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Economy and Systemic Paradigm

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Economy and Systemic Paradigm

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Summary
Critical phenomena manifested everyday on a planetary level, hitting societies by the deterioration of their commons, and basic functions lead us to consider the need for an economy based on social patterns and ecological focus, viewing the planet as an open system; study the components and functions of the subsystems that comprise it; survey and inquire into the commons, and providing criteria as well as systemic guidelines for their more rational preservation and administration.
Raises the issue for a change of vision by self-recognition of humanity as a component of an integrated system, a provider of sustainability and survival.

The so-called "Commons"
Broadly speaking, “commons” are the primary goods, necessary and useful for all large groups of people.
We may thus list some that exist in our “earth open system” in order of importance:
- The atmosphere,
- Water (in its various forms, oceans, rivers, lakes, glaciers, etc.)
- Fertile land,
- Ground water
- Native forests as a multifarous resource
- Plant species (especially the cultivated ones)
- Animal species (especially domesticated ones)
- Minerals

It would be necessary to establish a more accurate geography of the commons as complex systems:
• In nature
• Suitable for human communities in various continents and regions
No less important is to define what are the not distributable commons. Indeed, the fact that it is not possible to distribute certain common goods implies that no particular human community has the right or is able to take them as their exclusive ownership.
This is the case for the Earth's climate for instance: heating by human intervention is inevitably planetary (with greater or lesser effects depending on regions)
These exposed commons are at risk because of growing and permanent human intervention, even if technological progress can more or less delay the critical moment of exhaustion and destruction.
Anyhow such crisis will worsen and finally becomes inevitable. Oil, by example, is a nonrenewable resource, formed after millions of years, through anaerobic decomposition (i.e. without air) of fossils from past geological eras.

This text has been revised by the author, with the intention to offer it to the Symposium “Balancing individual and collective action…” as a kind of “food for thought”

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Today, with the intense exploitation of oil wells throughout the
world, it is estimated that oil could become exhausted within the next 100 years

The pollution of our global environment increases relentless by the enormous and steadily growing amount of all kinds of waste we pour on continents, oceans, atmosphere and outer space (many of them without possibility of recycling by nature, at short or even at long term). If we thus follow to deplete and foul our planetarium nest, we will not, nor will our planet, with which we interact biologically, we cannot afford such a parasitic behavior.

As partakers of the planetary ecology, we should monitor the economic planetary system in formation

Already being in advanced evolution, the various features lines of the global economic system, should be closely observed:
The globalization of communications
The enormous acceleration of the ways of communication since the 19th Century
The great national, international and even intercontinental road networks
Oceanic and maritime communications
The modernization of the forms of communication (from rowing to the reaction engine)
The technification of the information (from the ancient and medieval manuscripts to the Internet)
In short, we are currently replacing many human communities, formerly independent of each other, by a global community increasingly globally integrated thanks to the mentioned technological facilities.

Obstacles to an ecologically stable economy

The systems approach helps us observe manifestations of instability, disorder and violence that continue occurring within many societies, despite the extraordinary technical progress now seen almost all over the world.
To preserve our future as a species it is necessary and urgent to acquire a clear awareness of such situations.
The following statements, highlight five of the most dangerous ones:
- **The arms race**, which presently costs the world's leading nations astronomical sums and are substracted from the resources that should be applied to addressing and resolving the many outstanding issues that still plague mankind.
- **Universal inflation**, which steadily eats away the purchasing power and is a result from the waste that plagues our society, including the bureaucratic proliferation and arms race already mentioned, and planned obsolescence of products and artifacts (denounced for decades by the American journalist and social critic Vance Packard,)
- **Uneven unequal development**, for which dangerous and increasing tensions arise between highly developed societies - which are still the least ones - and many others yet mired in backwardness
- **The emergence of megacities** each bringing together ten million people or more , some of them successful. But many pockets of poverty and misery ... are still real socio-political time bombs.
- **The rapidly growing degradation of many environments**, which are actually the insistituible support of vast human communities

Perturbed mechanisms of dynamic equilibrium in the relationship of human communities with their regional environment and the planetary one

The dangerous self-accelerating mechanism in economies

The ideology of unlimited economic growth hides a self-acceleration phenomenon unsustainable in the medium term, probably a few centuries and maybe a few decades ...away in time.

