What's wrong with the world? Rationality! A critique of economic anthropology in the spirit of Jean Gebser

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A critique of economic anthropology in the spirit of Jean Gebser

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ABSTRACT: Jean Gebser (1905-1973) was a multidisciplinary thinker whose ideas about human consciousness and the future inspire the following five vantage points for the heterodox critique of contemporary economic anthropology: (1) Characteristic attributes of consciousness and those of the environment surrounding the individual are equivalent, eliminating the possibility of single-minded, seamless, rational control, especially during macrohistoric phase transitions; (2) *Diaphaneity* as a mode of deep and comprehensive understanding will be needed to deal effectively with emerging global resource and environmental problems; (3) Costs in the form of irreversibly accumulating inaccessible energy shadow economic expansion that our cultural conditioning portrays as pure progress; (4) Rationality, as the most laudable motivation for individuals, business firms and nations, has led to an unfounded techno-fetish; and, for various reasons, it fuels accelerated movement toward collective self-destruction; (5) Signs of chaos (not the harmless and controllable kind found in standard economic literature) corroborate the notion that we have entered a new period of macrohistoric phase transition as interpreted by the thermodynamic comprehension of universal history.

Jean Gebser (1905-1973), considerably better known in his native "Mittel Europa" than in the Atlantic world, relied on natural and social sciences, as well as on the arts and humanities, to formulate a compelling phenomenology of consciousness. It appears to be increasingly pertinent to the world's inexorable awakening to the physical limits that face human drives in the aggregate.

He identified five structures of consciousness: *Archaic*, *magic*, *mythical*, *mental*, and *integral*. These have always been simultaneously and comprehensively present in all of us with a crucial qualification: Historically, they dominate actual consciousness in the sequence indicated. Although with nonnegligible overlaps, each emerged, became decisively influential, turned deficient and was gradually replaced in its epoch-defining capacity. Currently, we live the apotheosis of mental dominance, already in its deficient phase, struggling to ward off the fifth (*integral*) structure, which began to press to the fore at the turn of the last century.

An originary perception of existence is "ever-present" in consciousness.[1] It had become suppressed and latent over the ages but once the *integral* structure defines our relationship to "Being" it will be free again, renewed and enriched with transparency and intensity. This final, culminating moment of consonance will usher in the age of a healthy

[1] Gebser's *magnum opus*, "The Ever-present Origin," is a skillful translation of the original German title "Ursprung und Gegenwart."

equilibrium among basic human propensities. The *archaic* deep sleep and relaxation, the *magic* sense of unity; experienced, among many other ways, through music; fulfillment of poetic inclinations that characterizes the *mythical*, and the cultivation of sciences that the *mental* in us urges, will all have their opportunity to flourish.

Gebser did not want to be honored as a wise-hearted seer or guru. He never acted as a counselor of "correct" behavior and would most certainly consider it a practical joke if he had found a sticker to this effect pasted on his legacy. He emphasized that life cannot be fundamentally different from what we understand to be the human condition. Nonetheless, he maintained that the *integral* structure would give the individual the best chance of self-realization and should generally improve the quality of life. Remarkably, *integral* consciousness translates into interpersonal relations at all levels of social organization that would be perfectly compatible with long-term, world-embracing sustainability.

Since any attempt to do justice to Gebser's *oeuvre* (including the criticism directed at it) would overwhelm the present undertaking, what follows is intended only to demonstrate why the heterodox approach to contemporary socioeconomic issues finds support and inspiration in his thoughts.[2] In particular, the following five Gebserian insights brought into contemporary economic context remind us of how unfit "mainstream" is to absorb and reflect the emerging new reality; how irrelevant and aporia-promoting its hypertrophied abstractions and atomized preoccupations have become.

(1) Characteristic attributes of consciousness and those of the environment surrounding the individual are equivalent, eliminating the possibility of single-minded, seamless, rational control during macrohistoric phase transitions (*chaotic transitions*[3]); (2) *Diaphaneity* as a mode of deep and comprehensive understanding (an approach that excludes latching on to any particular, "either/or" type of explanation, perspective, or Oedipal macro-narrative) will be needed to deal effectively with global resource and environmental problems; (3) Costs in the form of irreversibly accumulating inaccessible energy shadows global economic expansion that our cultural conditioning portrays as pure progress; (4) Rationality, as the deficient phase of the *mental* structure, fuels accelerated movement toward self-destruction; (5) Signs of chaos (not the plain vanilla kind found in standard economic literature) corroborate the notion that we have entered the period of a new *chaotic transition*.

(1) *The intangibly conscious interior and the tangible exterior are, to a large extent, each other's reflections.*

In this respect, Gebserian thought confirms (and is confirmed by) perhaps the most remarkable achievement of 20th century Western philosophy. Structuralism and post-

[2] The reader who wants to become better acquainted with Gebser is referred to his two best known works listed in References. Feuerstein (1987) provides a complete exegesis and Combs (1996) includes an excellent summary.

[3] *Chaotic transition* is a cataclysmic macrohistoric gestation that ushers in a new global era. See later in the text and in the Appendix.

structuralism (or postmodernism) finished what Kant, Hegel, Marx, Nietzsche, Freud, Saussure, Wittgenstein and many others began, namely downsizing, and perhaps even abandoning, the conviction that a Cartesian-cogito-like, background-independent subject can make an objective, value-free sense of the world.

Consciousness cannot possibly live a life independent from the specifics in which it is born and develops. Surrounding socioeconomic milieus are fused with thoughts, feelings; traditions and culture, with a temporal *Weltanschauung*. In short, we think and behave the way the world is and the world is the way we think and behave. The consequent statistical equivalence between what one may consider average consciousness and the typical external matrix results in a structure of understanding that is manifest in profound, stability-preserving beliefs about what is natural, normal, desirable, and achievable.[4]

This condition governs even erudition although it does so inconspicuously. Standard knowledge is not merely an accumulation of scholarly contributions by outstanding individuals. It is also a congenerous reverberation symptomatic of where the evolving interior/exterior equivalence happens to be along the macrohistoric timescale. But this second feature -- the temporality of epistemological awareness -- remains largely concealed both from those who are engaged in scientific endeavors and the general public.

The academic centers of 16th century Europe were dominated by big-wig theologians who provided advice on how to ensure general welfare by recognizing and eliminating Satanic influences. "Graduate students" in search of lucrative careers specialized in demonology, wrote dissertations in flawless Latin on the *punctum diabolicum* and *maleficium*. All that intellectual effort, ambition, and brilliance, all the honor that had been bestowed upon these pursuits! And yet, the whole enterprise became the laughing stock of scholars by the end of the 17th century and the *Enlightenment* relegated it to the absurd proto-history of modern mentality.

The overwhelming force of radical presence thwarts the application of such thoughts to prevailing conditions. As during every past epoch, what "is" now appears to be all that life can be; all that is "true." Orthodoxy is insensitive to, and subtly sidetracks deviations that threaten it. Its entrenchment remains resilient even when the passage of time thrusts new conditions onto the stage of history, rendering its worldview and methodology increasingly obsolete and irrelevant. It can do so by thriving on the resistance against the unfamiliar, against upsetting the learned, institutionalized ways in which ends and means can be connected in daily life.

Epochal transformation is a mysterious and tortuous journey. Recognition that rules and principles for the whole (the world) are different from what may be applicable to the

[4] Average consciousness presumes that individual consciousnesses have either common general features (e.g., higher income is better than lower income) or common attributes of varying intensity (e.g., desire to consume luxuries). Similar thinking constructs and maintains the "typical exterior," i.e.; the social and economic characteristics of the milieu in which the individual strives for differential success.

parts (nations, political movements, business firms, individuals) could come only after the mist arising from the clash of wills is dispersed.

Since the way a comprehensive change occurs at the global scale cannot be called a rational process (at least not *ex ante*) nor can it be called an irrational one (it is rationalizable *ex post*), it ought to be characterized as "arational."

