



What Means “LIFE”

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“Life” from an old Celtic word “LIF” that means “Duration of a cycle”.
In fact life of any organism ultimately depends of a metabolic cycle of
Energy / Matter (E/M) transformations

- Starting from the hypothesis of chemical origin of life evolution, we know that all the originary molecules are very stable as well as they are : H₂, N₂ , CO₂, H₂O.
- So that, only through a catalyst activity the chemical, evolution processes can be able to utilize (E/M) dynamic flows, to change the probable Entropy in Negative Entropy, to generate more and more complex molecules, during the out of equilibrium dissipative processes, untill to obtain self-reproducible molecular systems .(RNA's , DNA) .
- - Now we ask : how the catalyst activity can change the probability of the chemical reactions to drive any particular transformation to a new molecular order ?
- * - To reply to this question I wrote a paper for the “VI° Gathering in Biosemiotics” that you can find in : http://www.edscuola.it/archivio/lre/what_means_life.htm.
- - Now I will to summarise the above article, starting from a definition of what means “INFORMATION”.
- This because self organized bio-chemical processes, depend more by means at distance signal information , that not by direct interaction through molecular collisions.



“LIFE” : an Old Celtic Symbol

**In-formation , from the ancient latin etymology, means :
what is embodied in the form , and/or what is the driving force
for changing the forms.**

- Catalyst activity is very strange event, in fact any catalyst does not change its energy / matter quantity at the end of the transformation processes.
- J.J. Berzelius (1835) defines catalysis as a new driving force necessary to address the best reaction path (RP) of chemical transformation.
- Hence because the catalyst action does not consume energy and matter, then the catalysis needs to operate as a way of coding , storing and transmitting Information, to drive the flow of energy and matter. Hence Catalysis can be seen as a signal communication agent between Energy / Matter Interactions .
- The evolution, from not living catalytic dissipative structures, to living organisms, is characterized by an increase of catalytic complexity of storing information through self – enzymatic coding strategies to control and to protect the transmission of information .
- Therefore because the evolution of bio-chemical system can be based on an increase of catalytic or enzymatic transmission of information , it will be possible to generalize the relationships among Energy Matter, and including Information in a new paradigm of science.
- See: http://www.edscuola.it/archivio/lre/science_of_information_energy.htm



Berzelius

<“PFE”> = “The Fertile Evolution Principle”

- Thinking about a new paradigm of science we can assume that in origin, every event can be thought of as a transformation of the forms of Energy.
- Three fundamental forms of Energy ,can be considered in place of the simple duality of the interactivity between Energy and Matter :

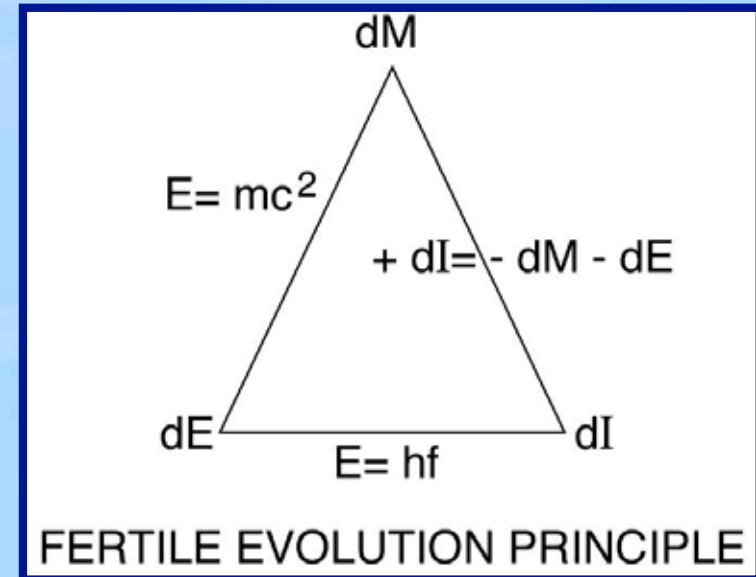
- 1) Free Energy codified by vibration (E)
- 2) Codified Energy in form of Matter (M)
- 3) Information – energy (I), that it is related to the information-catalytic generalised activities.

- Therefore as a consequence of the fundamental postulate of science, “ Energy cannot be created or destroyed” , we can write that the variation (d.)
- of the sum of the different codification, giving the Total Energy, need to be equal to zero : i.e.
 $\langle d. (E) + d. (M) + d. (I) = 0 \rangle$.

Following this way of reasoning, it is possible to pull out a significant solution of the above equation :

$$\langle + d. (I) = - d. (E) -d. (M) \rangle; \text{ <“PFE”>}$$

This equation is the “Fertile Evolution Principle”



NB : Both t, quantum and relativistic definitions of Energy, need to be revised to be utilized in “PFE” equation, this because it is necessary to consider the different contents of (I)

Information Energy = High Energy Quality

produced through evolutionary transformation cycles.