The evolution of the vast majority of statistics related to natural resources, production and consumption and also of planetary human demography, shows a clear trend of accelerating growth and, in some cases, even an acceleration of the acceleration itself.

Processes of this type are extremely dangerous because they tend to overwhelm boundary conditions in the environment on which they depend, as i.e. availability of energy or raw materials.

When the limit of the fundamental possibilities is thus reached, there is always a blockage and often a fall that can lead to the catastrophic destruction of the affected system.

A historical example of this type of situation occured in Europe around 1930.

Depletion of many Western coal mines during the 20th Century, with consequences of mass unemployment and loss of competitiveness of industries - for example the steel industry – which had to initiate costly imports of coal and oil from other continents.

This led to social protests, massive violence and repression by force.

The blockage of regulations (or pseudo Keynesianism)

The obsessive idea of permanent growth, and even accelerated one, tending to a maximization of permanent living standards in quantitative terms, led to counter-cyclical intervention trials, applied even in the case of a mere tendency to slowdown in growth ... and led moreover to the idea of accelerating growth permanently through measures of financial or monetary stimulation.

This lead not only to the management but even to the blockage of the automatic and periodic phases of cyclical slowdown by natural regulations (the so-called crisis)

Consequently, the accumulation of stress produces and eventually triggers- in aggravated form - the crisis to be avoided.

This also ignores the planetary mega long term regulations, which finally condition and balance the man-planet relationship system.

"The regulators failed" has been one of the most sensible opinions recently heard with respect to the so-called "global casino" (a significant expression to describe the scenario and the events that led to the 20th century international financial crisis)

Reaching for stability in Economics

To consider in first place, the thermodynamic concepts

Although generally not known, thermodynamics meaning in economy have been considered for quite some time.

The point was made by a world renowned economist, but as frequently occurs with very original research, it had little resonance.

The Romanian Georgescu-Roegen considered the meaning of thermodynamic concepts in economy (1971).

He did so as follows: he says, quite rightly, that man acts in economy as an accelerator of entropy. He tries to organized, but as we can see ever more clearly, tends to disrupt and “entropize” regional and global environment. Man acts as an accelerator of entropy precisely because he is trying to move his societies to a higher level of organization (ie, in their organizations). This can be achieved only by "structurative dissipation" of energy, in

agreement with the theory of irreversible systems far from equilibrium point (Prigogine´s theory of dissipative structures).
To move to a higher level of organization it is necessary to absorb and use a larger amount of energy, whose qualitative degradation and thermal dissipation allows for the creation of complex structures
This is exactly what man has done since his emergence as a highly brained species; but especially in an ever more rapid and massive way since the second half of 19th century, by industrialization and growing bureaucratization of technically advanced societies.
Contemporary societies are much more structured and diversified than a century ago. Many new institutions appeared, as well as new organizations of all types. This was possible only because of the ever increasing use of fossil energy which is non-renewable: nature does not replace what we consume.
However there will be a limit to such growth and differentiation. We may understand this by analogy with biological growth: As biological organisms we grow for 15 to 20 years, absorbing a large amount of energy. Eventually we reach our level of biological optimal structure as humans. Thereafter we do not develop more biologically.
In this way we obtain our best possible organization, with the corresponding lowest energy cost.
Similarly, social organization uses a considerable amount of energy. But we should try to use the least amount possible to get the best outcome at the lowest cost.
It is interesting to see how this process has progressed over the past 150 years.
The socio-economic development of overall growth seems to be uneven sectorally and apparently quite anarchic, or at least random, without no well-defined clear rules
Now this apparently spontaneous, unorganized and messed up general growth, starts to self-limit. It is the mutual self-limiting of these uncoordinated sectorial and regional growths, which will possibly lead eventually to a global order.
But let us not be naïve optimists:only our clear awareness of current developments, and an orderly learning organization, can avoid some acute crisis of adaptation and possibly very serious and costly setbacks, that to some extent could even become irreversible.

The observations of Georgescu-Roegen lead to the conclusion that the economic process is an extension of biological evolution. Accordingly , the most important problems of the economy should be addressed from that perspective.

Global management of resources, global ecological perspective

Despite the natural ecological warning of the seventies, which led to Georgescu-Roegen´s concepts and to the bio-economic paradigm of authors such as René Passet, founder of the International Agency for Transdisciplinary Research (CIRET), the current mode of exploitation of the natural resources of the most varied types, is still dominated by a short-term business pragmatism.
Both the discovery of mineral deposits of useful fuels and the use of forests and farmland have been appropriated by individual initiative, geared towards the personal profit from resources which by their nature, were common. Exploitation generated enormous and perhaps to some extent justified benefits for innovators and investors willing to take risks.
But the liabilities are rarely taken into account, either the disapearence of natural non-renewable capital , or the negative effects of processes of extraction or use (such as accumulation of sometimes toxic waste, loss of soil fertility, environment contamination, desertification, loss of plants or animals species, etc ...)
And no one bothered to maintain or create conditions for a really permanent use of resources:

in many cases their unconsidered looting means their irretrievable loss

The geographical management of energy (especially renewable)
Two outstanding phrases should be meditated:
“We must use energy to get energy” (Alvin Toffler)
Howard T. Odum, on the other hand, in a paper presented in 1973 at the
Royal Swedish Academy introduced the following concept:
“Any oil well (especially marine), any mine shaft, or nuclear power plant involves an energy expenditure (cost) before production (return)”

Comment:
This means that the net amount of energy obtained is considerably lower than commonly believed. Then, as
we are forced to look to less achievable or building sites for nuclear complexes, the energy cost of the facilities necessary increases and the possitive gain decreases
In other words, in the long term, the net energy balance tends to become zero: in terms of investment yields, and also in terms of motor strength or calories
This in itself is independent of the mere existence of reserves still possibly available.
The truth is that the discovery and exploitation of renewable energies (i.e.fossil fuels: coal, oil, natural gas, uranium) have been hitherto characterized as a sort of "treasure hunt".
A sensible collective attitude would have been to use at least part of the product
of the boom in the exploitation of these energies to study, fund and develop the use of renewable energy resources (solar and derivatives ocean tides and waves, etc.). However, little has materialized so far and we run the risk of encountering a dangerous time hiatus between the final decline of fossil energy sources and their replacement by sustainable long term ones.
It is obvious that such replacement involves considerable scientific research as well as ownership and distribution of renewable energy.
For example, the law about the use of the great empty deserts (for exploitation of solar energy), or oceans (thermal energy potential) is undefined. The deserts are in "ownership" of nations,simply because emissaries of some countries came in practical terms planting flags (and quickly return to their country of origin). But what this involves in practical terms about worldwide exploitation of the sun's energy, is not obvious.
(... Where it is not possible to plant flags, for example!). Solar energy anyhow represents more than 10,000 times the total energy consumed presently by the human species, and does not pollute in the least.
As for the oceans, it is recognized (still ...) that, save the water called "territorial" by political convention, they belong to everyone and no one in particular. What about , then, the legal status of facilities for the exploitation of ocean thermal or wave energy eventually undertaken by any national or transnational company? (In so-called international waters)
If these questions are not answered and responsible attitudes timely defined- that is before the unilateral manifestation of political or strongly affirmed economic property- it will be very difficult to avoid violent conflict, and unfortunate consequences. (It would be highly desirable that systemists pass on to younger people their restlessness and the need to forge a sense of belonging and planetary universalism above the ideological concepts of traditional nationalists, ignorant or indifferent to global planetary risks)

The long-term cycles
We also need to incorporate a long-term dimension to the theory in order to frame economic action in a non-contradictory and sustainable way.

In particular we should recover the theory of cycles and, more precisely, develop a good theory of overlapping cycles.
The theory of cycles in economics is somewhat discredited because those who proposed it first did not realize some complex aspects and tried to use it in a merely automatic way.
In fact, the observed cycles seem irregular, as a composition of various elementary cycles.
There is on this very topic a whole interesting literature, especially fromo Kenyon De Greene, a North American who has cosidered it between 1988 and 1995 in a series of papers.
The longest cycle - as a period ranging between 45 and 55 years – was originally detected by the Russian economist N. Kondratiev who observed it in the curves of evolution of various phenomena or economic processes.
It seems to be a composition of several shorter cycles, called with the names of economists who discovered them: the Kitchin of 3 to 4 years, the Juggler from 8 to 10 years, and the Kuznets from 15 to 25 years.
These complexities help to explain the controversies surrounding the cyclic explanations.
However, there is no doubt that cycles are a reality, however difficult their study.
In fact, long-term regularities appear to be a composition of various more or less regular interactions at short and medium term.
There is a possible mathematical modeling of such composition: the renormalization equation of Weierstrass (German mathematician 1815 -1897).

