New scientific evidence confirms Gebser's concerns about technological overreach

International Gebser Society Conference
Brigham Young University, Provo, UT
7th – 9th October 2010

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The first part of this presentation details the evidence promised in the title and the second explores why he was so right.

Part I: Big push plus blind faith equals predicament

Perhaps no other thinker besides Gebser has a better record in anticipating the nascent conviction that growing technical prowess entails a cumulative downside. With sober poignancy, and much against the beliefs inculcated in the generations of modernity, Gebser warned that technology cannot possibly bestow on man the omnipotence that he imagines himself to possess. What collective thinking has come to consider progress is indeed turning out to be a progression away from equilibrium between the individual and society, between humanity and nature.

But it is eminently important to underscore that despite all the negatively charged contradictions Gebser attributed to the rationalistic overflow inherent in what he termed "technologization," he was not against the practical application of the fruits of scientific advancement. Abandoning technology, he stated, is dissolution not a solution (EPO 132).

In its common, contemporary interpretation among social scientists, technology denotes the stock of capital goods and the skills required to operate them. It is the physical incorporation of applied science in quest of material welfare. It is the sum total of extrasomatic energy that expands somatic energy (labor, that is) to produce the goods and services the population needs and wants.

Since technology is a reflection of the economy's size and structure, it is inseparable from the problematic of resources and the environment. As a single, abstract concept, technology may be viewed as the metabolism whereby useful substances are taken from the lithosphere, the hydrosphere, or the atmosphere and, after degrading their molecular structures through production and consumption, are ousted back usually into all three at once. Oil, for example, comes from the ground, the lithosphere, but the gasoline used up by the automobile pollutes land, water, and air.

The world economy digests about 4.2 billion metric tons of matter per year. This mass, which is inevitably growing, returns into the terrestrial sphere in a form different from the one it had been taken from. Most of it is suspected to remain unreusable, unrecyclable waste and pollution.

The swelling tide of humanity, with its exponentially increasing pile of crafted structures

and objects, behaves like a leviathan that devours its own ecological niche. And it is exactly mental man's blind faith in technology, rooted in the prevalent, deficient mode of consciousness, that prevents the average individual, hence the majority of the global population, from recognizing this process, let alone taking its implications to heart.

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."

The expression "fulfillment of the law of the Earth" is found in the Gilgamesh legend. It is Enkidu, the main hero's savage avatar, the allegoric character of unspoiled instinct, who lets him know that current trends have tragic consequences in their tow.

Gebser never defined the "law of the Earth," but later developments in economics support the proposition that it could be considered identical with the *second law of thermodynamics*.

Penetration into the average consciousness that technology as the solver of all of mankind's problems is in a failing mode is signaled by an increasing recognition that the *second law of thermodynamics* or "the law of the Earth" has an important bearing on the future.

The degree to which the mutation from mental man into aperspectival individual occurs may be gauged by the respective significance society attributes to the first or conservation law and the second or entropy law of thermodynamics.

This is so because faith in limitless technical progress, which is at the core of the myth of a forever expanding cornucopia, is kept alive by acknowledging the importance of only the first law.

Given the virtually unlimited amounts of energy around us and Einstein's famous discovery about the equivalence of mass and energy, resources do appear to be infinite; the terrestrial sphere seems to be an inexhaustible standing reserve that can support economic growth *ad infinitum*.

If we consider only the first law as relevant to human welfare, nature appears limitlessly abundant. But this is only appearance.

The practical asymmetry in the mass/energy nexus and the consequent inevitable build up of entropy in the terrestrial sphere are the most obvious blind spots of this vision. When thinking about mineralogical riches and production techniques (i.e., not about general relativity), mass can be equated with matter. As soon as we do that, the mirage of solar energy substituting for orderly structures vanishes. Energy can be produced from matter but the reverse is impossible in economically significant quantities. We cannot manufacture oil from heat, coal from electricity, copper from sunshine. The growth of

biomass through photosynthesis also draws from the Earth's fixed supply of matter. Photons from the yellow star do not become substance; they only facilitate the synthesis of what is already here.

To see in its fullness why and how the second law renders nature scarce, we need to have recourse to the concept of natural capital, defined as the totality of structured order in human service.

Through this broad definition we lump together material resources (oil, timber, metals) and the capacity of the environment to render services such as waste absorption, the regulation of the atmosphere, the enjoyment of scenic assets, and other amenities.

If we define entropy as the ratio of useless substances within all substances, we can recognize how both the depletion of nonrenewable resources and the liquidation of pristine ecological conditions through filling environmental sinks beyond their regenerating capacity may be equated to increasing entropy. Both processes turn usable structures into unusable ones.

Such is the law of the Earth.

By the end of the 1960s and early 1970s, these revelations had penetrated economics and public debate.

Since then, as it is well known, the environmental and conservation movement had spread to every corner of the planet to become passionate and influential in both local and international politics -- as if deep down, the world recognized that resource and environmental issues represent a slowly emerging life or death challenge, potentially affecting everybody, everywhere.