The acknowledgment that light is both wave and a stream of corpuscles exemplifies arational propositions. While the rational mind insists that things must be either this or that, the arational approach accepts two (perhaps even more) facets of a single truth. And, as Gebser frequently pointed out, rather than impairing the individual's ability, the cultivation of arational proclivities enhances creativity.[5]

Accepting the internal/external equivalence translates into welcoming the necessity to participate in the social process by making and advocating choices, while understanding that all of us (and all the time) are involved in an endogenously-organized collective motion at the species' level, which eludes any individual or partial, selectively rational control. The future is an upshot (rather than a conscious synthesis) of conflicting ideas and blueprints. This is especially the case during *chaotic transitions* at the global scale, for which there have been only two complete examples: "1789-1834" and "1914-1945." (The Appendix briefly describes a new macrohistoric theory that depicts the past half millennium as a slow -- at least from the human observer's vantage point -- thermodynamic alteration between dynamic steady states -- called *global systems* -- and *chaotic transitions*.)

The unity between what is internal and external has a material basis. The brain contains both the information about the institutional aspects of the environment and the information about how to deal with them in an endless variety of "behavior-provoking" situations.

These individually anchored and physically conceivable traces are interconnected (again in physically interpretable ways) into a worldwide network under the reign of a *global system*. The latter can be visualized as a single physical object, a complicated lattice with billions of individual nodes in the service of a historically valid scheme of coordination equilibrium. It may be called the *global system-specific integrated web*.

(2) Diaphaneity, seeing through it all.

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[5] "Arationality" intrigued some of the most memorable figures of twentieth century literature. F. Scott Fitzgerald, for example, remarked that intelligence is the ability to accept two contradictory ideas and still function. George Orwell discovered the possibility of abusing this faculty. In "1984," the political tyrant uses "doublethink" to perpetuate cognitive dissonance as a method of terror and subjugation. Big Brother puzzles and keeps minds paralyzed with slogans such as "war is peace;" with suggestions that the "Inner Party" is both infallible and learns from past mistakes.

Diaphaneity is a manifestation of the *integral*, arational consciousness in Gebser's work. It means being in the world according to the way it "really" is, as if it were transparent. While the most profound implications are ill-suited for this space, much of his elaboration is relevant for the subject at hand.[6]

What is real? What is the use of contemplating all in one?

These are the two most obvious questions skepticism is likely to prompt. "Real" as a comprehensive attribute appears to be an overly subjective notion -- and a mobile, evolving, time-dependent one into the bargain -- to be recognized by economists. And why bother with the "whole?" Is it not what it is; big, complex, and immeasurable? Preoccupation with it belongs to the *Café Philosophique*.

Answering the above questions differently is part of the critique the current examination intends to direct at prevalent interpretations of human nature and cultural evolution in economic sciences.

"Seeing through it all" is a social phenomenon that always existed and always will; only its contents shift as the external/internal compact develops over time. But after the shift, the previous clarity is revealed to be a retrograde, inferior dogma. What seems ontically evident in one epoch comes to be regarded as ontologically inadequate in the next. Thus, comprehension as inner articulation along with its broadly shared hermeneutic and methodological self-awareness is a historical category.

It was perfectly clear to Aristotle and Ptolemy that a stationary Earth is the center of the universe. If the Earth moved, they argued, we would feel the breeze. Were the cosmic center located on the Sun or on some other heavenly body, the earthenware plate dropped by the slave would fall toward the hypothesized center rather than to the kitchen floor. Copernicus, Kepler, Galileo, and Newton helped see "through it all" differently, and, one may say, more correctly.[7]

Similarly, the crystallized socioeconomic order is inconspicuously present in the interstices of most minds. It can always be characterized a-historically in its defense. It excludes both what was common sense, phenomenally confirmed experience in the past and what it may be in the future. The prevalent *global system* keeps churning out standard (or kindred) responses and opinions, regardless of the infinite variety in value-and-belief-judgment prompting instances. The vast majority of the myriad assertions in daily life are derivatives of the extant-dominant diaphaneity. The parade brings ever newer and more surprising spectacles but the approving applause of the spectators remains the same.

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[6] Gebser used the pietistically-tainted word "spiritual" to describe diaphaneity. Yet, he characterized "spirit" as a psychic phenomenon, the power of transformation, and primordial energy (Gebser, 1984, pp. 229, 326, and 330).

[7] Professor Emeritus Kent Nielsen of *Brigham Young University* elaborated on the transformation of core scientific convictions in his featured address to the *40th Annual International Jean Gebser Society Conference*, Provo, Utah, October 8, 2010.

Disguised to the extent of being forgotten, subconsciously stored symbol/referent relations speak through the individual. Moving the level of abstraction one notch higher, the order of things is a solidly entrenched interconnectedness -- a forward-projecting collective will -- lodged into the neuro-anatomy of the *global system-specific worldwide web*.

The typical economics professional of our days seeks success by assuming the much-extolled sharp focus, the "positive," engineer-like attitude toward phenomena *qua* objects without any evidence of attempting to understand "pre-analytic" (Schumpeter) notions about what constitutes reality. Highly specialized individuals, who cannot possibly find the time to read each other's literature, work within the dispersed spectra of a worldview-dictated referential context. It may never occur to them that they are extras in an imperceptibly slow unfolding, which, over a macrohistoric time scale, punctuates old and brings forth new conceptualizations. For example, labor unions were nonexistent during GS0, a social plague and police matter under GS1, but a required component of legally guided collective bargaining since the instauration of GS2. (See Appendix.)

In our era, education and cultural conditioning impart knowledge of salvation for any and all economic problems through market forces, aided by governments within the institutional-legal framework of a system called *mixed economy/weak multilateralism*. The Earth as an ecosystem is not considered a long-run constraint to economic growth. Neoclassical tradition, which enjoys the upper hand in telling the world what the shape of things is (when need arises "to see through it all") likes to formulate this conviction as a dismissal of 19th century "diaphaneity."

The classics firmly believed that the exhaustion of natural resources, land chief among them, would terminate demographic and economic expansion and lead mankind to a dismal steady state. But having witnessed the power of entrepreneurship and the marvels of science and engineering during the twentieth and early twenty-first centuries, we now "know" that natural constraints do not bind in the long run. Proof: The costs of energy and raw materials in developed country GDPs have declined to a small fraction. Aren't things obvious enough?[8]

The subrealistic diaphaneity of our times (succinctly expressed by quoting the small fraction of natural resources in overall expenditures) falters on confusing the "long run" with "forever;" on missing the most crucial structural relationship that the next popularly embraced diaphaneity must include. Namely, the increase in global output is not a pure benefit. It entails increasing global costs; hence, the world economy has a scale limit. The teleology of infinitely growing GDP will eventually find its way into textbooks on the history of thought. But unlike the harmless ancient belief that the universe is built of fire, water, air, and earth, it will be accompanied by the condemning label "self-destructive anthropocentric creed."

[8] For a critical view of demoting the significance of natural resources based on the percentage of energy and raw material costs in developed country GDPs, see http://www.scribd.com/doc/37932697/A-Critique-of-Contemporary-Economic-Beliefs.

The emerging diaphaneity associated with *integral consciousness* is likely to accord as much merit to describing the Big Picture in qualitative thermodynamic-economic terms as furrowing into narrow manholes of extreme specialization. It will constantly urge us to go beyond the measurable; to surpass dualistic, center-oriented, one-sided brightness that fragmented pursuits and partial results provide. Since it will cultivate an essential understanding of the human condition and prospects, perhaps even at the expense of pushing specific programs, it will not consider the "indeterminate" (or differences of opinion within the "indeterminate") useless.

Of course, the discovery that a perennial conflict exists between established knowledge and the motivation to see through things differently in light of a structural alteration in observed phenomena is not new. It has a long and distinguished philosophical ancestry. Two brief references follow.

Sensus communis, a concept of Aristotelian origin, recognizes the importance of what may be suggested by the absorbance of all available information and the totality of aspects.[9] Since it grasps reality by going beyond entrenched scholarship, and is nourished by the probable and the qualitative as opposed to "in-your-face" quantitative examinations within the context of axiomatically accepted, "off-the-peg" knowledge, it has always been in conflict with authoritative cathedras.