Transitions underway
We can mention:

- The growth of multinational corporations: financial estate (or "economic states") at international level

- The responses of national states

- The birth and consolidation of all kinds of transnational organizations

- The diversification of technology into less general and specialized techniques

- Doing more with less; enterprises with ecological criteria.
  Examples are the construction and layout of dwellings with limitations in order to maintain more green spaces, and absorbent materials, made by "clusters" (groups) of companies with anti-unemployment criteria
  (Experiments in progress in Belgium), energy from hydrogen; biopesticides biotechnology: a larvicide to combat dengue fever produced by researchers at the University of Rosario,
  Argentina, which distinguishes between mosquitoes and bees! ...)

- A Social Economy: includes cooperatives, mutual societies, non-profit associations, particularly SMEs, microcredit as the extension of very small loans (microloans), initiative from M. Yunus of the Grameen Bank, Bangladesh, operating in more than 30 countries around the world to encourage group solidarity and responsibility.

- The historic shift of economic power centers:
  17th Century - Spain and later England
  18th -19th England , Western Europe

20th Century - Europe, North America
21st Century - North America, East Asia (in progress)

Mutation of economic thought:

- From economic nationalism to global economy
- The current realities, future prospects and desires, could be in growing contradiction (Holroyd: Change and discontinuity)

A translation, Final Reflexions, and Bibliography

Kenneth E. BOULDING
This well known English economist, was chairman of the American Economic Association, the American Association for the Advancement of Sciences, and the then International Society for Systems Research, now ISSS.

The Economics of Spaceship Earth future
Boulding's text is from 1966, but remains in force: its importance is appreciated increasingly with the passing of time.
Boulding points out that:
"Earth's limited future needs economic principles quite different from Earth's unlimited past. To show it in a somewhat picturesque way , I am tempted to describe the open economy as a "cowboy´s economy", the cowboy being a symbolic figure of the boundless plain, and of a behavior associated with bold, exploitative, romantic, violent ways, characteristic of open societies. The closed economy could just as well be called the "spaceman economy", in which Earth has become a single spaceship, devoid of unlimited resources of any kind, either for extraction or as a cause of contamination. In this economy, man has to find his place in a cyclic ecological system suitable for continuous regeneration of the forms of matter, while however although not able to do without renewed energy inputs. The difference between the two types of economy becomes more clear in connection with consumption.
In the "cowboy economy", consumption is regarded as something good, like production: The success of this economy is measured by the ever growing importance of the flow that is derived from the "factors of production", part of which is drawn from the reserves of raw materials and noneconomic objects (f. instance: the "environment"),and some are the flows to the reservoirs of contamination.
Should infinite reserves of usable material be postulated as well as an unlimited environment wherein to depose effluvia, then their amount is indeed a plausible measure of economic success. National Product is an approximate gross measure of this total amount.
But we should distinguish the share of GDP obtained from renewable resources and, in the same way, the consumers share which represents unusable effluvia, for the production system. Nobody, seems to have ever tried to discriminate the impact of this on the GNP
Although it would be interesting and very important ... this is unfortunately outside the scope of this text.
Instead, in the economy of the space man, the maximization is by no means desirable, and

would be considered in fact as something to be minimized rather than maximized. The key measure of a successful economy is not production and consumption, but the nature, extension, quality and complexity of total capital in existence, including in this case bodies and human minds included in the system. In the economy of the astronaut, what concerns us, is in priority the maintenance of this capital. Any technological change that contributes to maintaining a defined capital by lower input (i.e. less production and less consumption) is obviously a benefit. The idea that both excessive production and consumption can become negative factors rather than positive ones, seems very strange to economists who have been mesmerized by the concept of maximizing revenue streams with almost complete exclusion of any concept of maintenance or renewal.

There are currently difficult and unresolved issues about understanding whether human welfare should be considered as capital or as a flow.

Indeed, some think both views should be included. It seems that practically no studies have been made about these two dimensions of human welfare.

What is, for example, the difference between merely eating and being well fed?

Does it make economic welfare clothes and luxury homes, complex equipment etc ..., or should be measured by the wear and depreciation of these things?

I am personally inclined to regard the concept of capital maintenance, as more important. To be well fed is for example more important than just eat much. And what is often called services is basically corresponding to maintenance of good socio-economic functionality.... From this point of view, eating is necessary mainly to ensure biological homeostasis, i.e. maintain properly the conditions of life. In other words, there is nothing specially desirable in consumption itself.

Insofar as we can maintain a given state with a lower consumption , we are better. This last consideration may us perhaps make a pause. Would we really want , for example, an operation that would allow us to restore our body tissues by injections while we sleep? Is there, perhaps, a certain virtue in the flow of activity, production and consumption in themselves ... in producing food and eat it? It would certainly rule out this bold possibility. The demand for variety gives rise to other interesting problems.

Surely we do not want to maintain a steady state: we want fluctuations in the state. Otherwise there would be demand for variety in food at the scene, travel, social contact, etc ... The variety requirement may, of course, be expensive, and sometimes too expensive to be tolerated, or at least considered legitimate, as in the case of marriage partners, in which case the maintenance of a state familial homeostasis is generally considered more desirable than the variety and change of libertine excess. **There have been problems ignored by the most professional economists with an amazing persistence.** My personal dealings to call attention to some of these ... have seemingly not produced any reaction.

Economists continue to think and act as if the production, consumption and GNP flows were adequate and sufficient measurements of economic success.

One may wonder, of course, why worry about all that if the astronaut's economy is still far in the future (and at least beyond the survival of all currently living beings).

“Let's eating, drinking, spending, exploiting and polluting with joy and let posterity worry about Spaceship Earth”…seems to be the most current attitude.

It is always difficult to find an answer to the man who says: "What posterity will do for me? ". The concerned one is eventually forced to fall back on vague ethical principles postulating his/her personal concern with a human community or society that extends not only from the past, but also into the future. Until most individuals become identified with any such community, conservation remains obviously not the choise: Why not maximize the welfare of this generation at the expense of posterity? "Behind us, the flies ..." has been the implicit view of most human societies. The only answer to this is to note that the welfare of any individual

depends on many others. Moreover, the more satisfying individual identity is that which identifies not only a community in space, but also in time from past to future. If this type of identity becomes recognized as desirable, then posterity has a voice, even if it has no vote except in a sense: if your voice can influence votes, and decisions.
This whole problem has to do with the - much wider – of determinants of morality, legitimacy and temperance in society.
A considerable historical evidence suggests that a society that loses its solidarity with posterity and a positive image of the future, loses also the ability to address current problems and soon disintegrates.
However, even if we admit the relevance of posterity in relation to our current problems, we have yet to address the issue of time closely linked to taking into account the many uncertainties. Individuals more or less discount their future in their own life. The existence of positive interest rates serves- for instance- as a strong element to verify this hypothesis.

There is of course something very "refreshing" in the view according to which we should live like unconcerned birds. If so, we can forget and follow happily contaminating this planet. However, as being concerned about the future, I, at least, cannot accept such a view. Moreover tomorrow is very close: in some ways we are already there. The future shadow of the "Spacecraft Earth" is already spread over us and our wasteful euphoria.
The manner of fouling their own nest, which was locally typical of the activity of man in the past, seems now to be extended to the planetary society as a whole. Certainly, one can not witness with equanimity the present level of contamination of all natural reservoirs: the atmosphere, lakes and even oceans."(End of Kenneth Boulding´s text).

Final Reflexions

All the above is offered as food for thought.
As systemists, our vision is open to consider the overall picture of a planetary society , in constant interaction through global networks. In this complex scenario numerous outbreaks of conflict appear : war , restrictions of civil liberties , organized corruption at all levels with alarming presence in those of governance; much of the global population without access to basic needs, exodus and forced migration due to natural disasters, most of them a result of climate change due to human interventions. All this is threatening the vital natural stabilities which this text refers to . Recent financial crises affected world markets and endangered the stability of local economies in their condition as systems interacting with their environment. It is essential to install in our societies evaluative criteria to favor economic policies as rational as possible about natural resources in relation with the needs of production and marketing. Investments and expectations of compensation should be commensurated with the fairest possible deal for societies at their most vulnerable levels, in order to support the overall health of the social fabric . It is a great significant challenge for a deep change in the leading minds with access to decision making. Let us hope this is possible, and that colleagues, with their systemic action, are already influencing in this regard.

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