance of power. But through technology and petroleum-fueled industry we have overcome the ability of all other species to counteract our power to grow. It appears therefore that the only thing that will prevent our continued growth is the collapse of civilization, and possibly our extinction, caused by the resource depletion, ecological degradation, and environmental change resulting from our growth. Our best hope may lie in recognizing that human socioeconomic systems, like human individuals, tend to develop into an end-state of senescence that rigidly resists change, but with increasing fragility. With that recognition we may be better prepared to take maximum advantage of the transitional opportunities that the senescing system affords.

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