Hegel was, and his many followers over the past two centuries have remained, staunchly critical of "positivism." Understanding goes beyond standard conceptualization in the Hegelian view. It must include speculative, critical, counter-thrusting propositions and dialectical reversals. Without them, the object of understanding (e.g., the *global system*) would not even be recognizable; it would remain undisclosed, eluding interpretation.[10]

The constant scrutiny orthodoxy must encounter flows from the combination of the resilience needed for the effectiveness of human self-organization and for preserving its capacity to change under pressure. New ideas, better suited to deal with emergent conditions challenge senescent ones, first tentatively and unsuccessfully, then with growing intensity and relevance, until a new way of seeing through things itself becomes an orthodoxy.

Obviously, for the moment, the imperatives that follow from the growing phenomenal confirmation of human-activity-induced ecological degradation and emerging energy and other resource constraints remain largely disconnected from the imperative to pursue output maximization in order to alleviate poverty and to ensure decent living standards for the majority of the planet's population.

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[9] It may seem paradoxical that after discarding Aristotle's astrophysics and chemistry, we need to invoke the mighty thinker again when we search for the genesis of the observation that diaphaneity is subject to change. Let us ascribe it to a demonstration of the integrative nature of *integral consciousness.*

[10] In the chapter entitled "Language as Horizon of a Hermeneutic Ontology," Gadamer (2003) analyzes Hegel and his tradition in the ways we interpret understanding.

But consciousness is no longer insensitive to the "limits to growth." Transition to a new diaphaneity is unmistakably germinating. Early 20th century philosopher Henri Bergson memorably expressed just how subtle the process of collective awakening is. Referring to the vast grey area that separates strongly held views, he said that the inchoation of a new standpoint begins with "less of a thing thought than a moment of thinking, less a moment of thinking than a sensing of direction."

Abandoning the dogma of eternal economic growth may well be our generation's "inward thought" (to use Alfred North Whitehead's expression).

(3) *Illusion of exaggerated grandeur shadows industrial civilization; humanity misleads itself by imputing omnipotence to innovation.*

Without disparaging or wanting to live without the amenities of consumer capitalism, Gebser had been extremely skeptical to label the advent of the industrial age and attendant "technologization" an unadulterated progress. Modernity for Gebser represented entry into the deficient phase of the mental structure, a relatively short period of universal history during which the world proceeds toward inadvertent self-destruction.

One-sidedly praised gains, which he abstracts into a big push to the intensification of consciousness in the wrong direction under the banner of "rationality," are balanced by losses through increasing our distance from the "origin." The threat comported by the general lack of comprehension concerning human existence, inclusive of realistic notions about what technology might do for humankind, is on the ascent.[11]

This view approximates the contention of ecological economists, namely that economic activities are not free from negative effects associated with the *second law of thermodynamics* (the entropy law). That every time we add something that benefits humanity, we also subtract something from the potential of realizing further benefits -- i.e., that aggregation is shadowed by an equal or greater measure of disaggregation -- is a blind spot of contemporary economic thinking. An attestation to the validity of the observed law of cultural evolution, namely that the prevalent diaphaneity dictates what is "right and true," is that even first water economists continue to insist that "innovation" is the ultimate source of wealth.[12] The physical environment has been abstracted into a nondiminishing standing reserve to serve the satisfaction of human requirements through developing and applying "science and technology" which, by its putative independence from the state of nature, is presumed to have a limitless horizon.

[11] For a more detailed look at the subject, see my presentation "New scientific evidence confirms Gebser's concerns about technological overreach," at the 2010 *International Gebser Society Conference*: http://www.gebser.org/downloads/PoganyGebser2010.pdf .

[12] Baumol (2010) is an eloquent testimony of this neoclassical orthodoxy.

If run-of-the-mill economics recognizes "entropy" as worthy of consideration at all, it either declares its import for economic sciences null and void or intends to kill the subject by using two patently wrong arguments.[13]

The first one is based on the mistaken notion that the terrestrial sphere constitutes an open thermodynamic system and the second on the ill-considered claim that the equivalence of energy and mass (per Einsteinian physics) means that shortages in material substances can always be eliminated by deploying more energy which, courtesy of our Sun, is abundant and practically inexhaustible.

The terrestrial sphere is thermodynamically closed.

Modern thermodynamics distinguishes among three kinds of systems: open, closed, and isolated. The open system exchanges both energy and matter with the exterior; the isolated exchanges neither. Obviously, the terrestrial sphere is a closed system. Whatever we do with matter, incorporating it into our bodies, using it as raw material, discarding the bodies, throwing away or reusing matter again and again -- our virtually permanent weight and composition of atoms remain constant.

The terrestrial sphere's substance contains a lump sum of free energy and, for all economic intents and purposes our inventory of atoms is fixed. Combining this simple fact with the *entropy law* implies a diminishing availability of free energy contained in matter, a lessening ecological order, and a growing confusion about the sphere's true state (per "information entropy").

Matter and energy may be equivalent in theory but they lack mutual convertibility.

Despite their quantitative equivalence, matter and energy have an important asymmetry. While we can produce energy from matter, we lack the technology to do the reverse in economically significant quantities. Nor can the readying of energy for worldly applications take a detour around matter: The manufacture of solar panels, hydroelectric and wind turbines, geothermal stations, and nuclear reactors must draw from the fixed number and structural distribution of atoms.

Further, not only energy but matter is also subject to the *second law*. Deployment of matter always entails some irreversible loss of usable molecular structures.

All technological processes, whether in the generation of energy or production of material goods, reduce the ratio of economically accessible to total energy (where total energy is the sum of accessible or "free" plus inaccessible or "latent" energy[14]). The

[13] Textbooks on ecological economics deal explicitly with the *second law* (e.g., Daly and Farley, 2004; Common and Stagl, 2005) and its relevance to the economic process remains a serious research interest. See, for example, Jing Chen (2005).

[14] Energy is regarded "free" as long as accessing it requires fewer joules than what is obtainable from the same quantity and qualitative composition of matter. When the similarly interpreted cost/benefit relationship turns disadvantageous (i.e., obtainable joules are below the joules required for access), the energy is called "latent." Conventional (easily accessible) oil and high quality copper are examples of

consequences of irrevocable degradation (i.e., the transformation of low entropy structures into high entropy ones) remain with us forever. Ultimately, the increasing billions of metric tons of matter that the world annually ingests, digests, then extrudes back into the very same space whence they come do not leave the ecological *status quo* unchanged.

Mistaken notions about thermodynamics (the physics of the human condition) fuel techno-fetish, the belief that nature is infinitely manipulable.

The grand illusion that helps vulgar (nonecological) economic thinking to remove the red herring of entropy from discourse resides in a quasi-religious faith in "science and technology." It is a rather naive myth.

The usage of conflating "science" and "technology" into a single *meme* wrongly equates theory with practice. Science refers to solutions on paper, on the computer screen, or in labs, while technology means the profitable physical incorporation of "R & D" results. The second does not necessarily follow from advancement in the first.

Scientific information is neither free in terms of matter and energy nor is automatically translatable into profitable enterprise. Moreover, technological possibilities are not independent from the state of matter in the terrestrial sphere and that state changes with the growth of human presence and the size of the planet's economy.

Thinking that free (accessible) energy can be maintained by increasing knowledge is tantamount to the claim of having discovered a perpetual motion machine -- the source of boisterous merriment in patent offices around the world.

Referring to technological progress, as his generation understood it and as ours continues to pursue it, Gebser said "If the destructive might of such progress is not weakened, these developments, according to their degree of autonomy will automatically fulfill the law of the Earth." (Gebser, 1984, p. 96.)

Expansion of a species, which in the case of *homo sapiens* comes with unlimited material demands for economic purposes, eventually exhausts the ecological niche that facilitated its existence in the first place. The connection ought to be made by now. The preoccupation with the environment and natural resource issues that began to grow in the early 1970s is a sign that nature, in which we are embedded in an exponentially expanding pace, has abandoned its relaxed, permissive stance in favor of an increasingly constraining mode.