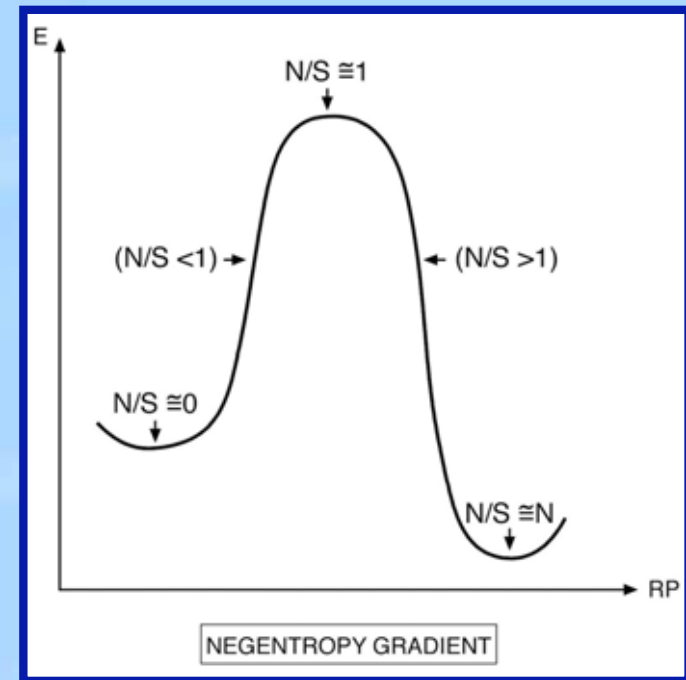
The Principle of “Conservation of Energy” states that the total amount of all the energy form remains constant. In other words, energy can be converted in a different form, but it cannot be created or destroyed.

Hence all forms of energy can be transformed in a different level of Quality . As a measure of such quality can be taken the gradient between Negentropy and Entropy (N/S) .

Hence “Heat” belong to a “Low Quality” of energy (i.e. $N/S < 1$.) while information energy is an expression of the highest rank of Energy Quality.

($N/S > 1$.)

Therefore the “**Fertile Evolution Principle**” can be seen as a function of the “**Evolution of the Quality of Energy**”, driving all steps coming from the self organization of matter to the self reproductive life systems.



Bio-information



- Following the <“PFE”> principle , the continuous increase of “ Information Quality” in biological systems drives the flow of energy and matter to a progressive evolution of living organisms.
- See: http://www.edscuola.it/archivio/lre/chemical_bases.htm
- Life is generated by means of bio-information growth through a series of step by step maturity of catalytic codification in storing and transmitting “**bio-information**” in a way that “*Qualified Information Energy*” prevails over the chaotic flux of matter and energy.
- On the basis of this new theoretical approach about the role of “**bio-information in living evolution**”, the EGOCREANET , “Laboratory of Education Research” of the Florence University (It) , recently proposed an European PATHFINDER Project in collaboration with the ICT&S Center in Salzburg ,directed by Prof. Wolfgang Hofkircher .see in: <http://www.edscuola.it/archivio/lre/pathfinder.htm>
- In conclusion now we wish activate an open debate, to share and to understand better the “**meaning of life**” aiming to discuss the above proposal for improving a deep revision of the conception of “ *Information Energy*” , as a new form of energy transformation, that can be extracted and qualified during the living system evolution. – Paolo Manzelli – 06/07/06- Salzburg (At)



THE NEW : "UROBORO"

though triadic Energy Forms Dynamics

Triadic categories of cyclic Energy Interactions.

- 1) "E" = $hf \rightarrow$ Un-formed Energy ;
- 2) "M" = $m/c^2 \rightarrow$ Formed Energy ;
- 3) "I" - Information Energy -from "PFE" ; $\langle dI = -dE - dM \rangle$

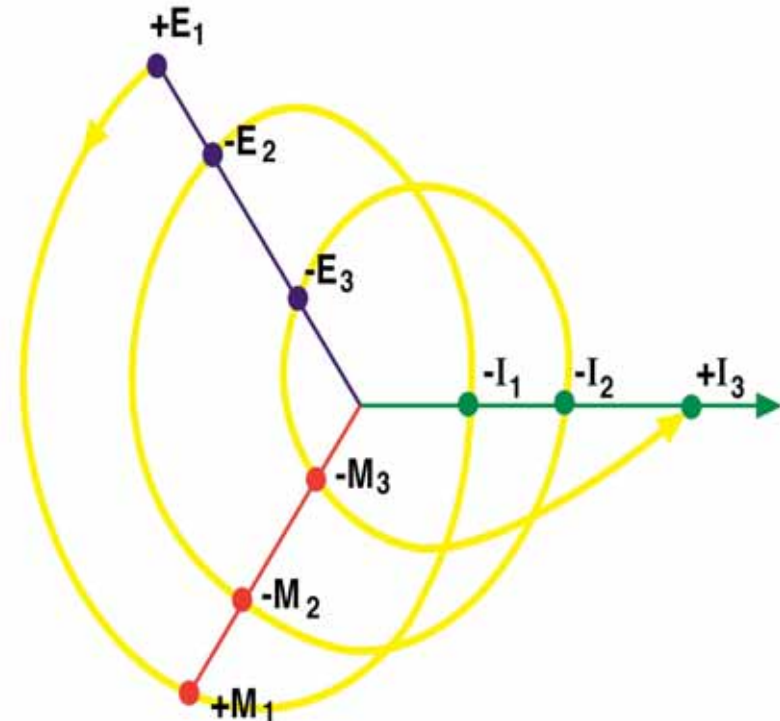
A) – Cyclic Codification $\langle E \rightarrow M \rangle$; Free Vibration-Energy can be stabilized in bonding complex structures through catalytic activities utilizing Information Energy (I) Cycles to avoid chaos

B) – Cyclic Decodification $\langle M \rightarrow I \rangle$ based on the splitting of Wave/Particle duality . Pure Wave = Information Energy "I".

C) – Transformation $\langle I \rightarrow E \rangle$; new entanglement between the Wave/ Particle, producing Photons , Phonons , or at more evolution levels "Bio- particles",es: Bio-photons.

- The nature of the Codal / Decodal signal changes among the three form of Energy , can be seen as a dynamic changes in space / time quadri- vector.

"PFE" = TRANSFORMATION DYNAMICS



"It is more easy to break the atom, instead of change scientific prejudices" - A. EINSTEIN .

Additional slide Paolo Manzelli 10/07/06 – Florence- Italy.: