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Scientists are rightly concerned about climate change. Not all are equally as vocal about passing judgment on the past and present stupidities of avaricious world leaders in both politics and commerce.

Economic systems, like ecologic systems are subsets of the self-functioning self-evolving whole global system of Planet Earth. Scientists seek to make more profound their factual knowledge of the Laws of Mother Nature. One of these laws, the Second Law of Thermodynamics (The Law of Entropy) has a special universal application. In the physical world, entropy is everywhere. Its investigation, despite some inherent difficulties is rewarding, particularly in regard to the role of entropy in other topics. Applied analogically to the psychodynamic realm, it is the underlying explanation of today's money crisis.

Entropy is concerned in a special way with a lack or loss of order. Its study in Physics might be termed the investigation of chaos. It deals with heat in motion. Heat is energy in transit due to temperature difference. It is the energy of free uncoordinated and unregulated individual molecular motion. Its physical magnitude can be represented numerically as an undirected quantity, a scalar and not a vector. As an unregulated disunity of not self-other-organized energy, heat suffers the restriction that only a fraction of it can be put to directed mechanical use. Ordered energy as a unity, can be put into some system, only to become in the latter the un-ordered heat energy of its disunited molecular parts. As long as we are not able to harness at one time the directional motion of each free molecule, we cannot convert their total random motion back to ordered motion in the selfsame system. It is not that energy is destroyed, but simply that, when *privatized*, it becomes unavailable for further ordered mechanical work in the system as a whole.

We can imagine a thermodynamic or heat-energy system made up of 100 free and independent parts and into this system 100 units of heat energy is introduced from some other source. If the energy were shared more or less equally (in actual practice this does not happen), then each part would receive one unit of extra kinetic energy. Each individual part would continue on its independent self-centred way, not caring for the system as a whole. If the system as a whole were required to perform some directed work, it would receive only a fractional amount of directed interdependent ordered response from the random movement of its un-ordered parts.

There is an essential one-sidedness in Nature, evident in the fact that though ordered work may be completely dissipated into the free or random motion of un-ordered heat energy, the latter may not be entirely converted into further ordered useful work. This is observed in all of Nature's spontaneous processes. Water, if not in any way obstructed, flows from a higher level to a lower; heat flows of its own accord from a hotter to a colder body and gases diffuse through an opening joining a region of higher pressure to one of lower pressure. All simple mixtures of non-reactive gases or miscible liquids when left to themselves, always tend to mix completely and uniformly and never to unmix. Iron rusts and rocks erode, living things grow old and die. These are all what are called irreversible processes which take place in the one direction only of maximum energy-uselessness. They proclaim the Law of Entropy.

From a metaphysical point of view, entropy relates the disunity of free parts to their unity as a whole. In Physics, it is a mathematical factor measuring the uncoordinated or unavailable energy of a thermodynamic system. It contrasts the total energy of a system's units, considered as disunited units within a system, with the ability of the same system as a whole to do effective work outside the system.

In Nature, every physical and chemical process proceeds in such a way that the total entropy of all the bodies taking part in the process is increased. This accounts for chemical irreversibility. Fires do not un-burn. They may die out, but there is no hope of ever getting the wood back from the ashes and the smoke. A statistical interpretation of the Law of Entropy exacts that any system left to itself, can change only in such a way as to increase the probability of the increasingly disunited state in which the system finds itself as a whole due to the increased lack of coordination of its parts. Cybernetics would call this a type of positive feedback, putting the system more out of order as a functioning whole. That the system should return of its own accord to its first state becomes ever more highly improbable.

The real significance of the observed irreversibility is that the Universe runs down to the extent that when entropy increases, energy becomes more unavailable for other useful work. Once hot and cold water have been mixed and have come to a uniform temperature, the opportunity of converting heat to mechanical work in such an isolated system is now lost irretrievably. Energy is not lost, but opportunities for using it are, because of heat's own internal lack of set order. The lukewarm water will never unmix itself and separate into hotter and colder parts, though Statistical Mechanics which envisages and permits such miracles in nanospace, admits in theory that it is *highly* improbable but not completely impossible. In practice, we know it just does not happen. No finite thermodynamic system can save itself, by itself, from death. The wages of singularity is mortality. Entropy rears its one-eyed, one-directional head in the realm of Physics. It spreads its influence right throughout Chemistry and seemingly contradicts itself in Biology. But it is only a seeming contradiction.

Empirical Science bears witness to the biune Existential self-other Relativity of such phenomena as Electro-Magnetic Radiation in Physics, Sexuality in Biology and the "I-You" of

speech in human consciousness. From such observations, there may be postulated a First Law of Cosmology. *All growth and subsequent sustainability in any evolved or still-evolving system of the Cosmos is both self-functioning and simultaneously other-dependent.*

Overcoming entropy's gloom and doom demands the interaction of a unifying *other-self* in evolutionary processes. Self-functioning self-evolving feedback-systems cannot conceive, construe, and construct themselves. Systems can only evolve to a higher order with the positive help of an *other*. Left only to their inertial free selves and to the curse of entropy, they can merely adapt to present circumstances or decline and eventually perish.

Sobering thoughts arise when we conceive the economy as a sub-system of a larger eco-system. The larger eco-system is materially closed, finite and non-growing. Solar energy flows into the larger system which, in turn, radiates an outflow of heat energy. As solar energy becomes degraded it is responsible for all the biogeochemical cycles that support life. The economy is seen then as an open sub-system with respect to both matter and energy. It takes in low entropy matter and energy from the eco-system and expels high entropy waste matter and energy back to the eco-system. It lives off the degradation of materials and energy. We start with depletion, we end with pollution. There is no way we can avoid this situation, anymore than we can stop eating and eliminating waste. It is a natural part of the economy. It is the digestive tract and it has to be there.

Material things can be recycled. We can take some of the waste matter and use it again. It would solve most of our problems if we could recycle energy. We can in a way but it will always take more energy to gather up the waste energy and bring it back and use it again than the amount of energy that you recycle. The energy cost of recycling energy is always greater than the value of the energy recycled. It is a losing proposition but most economists, obsessed with mythical

growth, do not seem to understand the second law of thermodynamics or the entropy law.

In the past we have been accustomed to think of just three states of matter, namely, solid, liquid and gaseous. In these three phases, there are well defined relationships between free individual particles among themselves and between the free individual particles and their collective whole. Entropy considerations bear witness to a real kind of conflict of interests between the freedom of individual particles and their ordered growth into a whole-some complexity.

It is only within the context and the constraints of the logic of self-functioning-feedback-systems, and by analogy with the concept of positive entropy in Thermodynamics, that a truly satisfactory explanation and understanding of the problems associated with the nature of good and evil in Economics can be found.

In the study of self-regulating systems, a necessary distinction is made between positive and negative feedback. Thermostatic devices are used to maintain a relatively constant range of temperature in some place. In a room, electricity may be allowed to heat a radiator. When the air in the room has reached a desired temperature, a thermostat senses such a situation and acts to turn the power off. When the temperature falls below a certain point, the device again senses this and once more the appropriate signal is given, and the power resumed.

This self-stabilizing system has but one choice, to turn a switch on or off and is described as having *negative feedback*. If the system had been incorrectly wired, so that the switch was turned on above a certain temperature and off when below another lower fixed point, then an instability would result. It either now remains turned off and cold prevails or once turned on, it goes on heating until a disaster occurs. Such a system is said to have *positive feedback* and being progressively unstable, it must eventually break down. It aims to keep

positively doing more of what it is already doing, to its own ultimate destruction.

From the viewpoint of design in Technology, such negative feedback is altruistic and *good*, whilst such positive feedback is selfish and *evil*. Not all positive feedback is necessarily evil. For a system of systems as a whole, a kind of positive feedback which favours orderly growth or sustainability is good. It is the cancerous positive feedback growth of any subsystem which militates against the good of that system as a whole and which incurs the indictment of evil. This evil positive feedback of Cybernetics can be associated with the concept of positive entropy in Thermodynamics and with the problems in the social sciences resulting from the conflict of private “mine” and public “ours”. This negative and positive feedback in technology must not be confused with customer feedback in marketplace advertising.

The perfection of human liberty does not consist in the mere ability to choose freely between this or that, between “mine” or “yours”. It is the ability of humans in self-other love to transcend “mine” or “yours” and for self and other to embrace and cultivate “ours”, in the oneness of togetherness.

For three decades, under the influence of the Chicago School of Economics, most economists in Academe subscribed to some form of worship of the god of mammon by insisting on deregulating finance in the market place. They neither understood the inexorable Universal Law of Entropy nor were they willing to learn about its consequences. Free Market Capitalism is a scientific blasphemy. Instead of the blind leading those whom they have blindfolded into a promised land, they have ditched them into the bottomless pit of the underworld.

Capital is a kind of economic energy in the mindset of a commercial system. If privatized, an analogical kind of psychodynamic entropy will eventually effect the certain disintegration and demise of our whole present financial system. It is happening now under our very eyes.