And yet despite all the efforts and shared presentiments, the buildup of entropy continues to accelerate.

Remaining heavily dependent on fossil fuels is the only way to realize the spectacular economic growth all official national and multilateral sources forecast between now and 2030. A disturbing consequence is that carbon dioxide emissions during the next two decades are expected to match the increase during the previous two decades. This is a clear disaster in terms of climate change, biodiversity, and water supply. It conjures up the chilling specter of losing the last opportunity to bring environmental degradation under voluntary control.

The snail-paced development of green energy and raw material sources relative to the megatrend of unsustainably growing total demand and continued abuse of the environment signify the failure of technology to compensate for the destructive forces associated with the exponential accumulation of material wealth.

Gebser's predictions of an unstoppable drift toward the "fulfillment of the law of the

earth" and technological progress rather heading off a collision with planetary barriers only catalyzes it are unfortunately on track.

We are not likely to see the decisive breakthrough to integral consciousness, which is, of course, the fundamental condition of long-run sustainability, until and unless it becomes generally accepted that the entropy law amends the conservation law in the following two ways:

First, unfavorable and irrevocable developments accompany economic expansion.

Second, nature's manipulability is far from unlimited because 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. Moreover, scientific information is not free in terms of matter and energy. Its development has costs in terms of entropy.

Gebser maintained that, in absurd way, our epoch (the "intrusion of time") is characterized by an obsession with space and the desire to conquer as much of it as possible. One may conclude from this that the "collapse of time," which signifies the end of our chaotic material craze, must occur when mankind runs out of space; or, put differently, when space becomes a constraint to human expansionism.

And it is exactly through spatializing the drawdown of material and environmental resources, natural capital, that is, that modern ecological economics demonstrates the extent to which our world is grossly out of order and unsustainable.

Professor William E. Rees of UBC invented a method to accomplish this task and named it "ecological footprint analysis.[1]"

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 a measure of 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 unit of "ecological footprint" is bio-productive "global hectare," which is composed of crop- and pasture-lands, forests and marine fisheries.

Comparison can be made between a nation's actual administrative territory and the area it claims (i.e., the ecological footprint). Computer routines are available on the Internet for estimating individual-specific ecological footprints.

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[1] 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.

Aggregate calculations show that the planet's 13.6 billion bio-productive hectares must support a global population of roughly seven billion. This means, on the average 1.94 hectares per capita. According to the latest Living Planet Report, the actual usage is 17. 5 billion global hectares or 2.50 hectares per person -- more than a 28 percent overshoot.

Excess demand for resources will intensify with demographic and economic expansion. It is a clear indication that *homo sapiens* is liquidating irreplaceable natural capital. It fills up more space than it should if its potential for longevity under dignified conditions is to be preserved.

Part I may be summarized in four propositions:

Proposition 1: Gebser's law of the Earth may be interpreted as the *second law of thermodynamics.*

Proposition 2: The advent of mutation into aperspectivity may be gauged by the rise of the second law's significance relative to that of the first law.

Corollary: The verition of reality entails the recognition of both laws in their integrality.

Proposition 3: Decline in the predominance of the first law may be equated with decline in the belief that man's ability to manipulate and use nature through technology has no absolute limits.

Proposition 4: Gebser's assertion that mental consciousness overstresses the importance of space and that the dynamics that follow from this orientation are pushing our civilization toward a disaster of planetary proportions should be regarded as proven by ecological footprint analysis.

Since EPO was published in 1949, and some changes may have been made to the second edition in 1953, we can safely say that Gebser was at least 20 years ahead of the global discourse.

Part II: Why was he so right? The triumph of systasis

Gebser remains well correlated with the facts and insights that have emerged since his times because of his correctness in identifying the direction in which consciousness is exfoliating as well as in his systatic or integrative approach to the phenomenal domains of mutational unfolding.

The integrative approach is manifest in the joint use of space, time, and energy as fundamental variables in explaining the intensification of consciousness from the magic world of spaceless and timeless oneness to space and time-free aperspectivity; and in treating developments that are external and internal to the individual as identical.

The two approaches are equally important and they both hinge on the clear division of energy from the human perspective into somatic and extrasomatic forms. The somatic subcategory includes work and social movements of historic relevance. Extrasomatic energy approximates the concept of technology.

Gebser made creative use of the hermeneutic potential for systatic comprehension inherent in the equivalence or mutual convertibility among space, time and energy, which flows directly from the "theory of relativity." It may even be assumed that "relativity" inspired the whole idea of considering these concepts the primary constituents of consciousness (EPO 162).

Gebser sketched out the entire process of mutation to aperspectivity in terms of time; that is, the "breaking forth of time" of late 18th century gave way to the "irruption of time" which has two phases, "intrusion of time" and "collapse of time." Then he brought the temporal into context with spatial and energetic aspects.