(4) *Rationality: The great catalyst behind overshooting limits*

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materials containing free energy; gasoline fumes and copper ashes exemplify "latent energy." This quantitative relationship cannot be dismissed by citing "technological development." It implies an absolute physical limit, which is *totally* independent of human knowledge, prices, and general economic conditions.

Gebser does not object to rationality as an analytical method or because he prefers its opposite, irrationality; or that he urges to attribute more importance to emotion than to logic, to place feelings above the intellect, and, consequently, to discourage factual reasoning, denigrate specialization, abandon focused investigations and fidelity to numerical discipline. His problem is with "rational consciousness," which, by being divisive, lives up to its root word "ratio." It promotes self-regard to an idealized preeminence with claims of anthroposophic completeness.

By colonizing our inner world, rationality has produced a world orientation that comports negative effects for both the individual and for society. It limits global integration, and uses social sciences to shelter a false and untenable perspective on the future.

Individual and society

The major offshoot of rationality -- collectively defined and culturally ingrained rational behavior -- is a shamelessly materialistic (chrematistic) comportment that dispossesses individuals of their deeper foundations. Under the banner of freedom and democracy, it promotes the profit motive to be the leader among social virtues regardless of the nature and size of the business. It blurs the difference between entrepreneurship and competition among plumbers, cleaners, and repair shops on local markets with rivalry in an arena where, hidden from public view and control, only gigantic financial outfits and multinational producers can operate. The much panegyrized benefits of the Invisible Hand, a virtual demiurge to neoliberal enthusiasts, are made out to be indivisible between realms of activity for which they may be expected to accrue and those for which they are not. In the end, rationality as a norm is being used as a blanket to cover the egregious concentration of wealth and attended income differentiation within and among nations during the past three decades.

The stereotypic, hence widespread, preoccupation with increasing income; or, as it is becoming ever more frequently the case, just hanging on to an achieved level of living, perpetrates false security. It engenders condescendence towards culture and labels the individual's artistic, contemplative proclivities to be wastefully impractical, idle pursuits.

Less obviously, rational consciousness severely limits or blocks out entire domains of reality. By not encouraging the development of freely chosen not-for-profit ways of self-expression, by implicitly equating docility and altruism beyond myopic reciprocity with a lack of fitness in the market place, it diminishes personal lives and communities.

Global integration

"Global problems demand global solutions" may sound like a bombastic platitude from the brochure of an ambitious consulting firm, but it is, nonetheless, profoundly true!

If reversing environmental degradation and working out a framework consistent with -- let us say -- two centuries of sustainability, the current spirit of international cooperation, which may be dubbed rational by virtue of its predication upon immediately perceptible

national interests by political societies, will prove to be woefully inadequate. Rational consciousness has already revealed its incapacity to locate a generally accepted discount factor to calculate the present value of future benefits that are expected to flow from investments in environmental and resource sustainability. And while market-based environmental analysis and modeling to advise on how to get the "prices right" is a booming subfield in economics, there is no shortage of admissions that the international community is very far from being able to settle on and live with the consequences of agreed upon figures on marginal damages of pollution and associated abetment costs. [15] No democratically elected government can face its constituents with international deals that impair its economic growth and make it appear to have buckled under foreign influence or have become brainwashed by some wooly, moist-eyed sloganeering about world government. [16]

The current level and form of global self-organization seems to be morally and mentally unequipped to serve the best interests of the species. The force of the "ratio," which keeps the horizon of segmented private interests focused on the short term, is virtually intact and the horror scenario of "business as usual" continues to unfold.

This does not mean, of course, that the powers that want to see the world abandon its self-destructive course in the name of rational drives are not gaining strength. The struggle over cyberspace is a noted testing ground. Rationality, which urges us to find profit in every nook and cranny, attempts to chop it up by creating gated subsectors and mini-domains while the opposition (e.g., in the form of *Wikipedia* or *MPRA*) tends to keep it a global public good in the service of developing, storing, and disseminating information.

With the spread of enclosing common grazing lands in 19th century Britain, private profit motive won big time at the dawn of *laissez faire* capitalism. Will it succeed again now, on the threshold of a new *chaotic transition*, to fence off, deed and entitle public property in conformity with the two-century-old belief that legal exclusion serves the cause of economic inclusion the best?

Science

Contemporary scholarship, an external reflection of rational consciousnesses, gravitates toward mechanically functioning, calculable-predictable systems; it tends to hyper-sectorize inquiry into an expansive maze of disjointed subfields. Consequent adaptive behavior shuns groundbreaking out-of-the-box articulations and nonquantitative, speculative modes of insight.

Backlash against these excesses appears to be much stronger in natural than in social sciences.

[15] Muller and Mendelsohn (2009) underscore the elusiveness of society-wide, collective agreements regarding such figures.

[16] Acemoglu and Jarred (2010) analyze the limits to globalization, the intrusion of revived nationalistic-military tensions into international relations, signifying perhaps a new tendency of de-globalization.

String theory and other efforts aimed at integrating general relativity and quantum theory, for example, may have permanently changed the internal culture of physics. The mindset in this domain has become compatible with the *arational* or *apersepctival* consciousness structure. Gebser identified the emergence of this new (fifth and final) constellation in physics through the Einstenian revolution and the development of nuclear science at the dawn of the past century (Gebser, 1975, 1984). If abandoning space and an independent, segmented time dimension were the hallmarks of the mutation toward *arational* comprehension a hundred years ago, working with open concepts and showing an unprecedented readiness to alter, adjust, and renew positions, as well as to tolerate competing, alternative ones, characterize the feverish activity around the "theory of everything" now.

In sharp contrast, rationalistic rigidity remains firmly ensconced in social sciences, especially in economics. Introduced by John Fraser Muth (1961), the "theory of rational expectations" is its flagship paradigm. It may have represented a new way to make economic phenomena intelligible, but its manifold elaborations over the past two and half score years have failed to usher in the acknowledgement that economic growth leaves a trace of irreversibly accumulating ecological costs in its wake.[17]

The general reason for this titanic oversight is that the intellect cannot look at society and its problems with the objectivity of an outsider. As pointed out earlier, consideration of social problems and their possible solutions remains enclosed within the *global system*-determined worldview, a hermeneutic so comprehensive that it seems like an unchanging ontological horizon. Thinking keeps reverting to what is generally accepted as being "known," "proven," "certain," and "real."

But there is also a specific reason why rationality as a limiting orientation is so deeply ingrained in economic thought. Economics has rationalized what may be considered the most salient, empirically observed reflections of rational consciousness. Indeed, there is an overlap between rationality in the broadest sense and rationality in economic usage.

Upon hearing that someone has been characterized as "rational," we tend to think of a calculative person who never undertakes an action before comparing the costs it may entail with the benefits it is likely to procure; a hard-driving, goal-oriented individual, guided more by optimizing self-interest and the desire to accumulate or safeguard material wealth than by feelings, emotions, or instincts; someone who wants to absorb as much information deemed to be useful to achieve a specific goal as time and cognitive capacity permits. In an impulse of dualistic opinion-forming (a critical symptom of rational consciousness at Gebser), the lack of these attributes is likely to demote conduct to the uncomplimentary status of being "irrational."

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[17] Cultivation of the theory of rational expectations (TRE) has led to awarding several Nobel Prizes and other high academic distinctions. It has also provoked visceral criticism. While it is next to impossible to select a concise body of references on the subject, Sargent (1971) and Lucas (2008, 1995, 1987, and 1975) seem to be good candidates to provide a general idea about TRE's focus and implications. Dopfer (2005) and Common and Stagl (2005) are examples of the criticism that strikes TRE at its core.

The characterization of "rational behavior" in economics, which automatically disregards its dualistic complement as unlikely to exist, does not differ essentially and in substance from this general perception. It only extends its application to groups of individuals (e.g., to households, firms, and nations), which are also presumed to choose courses of action according to recognized principles of rationality.

Consequently, traditional economic thought -- neoclassical economics as its currently most charismatic genre -- did not invent rational behavior. It has only "rationalized" via defining and working with utility and production functions what may be universally observed across society and over historical time; that is, the reflections of rational consciousness. If rationality poorly captures the repertoire of human behavior (e.g., by proxying it through a simplistic "representative" individual, firm, or country), rationalizing rationality may well turn out to be a pure *l'art pour l'art* endeavor -- a sacrifice of reality for the sake of unencumbered analysis.[18]

What was Latin for pre-Enlightenment scholarship is now mathematics for modern economics. In both cases, prestige of mastery became the complacent colporteur of false relevance. How could the prosecutor's opinion delivered in flawless Latin in a 16th century witch trial not to be correct? How could an argument about everlasting growth in an equilibrium framework, demonstrated through concave majorants of positive functions in continuous operator fields, be beside the point?

Traditional thought lives in an inextricable symbiosis with the extant order. Although the support it extends in return for being nourished by it comes in many forms, it may be classified into four main categories: (a) reducing economic phenomenology to mere numbers whose significance is axiomatically presumed to be overwhelming (e.g., GDP growth); (b) forcing simple concepts (i.e., homogenous individuals, firms, countries, and products) and simple equations (e.g., utility functions and those used in neoclassical capital theory) to account for complex phenomena; (c) embracing complexities (e.g., searching for nonlinearities) but diagnosing them either as harmless or beneficial for the system[19]; (d) providing continuous assurances that there is nothing new under the sun. Anything that happens or can happen has already happened before. If we learn from the past, then a reform here, an institutional innovation there will ensure that everything remains as is. The body of public comments during and following the 2008 financial crisis is a telling example.[20]

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[18] Kurt Dopfer offers compelling observations about the limiting nature of canonical assumptions concerning prevalent modes of economic rationality in terms of cortical interconnections and neuronal functions. Neoclassical economics surreptitiously equates the central character of its inquiry, the *homo economicus*, with a lifeless pocket calculator. See, "Evolutionary economics: a theoretical framework" in Dopfer (2005).

[19] See more on this subject under point (5).

[20] How established science remains in the saddle in the face of change and criticism is, of course, not a new subject. Applying the thoughts of some of the classics of science philosophy, one might say that mainstream economics is "normal science" (Kuhn, 1962). Its "main paradigm" (Kuhn, 1962) is market-driven economic growth with the government playing a minimal role. Thoughts that fit the mainstream may also be regarded as the "hard core" (Lakatos, 1980), which defends itself from "scientific revolution"

As the rationalizer of rationality, the economics profession has become the ideological sword and shield of GS2-style, carrying-capacity-ignoring ecological imperialism. Its strenuously novelty-dismissing a-historicity finds expression in resisting change even within its own perimeters (see, for example, Krugman, 2009). So far it has succeeded in disguising its entrenched orthodoxy through the choice of themes and range of considerations, partly by characterizing changes in modeling and expanding phenomenological observations within its unecological paradigm as "revolutions," e.g., "the rational expectations revolution," "the increasing returns revolution."

In the final analysis, the existential foundations and phenomenology of universal history are much broader and more complex than what can be grasped by the rational (i.e., contemporary) approach to economic problems. The gap is becoming especially severe now as our generation enters into pathologically stressful times of fundamental institutional and behavioral transformation.

The species and its sphere

Shortly after World War II, Gebser voiced the danger that the relentless stampede along the "more, more, now" path would lead mankind to a self-engineered abyss. He was ahead of his time, considering that the environmental and conservation movement with international scope could be dated to the 1968 founding of the Club of Rome. Its declaration that material resources and the environment represent a life or death challenge for humanity is similar in essence to the alarm Gebser sounded two decades earlier.[21] That he had arrived at the indicated conclusion through an "integral" process (*systasis*) is a lesson in humility for those who restrict the possibility of discovering reality to the analysis of quantitative information.

The successful application of *systasis* to the "limits to growth" problem required the recognition that (a) external circumstances, in which the majority of individuals are embedded, correspond to their inner world, schematically; to the prevalent structure of consciousness (point 1); (b) a formal equivalence and numerical exchangeability exist among space, time, and energy, and (c) the rational/mental structure is obsessed with

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(Kuhn, 1962) -- or from "falsification" in Popperian terms (Popper, 1959) -- by developing "auxiliary hypotheses" (Lakatos, 1980) and flexibly deploying them through "research programs" (Lakatos, 1980). If ideation in economics is a response to changes in the socioeconomic environment and if "normal science" or the "hard core" succeeds in defending itself through absorbing, shunting off, or discrediting competing theories, which aspire for the status of a new "main paradigm" or "hard core," received wisdom survives by adaptation to the basic components of the socioeconomic environment. These remain intact until the next seminal gyration or *chaotic transition* creates a new basin of fundamental structural components (i.e., a new *global system*) in which only relatively insignificant socioeconomic changes occur.

[21] Georegscu-Roegen's book *The entropy law and the economic process*, first published in 1970, marked the beginning of debate about the *second law* among economists. The 1972 publication of *Limits to Growth*, authored by Donella and Dennis Meadows, *et al*, intensified and spread the debate about resources and the environment. The book was subtitled "A report for the Club of Rome's project on the predicament of mankind." Sustainability became a subject of global discourse in 1983 when the UN General Assembly set up the World Commission on Environment and Development.

"accumulating space," forgetting that, since matter fills up space, space also measures matter.

Introduction of the concept "ecological footprint," for which we may thank William E. Rees, *University of British Columbia*, validates Gebser's assertion by making point (c) accessible, transparent, and convincing. [22]

The "ecological footprint" is the land and water surface required to maintain the living standard of a given population. It is obtained by converting material flows into surface. That is, the resources used through consuming goods, and services, housing, and transportation as well as the environmental capacity required to absorb the waste generated have been translated into space.

The bio-productive "global hectare" is the unit of "ecological footprint." It is composed of crop-, pasture-, and forest land as well as marine fisheries. A comparison can be made between a nation's actual administrative territory and the area it claims (i.e., its ecological footprint). Computer routines are available on the Internet for estimating individual-specific ecological footprints.

According to the 2010 *Living Planet Report* (found at *Business Green.com*), the current level of global population and economic activities would demand 1.5 times the size of the Earth to leave a sustainable ecological footprint. Barring a clear break with fossil-fuel dependence and other harmful structural components of our growth-dependent economy, the overshoot in terms of space is likely to worsen during the next two decades. If "business as usual" expansion continues between now and 2030, humanity will pretend that it lives on twice the size of the planet it actually occupies. Clearly, global society is liquidating irreplaceable natural capital; it fills up more space than it should if its ecological niche is to be preserved. (For a recent complete and detailed survey of impending resource shortages, see Diederen, 2010).

(5) *The era of large-scale discontinuity is upon us.*

A close reading of Gebser allows for the extrapolation that *Weltanschauung*, ethics, intentionality, and norms of average everyday conduct associated with *integral consciousness* mirror a stable, prosperous, and equitable world economy. However, since the existence of implied conditions presumes transition from the *global system* of *mixed economy/weak multilateralism* (GS2) to the one defined as *two-level economy/strong multilateralism* (GS3), the temporal taxonomy evident in Gebser and the one suggested by the thermodynamic comprehension of universal history may be regarded as theoretically equivalent. The orthogenesis of survival significance for *homo sapiens* may be summed up as *GS2/rational consciousness → GS3/integral consciousness.*

[22] See William E. Rees, "Revisiting Carrying Capacity: Area-Based Indicators of Sustainability," in *Population and Environment: A Journal of Interdisciplinary Studies*, vol. 17, no. 3, Jan. 1996. The article's bibliography is a guide to the concept's genealogy.

Obviously, the mutation from *rational* to *integral consciousness* and the transition from today's economy to one that provides material welfare and psychic wellbeing without the accelerated depletion of natural capital cannot be a simple switchover -- the result of suasion and clever reforms (Laszlo, 1994).

Discontinuity darkens the horizon, a chasm on a scale that defies imagination, simply because the requisite institutional alterations and massive-scale behavioral microevolutions that occurred in the course of the last *chaotic transition* (i.e., during the movement from GS1 to GS2) are thwarted by those needed for GS2 → GS3.

The reason for invoking Gebser in this context (or, for that matter, any appropriate adventitious source) is that economics does not seem to be able to transcend itself, to adduce the evidence necessary for the recognition that the world faces a perhaps multigenerational macrohistoric tussle during which GS2 must leave the scene in order to make place for a new form of global self organization that limits economic expansion in a traditional sense.

Standard economic growth theory, a very busy, fast evolving research area, does not encompass the possibility of such limitation (Barro and Sala-I-Martin, 1995), and a cursory glance at research activities in nonlinear phenomena, the field from which such recognition could originate, confirms this opinion.[23]

Tame chaos, ban catastrophe!

Most of the copious writing on *chaos* theory's relevance to the economic sciences has circled around the central conviction that equilibrium growth and associated progress in material welfare are not in danger. Low-dimensional (read "nonrandom, hence deterministic"), self-sustained, endogenous, inter-temporal variations or fluctuations have been found to be nonthreatening to *bona fide* market economies.[24]

Chaos can be demonstrated either by analytical equations or by data in combination with some model.

The first approach is based on showing with algebraic methods that a nonlinear, dynamic system of functions, purportedly accurate in describing the economy, is potentially self-disruptive. That is, it reveals initial-condition sensitivity and moves the system toward a "strange attractor."

Although the mathematical methodology of the prevalent orthodoxy allows endogenously arising fluctuations with deterministic structures (without shying away from the identification of "unstable" time evolutions in phase diagrams), the boundary conditions

[23] For a thorough survey of discontinuities in the economic process, see Rosser (1991).

[24] For reports on actual calculations, complete with historical notes, comparisons, evaluations, and an extensive list of references, see Shintani and Linton (2001), Rosser and Kramer (1999), Benhabib (1992), and Baumol and Benhabib (1989).

inherent in standard theory always eliminate their significance. The argument between those who claim that automatic self-equilibration (i.e., convergence toward "Walrasian equilibrium") is sufficient and those who maintain that Keynesian-style intervention is a "must" is internal to the teleology of everlasting expansion. The two sides of this political dialectic are united in the reassuring synthesis whereby the worst that can happen as a result of bifurcation is an unexpected steady state solution.

The second avenue entails the requirement to prove that the time series of a relevant economic phenomenon or quantity (e.g., real growth, investment, consumption, monetary aggregates, stock values) are nonlinear, then showing (usually through reliance on some nonparametric estimator such as "neural network" models where the data are allowed to define the functional form) that they contain a deterministic pattern.

Studies following this avenue have underscored the presence of nonlinearities in aggregate time series but did not reveal anything dramatic. Within their reasonable range, parameters (e.g., labor's share in a customary production function, capital/labor ratio, discount factor), the model of differential equations describing economic evolution reveals globally asymptotic behavior. The conclusion is again that there is no *chaos* in the data (even if they turn out to be nonlinear) or that the *chaos* found is harmless or that *chaos* as a methodology is not useful in the study of a well-functioning market economy.

All in all, innocuously small developments will never cascade into a naked singularity in the form of some generalized structural breakdown. Even if the time paths identified do not converge to a point or a stable periodic attractor, or to some limit cycle, they remain bounded. By what? Perhaps by *ergodicity*[25] dyed into the pith of reality or because *Natura non facit saltum*; announcing the triumphant return of the poltergeist of an earlier *diaphaneity,* championed by Leibniz, Darwin, and Alfred Marshall.

One may even venture to say that the study of *chaos* in the mainstream has system-bolstering implications because it implies *in toto* that the determinism associated with it iodizes the time-reversal asymmetry of nonlinearity.

Recurrence, the indelible signature of determinism, trumps the ferment of disorder through unidirectional transformations (what time-reversal asymmetry actually means). It bootlegs reversibility in a broad sense, essentially underscoring intrinsic stability. As if nonlinearity posited the null-hypothesis that the prevailing institutions are transitory (i.e., drastically changing conditions may give birth to self-propagated structural instability, ending perhaps in a complete systems failure) that the deterministic pattern of *chaos* could safely reject. Once a pattern has been identified, economic agents and policymakers could take rational countermeasures to avoid disruptions, dampen boom/bust vacillations, and eliminate all harmful epiphenomena of chaotic dynamics.

In contrast to the way *chaos* has been applied to examine the economic organization's resilience, *catastrophe* theory offers a direct way to search for bifurcations that could result in comprehensive discontinuity.

[25] For abuses of the term, see Georgescu-Roegen (1971).

Catastrophe enjoyed some vogue following the 1973 OPEC oil embargo but became a derided heresy by the late 70s (Rosser, 2007).[26] Indeed, it came as close to being excommunicated from the university as the economics-theology parallel (as introduced by Nelson, 2001) permits the metaphor.[27]

In summary, deterministic nonlinear processes pose no danger to the global economy's self-sustained, dynamic stochastic general equilibrium. The system has no inherent tendency toward eliminating itself.

The deterministic pattern, if it can be detected at all, is cyclical, moderate, could very well be positive (e.g., attributable to innovation) and is subject to control. This opinion has been found unassailably robust. It is considered a commonplace truth; questioning it is not *comme il faux*.[28]

Experience and the ontological prejudice of rationality limit the range of predictions.

The integral perception of conservative natural resource data, the *second law*, and GS2's inability to ensure seamless substitution away from scarce natural resources suggests that clustering energy and material input scarcities and/or some environmental disaster will interrupt world economic growth within our generation's time horizon. From this vantage point, mainstream tragically fails to come to grips with the whole truth. The answer to the obvious question "Why is this case?" is twofold: experience and ideology.

If we smooth out time series through moving averages and consider occasional downturns ("the business cycle") par for the course, the world economy has exhibited a unique period of stability since World War II. Under these circumstances, there is no underlying, general reason why data or analytical equations rooted in observed stability ought to signal systems failure.

The *global system*-accompanying ideology lives in perfect harmony with this reassuring experience. It comes with axiomatic assumptions about human behavior, desires, and an unshakeable confidence in reality being moldable putty by appropriately focused rational minds.

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[26] As of this writing, not even the most thoroughgoing mainstream analyses envisage the rising marginal cost of oil to bring down the global economic system or consider the phenomenon known as "peak oil" a real and present danger. See, for example El-Gamal and Jaffe (2010). For a more realistic assessment of the world's oil predicament see Deffeyes (2010) and the following articles in the Post-Carbon Institute's *Energy Bulletin*: http://www.energybulletin.net/50503 and http://energybulletin.net/node/46223.

[27] Even less potentially damaging nonlinear phenomena are often attributed to some form of "imperfection" (such as in markets, foresight, or government policy) -- the quoted word evoking faith-based examinations. Economists have cited "Heterogeneous beliefs" as a condition that may lead to chaotic dynamics (Brock and Hommes, 1998).

[28] Nevertheless, the possibility of epochal *chaos* (i.e., disruption on a scale far beyond what tradition-motivated economic research allows into the realm of possibilities) has preoccupied historians for decades (McCloskey, 1991; Reisch, 1991) and has intrigued physicists willing to venture into social and economic issues (see, for example, Ball, 2004; Ruelle, 1991).

The established creed impregnates presuppositions, which, in turn, give birth to an interminable flow of theses reflecting the father's genes. As a consequence, the mental habits of transduction associated with *ad infinitum* output maximization (exponential growth) prevent creative induction to the effect that this fixed idea has an expiration date stamped on its back. Even radically alarming assessments see a way of skipping *chaotic transition* and moving to a much more sustainable, green economy.[29]

The ancient Greeks were onto something by believing that order in the world arises from the chaotic struggle of Titans.

APPENDIX

Synopsis of world history as the narrative version of thermodynamic unfolding[30]

The thermodynamic process that characterizes the human story (cultural evolution, universal history) is ecologically dissipative, hence irreversible by the *second law of thermodynamics*. The requirement of growing degrees of self-organization renders it *pulsatile*.[31] The dissipative expansion of self-organized physical entities must go through dynamic steady states (*global systems*) interrupted by bifurcations (*chaotic transitions*), episodes during which parameters for the next dynamic steady state are selected and introduced.

The global system is the planet's broadest and most comprehensive framework for socioeconomic institutions and behavior. It is the result of implicit collaboration at the species' level. In strictly physical terms, it may be viewed as a dynamic steady state of billions of interconnected neuroanatomical states.

During 1500-1789 (GS0), the world underwent sweeping changes as preparations for the age of *global systems* accelerated. European explorations and colonization nearly completed geographic globalization. Modern scientific thinking emerged and vital discoveries were made in physics, chemistry, biology, medicine, and astronomy. The ideas of all-embracing individual liberty and freedom of conscience, and the concept of "nation" as a form of sovereign territorial organization were born. The *Enlightenment* has gone a long way in prying the frozen fingers of dogmatic thinking from the human mind and identifying the project of social progress. The epoch produced unmatched achievements in the arts.

[29] The work of former U.S. Vice President Al Gore exemplifies the widespread view that the mobilization of "political will" through enlightening society would suffice to avoid economic discontinuity and/or environmental catastrophe while preserving the trend of perpetually growing material plentitude (Gore, 2006, 2009). Diederen (2010) provides a much more realistic basis to conclude that the opportunity for a "painless transition" has been passed and the only happy ending in sight is, indeed, a frugal one.

[30] For full length exposition, see Pogany (2006).

[31] Based on the work of Nobel Laureate chemist Ilya Prigogine (Prigogine, 1997), this theory had been applied to world history by Ervin Laszlo (Laszlo, 1991).

As the ensemble of particles (human biomass plus all human crafted objects) grew, its size had to reach the point where it required global-scale organization in order to grow further. *Laissez faire/metal money/zero multilateralism* -- by its full name, abbreviated as GS1-- was the first *global system*, with Great Britain as its epicenter. It lasted from the 1830s (Polanyi, 1957) to the outbreak of World War I.

Despite its well-known success in raising per capita output for a growing population, GS1 became increasingly unable to accommodate further economic development. Its main limitations may be summarized under four points.

(1) Dependence on gold limited the supply of money; (2) while industrialization reached the level at which national economies were prone to accelerate and decelerate if left on their own, system parameters did not include instruments (i.e., fiscal and monetary policies) to counter this phenomenon; (3) the system skewed distribution too much in favor of capital at the expense of labor, thereby constraining the development of mass consumption/mass production; and (4) it was unfit to accommodate institutions or schemes for international cooperation required by growing economic and financial interdependence among national economies.

By 1914, initial-condition sensitivity hid in the incongruity between system parameters and the state of the world. The "Guns of August" blew GS1 to smithereens.

The period 1914-1945 was the *chaotic transition* that led to the introduction of the second and current *global system*, called (by its full name) *mixed economy/ fiat money/weak multilateralism* (GS2). As observed in thermodynamic processes via bifurcation, diverse and intensely conflicting approaches emerged to reestablish order (i.e., a dynamic steady state).

These were the alternatives: (1) Restoration of GS1 by attempting to bring back the gold standard; (2) Communism: A new form of socioeconomic self-organization; (3) Fascism: Territorial conquest through military aggression, winner takes all (semi-colonial or colonial status for the rest of the world); and (4) Mixed economy: A new relationship between public authority and the market as well as between labor and capital.

<u>Mixed economy triumphed.</u>

The critical transformation realized during the New Deal in the United States quickly spread to industrial democracies following World War II, becoming the backbone of GS2's domestic economic organization. It implies a private-ownership-based market economy with important roles assigned to the state in securing economic prosperity and social peace.

The United Nations and its charter organizations represent *weak multilateralism*. Its flagship agencies in the economic and financial sphere are The World Bank, the International Monetary Fund (IMF), and the General Agreement on Tariffs and Trade (GATT), which became the World Trade Organization (WTO) in 1995. The United

States took the role of epicenter or "world leader" from Great Britain, upgraded with system administrator-like functions.

GS2 outshined and outperformed GS1. It brought material welfare within the reach of billions. During the threescore years from 1950 to 2010, despite an increase in world population from 2.5 billion to 6.9 billion, per capita global output (income) increased more than four-fold.[32]

Schematically, the chart below depicts the structure of world history (or the "archeology" of the current world order):

GS0 (1500-1789)	→	GS1 (1834-1914)	→	GS2 (1945-present)
Late feudalism/		Laissez faire/		Mixed economy /
early capitalism		metal money		weak multilateralism

Communism: Less than a global system but more than a footnote

Recognition of the above-presented perspective had to wait for the collapse of communism. During the Cold War, global society accepted the notion that there were two parallel, competing *global systems* vying for domination. Planet-wide self-organization appeared to be bi-systemic. In retrospect, Communism was not and could not have become a *global system*:

(1) To avoid isolation, communist-controlled countries had to deal with the rest of the world through GS2's multilateral institutions dominated by industrial democracies; (2) The Soviet Bloc, representing the "developed socialist world" during the Cold War, accounted for 5 percent or less of global trade; (3) The communistic social order appealed only to a small minority of the world population and this circumstance disqualified it from becoming the foundation of a new global order; (4) Socialist societies did not develop distinct socioeconomic personal traits. They only suppressed and deformed GS2-typical behavior. (Populations formerly under communist rule snapped out from socialist institutions and immediately adopted multiparty, private entrepreneurship-based economic organizations, roughly at their respective pre-communist level of social development.)

This is not to deny or even belittle the historic significance of Communism. Its early economic growth performance and proclaimed idealism presented the rest of the world with a major political challenge.

As a balance wheel, the communist threat helped define the respective weights ("the mix") of private and public expenditures in the mixed economy. It pushed the balance in favor of public expenditures (e.g., military spending in the United States, social programs in Western Europe and Japan).

[32] Estimates based on historical data published on line by The World Bank, and on IMF projections for 2010.

We can acknowledge this by observing that a restriction of public authority followed the catastrophic demise of socialist statehood. The era since 1991 has witnessed a forceful wave of deregulations and privatizations. During its existence, the communist sphere provided the socio-psychological, philosophical prop needed to prevent the real hegemonic world order (GS2) from acquiring ontological status; i.e., its attributes becoming confused with natural laws beyond human control. Since 1991, environmental and anti-globalization movements have become the main sources of highlighting GS2's shortcomings, i.e., its existence as a historic form of self-organization.

Given that communism was not a *global system*, we may conclude that, thus far, the sequence "GS0→GS1→GS2→" best describes the thermodynamic process we regard as universal history. The following synaptic table summarizes the main characteristics of these organizational stages.

Stages of Evolving Global Self-Organization

	Distinguishing economic feature (1)	International trade (2)	Labor/Management relations (3)	International cooperation among governments (4)	Game-theoretical classification (5)	Organizational complexity (6)
GS0	Agrarian	Agrarian products, metals, and primitive manufactures; employment level does not depend on international trade	Feudalistic hierarchy; collective bargaining is not a known concept	Nonexistent	Zero-sum game	Absence of global self-organization
GS1	Large-scale industrial	Add inter-industry commodity exchange; employment moderately depends on trade	No framework for collective bargaining; legal system unequivocally favors capital	Implicit	Positive-sum game without cooperation	Low level of global self-organization
GS2	Mass production, consumption	Add intra-industry commodity exchange; employment strongly depends on trade	Framework for collective bargaining; legal system creates balance between labor and capital	Explicit	Positive-sum game with cooperation	Higher level of global self-organization

What is next?

But now the ticking of the evolutionary time machine heralds the onset of a new transition. The reason is not, as Marx thought, that capitalism (now in its modern or reformed version) could not provide prosperity for the masses, or that it suffered from incurable limitations in ensuring economic expansion. The reason is the exact opposite: GS2 cannot stop growing. Its existence is conditioned on the maximum growth achievable and, therefore, it is incompatible with a predominantly renewable-resource based global society in agreement about the use of scarce, nonrenewable resources and the environment. The terrestrial sphere's ability to support unbridled economic growth is limited and we are approaching the limits.

The thermodynamic interpretation of global history predicts a halt to population and economic expansion for purely physical reasons.

Long-term world equilibrium -- GS3

As the world's growing population and economy encounter terrestrial limits, a new *global system*, called *two-level economy/strong multilateralism* will be needed.

On one level, activities that depend heavily on nonrenewable natural resources and put the environment at risk would be subject to globally-determined constraints. These activities would be allocated to nations and transnationally-dominated sectors such as the petrochemical and automobile industries. On the other level, it would be "business as usual" market economy.

Strong multilateralism implies some form of democratically organized world governance, complete with a global central bank, global currency, and global minimum wage.

The world currency would combine the discipline GS1's gold standard vouchsafed and the flexibility GS2's fiat money has provided (without the fractional reserve system, which, as will become obvious during the first half of the 21st century, is wholly incompatible with any consciously pursued economic steady state.) Much along the lines proposed by Keynes at the 1944 Bretton Woods conference, an international clearing house would keep cross-border trade in equilibrium.

There would be a framework of close cooperation in space engineering and colonization.

Comparing a world that can muster the will to cooperate at such an intense level with the one that lived through the past century and the first decade of the new one gives us pause. If it took "1914-1945" to move from GS1 to GS2, what will it take to accomplish the much more drastic transformation implied by GS2 → GS3?

While in different terms, Gebser awakens the same fears, the coming-to-the-fore of our latent, integral consciousness, which he considered inevitable, fills his readers with hope.

REFERENCES

Acemoglu D. and Jarred P. (2010), "Growth in a Partially De-Globalized World: Political Limits to Globalization," *The American Economic Review: Papers and Proceedings* 100 (May 2010): 83-88.

Ball P. (2004), Critical Mass, How One Thing Leads to Another, Farrar, Straus and Giroux, New York, NY.

Barro R. J. and Sala-I-Martin X., (1995), Economic Growth, McGraw-Hill, Inc. New York, NY.

Baumol W.J. (2010), Kauffman Foundation Series on Innovation and Entrepreneurship, Princeton University Press, Princeton, NJ.

Baumol W.J. and Benhabib J. (1989), "Chaos: Significance, Mechanism, and Economic Application," *Journal of Economic Perspectives*, 3:1, pp. 77-105 Winter.

Benhabib J. (ed.) (1992), Cycles and Chaos in Economic Equilibrium, Princeton University Press, Princeton, NJ.

Brock W.A. and Hommes C.H. (1998), "Heterogeneous Beliefs and Routes to Chaos in a Simple Asset Pricing Model," *Journal of Economic Dynamics and Control*, No. 22, pp. 1235-1274.

Combs A. (1996), Radiance of Being: Complexity, Chaos, and the Evolution of Consciousness, Paragon House, St. Paul, MN.

Common M. and Stagl S. (2005), Ecological Economics; An Introduction, Cambridge University Press, Cambridge, UK.

Daly H. and Farley, J. (2004), Ecological Economics, Principles and Applications, Pearson and Longman, Delhi, India.

Deffeyes, K.S. (2010), When Oil Peaked, Hill and Wang (a division of Farrar, Straus and Giroux), New York, NY.

Diederen, A. (2010), Global Resource Depletion: Managed Austerity and the Elements of Hope, Eburon Academic Publishers, Delft, Netherlands.

Dopfer K. (ed.) (2005), The Evolutionary Foundation of Economics, Cambridge University Press, Cambridge, UK.

El-Gamal M.A. and Jaffe A.M. (2010), Oil, Dollars, Debt, and Crises: The Global Curse of Black Gold, Cambridge University Press, Cambridge, MA and New York, NY.

Feuerstein G., (1987), Structures of Consciousness, The Genius of Jean Gebser -- An Introduction and Critique , Integral Publishing, Lower Lake, CA.

Gadamer, H-G., (2003), Truth and Method, Second Revised Edition, The Continuum Publishing Company, New York, NY.

Gebser J. (1984), The Ever-Present Origin, Ohio University Press, Athens, OH.

Gebser J. (1975), Transformation of the West, Novalis Verlag AG, Schaffhausen, Switzerland (in German).

Georgescu-Roegen, N. (1971), The Entropy Law and the Economic Process, Harvard University Press, Cambridge, MA.

Gore, A. (2006), An Inconvenient Truth, Melcher Media, New York, NY.

Gore, A. (2009), Our Choice; A Plan to Solve the Climate Crisis, Melcher Media, New York, N.Y.

Jing Chen (2005), The Physical Foundation of Economics, World Scientific Publishing Co., Pte. Ltd., Singapore.

Krugman P. (2009), "The Increasing Returns Revolution in Trade and Geography," *The American Economic Review*, 99:3, 561-571.

Kuhn T.S. (1962), The Structure of Scientific Revolutions, University of Chicago Press, Chicago, IL.

Lakatos I. (1980), The Methodology of Scientific Research Programmes: Philosophical Papers, Volume 1. Cambridge: Cambridge University Press.

Laszlo E. (1991), The Age of Bifurcation, Understanding the Changing World, Gordon and Breach, New York, NY.

Laszlo E. (1994), The Choice: Evolution or Extinction? G.O. Putnam's Sons, New York, NY.

Lucas R.E. Jr. (2008), "Ideas and Growth," *Economica,* London School of Economics and Political Science, 76:301(02), pp. 1-19.

Lucas R.E. (1995), "Econometric Policy Evaluation: A Critique," *Carnegie-Rochester Conference Series.*

Lucas R. E. Jr. (1987) Models of Business Cycles, Oxford: Basil Blackwell.

Lucas R.E. Jr. (1975), "An Equilibrium Model of the Business Cycle," *Journal of Political Economy*, vol. (year) 83, pp. 1113-1144.

McCloskey D. (1991), "History, Differential Equations, and the Problem of Narration," *History and Theory*, 30:1, pp. 21-36.

Muller N.Z. and Mendelsohn R. (2009), "Efficient Pollution Regulation: Getting the Prices Right," *The American Economic Review*, 99:5, 1714-1739.

Muth J.F. (1961), "Rational Expectations and the Theory of Price Movements." *Econometrica* 29:6, pp. 315–335.

Nelson R.H. (2001), Economics as Religion, Pennsylvania State University Press, University Park, PA

Pogany P. (2006), Rethinking the World, Shenandoah Valley Research Press/iUniverse, Lincoln, NE.

Polanyi K. (1957), The Great Transformation, Beacon Press, Beacon Hill, Boston, MA.

Popper K.R. (1959), The Logic of Scientific Discovery, Basic Books, Inc., New York, NY.

Prigogine I. (1997), The End of Certainty, The Free Press, New York, NY.

Reisch G.A. (1991), "Chaos, History and Narrative," *History and Theory,* 30:1, pp. 1-20.

Rosser J.B. Jr. (1991), From Catastrophe to Chaos: A General Theory of Economic Discontinuities, Kluwer Academic Publishers, Boston, MA.

Rosser J. B. and Kramer K.L. (1999), "On the Complexities of Complex Economic Dynamics," *Journal of Economic Perspectives*, 13:4, pp. 169-192 Fall.

Rosser J.B. (2007), "The Rise and Fall of Catastrophe Theory Applications in Economics: Was the Baby Thrown with the Bathwater?" *Journal of Economic Dynamics ad Control*, 31:10, pp. 3255-3280.

Ruelle D. (1991), Chance and Chaos, Princeton University Press.

Sargent, T.J., (1971), "A Note on the Accelerationist Controversy," *Journal of Money, Credit, and Banking,* 3: 721-725.

Shintani M. and Linton O. (2001), "Is There Chaos in the World Economy? A Nonparametric Test Using Consistent Standard Errors," Vanderbilt University, *Working Paper* No. 01-W11.