To flesh out the importance of technology, Gebser connected energy to space and time sometimes through its somatic and sometimes through its extrasomatic form.

An example for the somatic route:

"Work relates to property as time relates to space!" In other words, somatic energy deployed in creating material wealth (evidently through the use of extrasomatic energy) is metered by the resources used per period, or equivalently by space used per period, since, as ecological footprint analysis demonstrates, a bundle of resources can always be converted into surface.

Gebser rendered energy equivalent to space and time via its extrasomatic form when he called motoricity "an aspect of the phenomenon of time" or "spatialized time." The latter is an allusion to the fact that the working of a machine, the utilization of extrasomatic energy *par excellence*, can always be plotted against a time dimension or axis to control and measure its performance

By citing the 1782 discovery of the steam engine and the outbreak of the French Revolution in 1789 in the same argument, he connected both forms of energy to describe the "breaking forth of time."

The steam engine was, in Gebser's words, the "progenitrix of motoric forces," that is, the Ur-mother of extrasomatic energy in the service of "animating," as it were, capital equipment.

The storming of the Bastille, along with the hyper-dynamic political, social, and military developments that followed it during the next five years, may be viewed as an upsurge in somatic energy.

James Watt's discovery and "Quatorze Juillet" were only seven years apart, as Gebser emphasized, a coincidence on a macrohisotric time scale that reveals that the "breaking forth of time" was the entelechy of energy accumulating and transforming since the origin. It was a "breaking forth of energy."

Whereas the Industrial Revolution provided the medium of bringing extrasomatic capital equipment; that is, technology, into motion as well as allowing somatic energy to be channeled so as to deploy it in the creation of material wealth, the Social Revolution saw to the creation of conditions in which the newly found high potential of combining somatic and extrasomatic energy could be deployed to enhance material well-being on a mass scale.

The second way in which Gebser applied systasis is manifest in considering the internal and external aspects of consciousness inseparable and equivalent.

In this respect, Gebserian thought confirms and is confirmed by perhaps the most remarkable achievement of 20th century Western philosophy. Structuralism and post-structuralism (or postmodernism) finished what Marx, Nietzsche, Freud, Saussure, Wittgenstein and many others began, namely, the deflation and perhaps even the abandonment of the idea that a Cartesian-cogito-like independent subject can make an objective sense of the world.

What is going on inside the individual cannot be separated from the totality of information, pressures, and impulses that engulf it. Consciousness does not live a life independent from the conditions in which it is born and develops. Hence, every mutation is connected to a moral world order revealed in more or less age-specific, typical historical, religious, political, and even esthetic consciousness.

"To the extent that consciousness is an intensity and thus intangible (said Gabser), the space-time world represents the corresponding tangible phenomenon as an extensity." (EPO 137)

He underscored the external/internal equivalence regarding technology in the following way:

"Machine is an objectivation or an externalization of man's own capabilities; it is in psychological terms a projection." (EPO 132).

This is analog to saying that the employment of extrasomotatic energy is an externalization of inner powers or conditions. It is the visible, outward form of these powers and conditions.

Gebser's treatment of the external and the internal is eloquently illustrated by describing "breaking forth" as primarily external developments (steam engine and Bastille), and the "irruption of time" as primarily internal developments; alienation of the ego or its

amalgamation into the collective, both caused by society's growing materialization, rigidification.

Of course, we would not be here today if Gebser's work had conveyed only analytical brilliance. It is a certain mystique that gives his words the potential to induce endless contemplation, which transforms philosophical conceptualizations into "systatic eteologemes."

Regarding the unhampered ride of technology and the consequent overflow in resource use, he intimated the haunting idea that the "material-crazed man of today" is "the ultimate victim of the avenging mother – the *mater* whose chaotic immoderation is the driving force behind matter and materialistic supremacy." (EPO 150)

This is a reference to matricide in Aeschylus's Oresteia. The son kills the mater for a good reason; nonetheless, the dead mater refuses to remain silent. The furies of conscience drives Orestes mad, just as economic hardships and environmental degradation as an inevitable consequence of accumulating entropy drive societies, systems and individual lives out of kilter.

To conclude -- Gebser saw correctly, and ahead of his time, that the human quest for material wealth will intensify global scale problems that technology, mental man's trump card, will not be able to solve.

As the overreach becomes increasingly evident and the critique of average individual behavior assumes a planet-wide, social scale with a tendency to increase, Gebserian thought becomes everyday, practical reality. Only a radically new attitude rooted in space and time freedom, that is, in the recognition of the simultaneity of structures, could either avert the looming disaster or enable us to deal with its consequences.

Space and time freedom means not subjecting ourselves, each other, and the Earth's finite resources to the generation of a self-destructive flow of energy.

Our current consciousness cannot truly comprehend how and why the quality of individual life will improve through this ultimate, circle-closing mutation.

Perhaps the discovery of the spiritual, which Gebser so clearly articulated, will fill the explanatory and perceptional gap.