Progressive evolution is the inherent property of aqueous systems

Vladimir Voeikov
Lomonosov Moscow State University, Faculty of Biology, Moscow, Russia,
v109028v1@yandex.ru

The phenomenon of progressive evolution on Earth is displayed as the appearance of more and more highly organized organisms in course of time. However the currently dominating Darwinian concept of evolution ("natural selection" → "survival of the fittest") rejects any purposeful traits in it. The obvious progress in the course of evolution ("macroevolution") is explained by fortuitous appearance of complex organisms due to their better fit to their ecological niches.

According to the alternative concept of evolution suggested by Lamarck 50 years before Darwin living organisms possess intrinsic activity providing for their increasing adaptation and perfection in response to the challenging environmental factors. Adaptation is realized through the "use-disuse" of organs of individual organisms resulting in the accomplishment of their functions and more effective interaction of organisms with the environment. As soon as living systems display purposeful activity they should be considered as "subjects" rather than "objects" as they are looked upon in the frame of Darwinian principle. According to Lamarck adaptive changes of living organisms could be fixed in their progeny as the mechanism for the transmission of the acquired successful trait in generations. Lamarckian principle of intrinsic activity of living organisms (the driving force for the progressive evolution) is currently neglected by the majority of scientific community as the "vitalistic" one. Lamarck is mostly known for the "heritability of acquired characteristics" that was ridiculed for the whole XXth century. Only recently this mechanism of inheritance became "legal" due to the accumulation of critical mass of data favoring epigenetic inheritance. Reevaluation of the fundamental principle of intrinsic activity of living systems should be also started.

The principle of intrinsic activity implies that a living system has a higher energetic potential than its (immediate) environment and that it incessantly transforms this potential into free energy used for the performance of all kinds of vital activities. This principle also means that a living system extracts energy (and matter) from its environment, concentrates and organizes it in the form of low entropy coherent dynamic structures. Continuous performance of such a work provides for the increasing energy potential of a living system, for improving efficiency of its use, for the perfection of regulation of internal functions and communication with the environment including other living systems. All these properties of living systems provide not only for the progressive evolution of life on Earth but are attributes of other processes associated with development including embryological and postnatal development.

However all these features of living systems seem to contradict the second law of thermodynamics. In order to possess these features living matter should be able to reside in a stable non-equilibrium state and to have the property of conversion of low-grade energy obtained from the environment (for example chemical energy of food) into high-grade structural energy (energy of excitation) of living matter. Different organic molecules including biopolymers such as proteins, nucleic acids, polysaccharides do not possess such properties by themselves, and early ideas that, for example, proteins may be "living" have been rejected long ago. However it is generally ignored that the dominating molecular component in any living system (~99% on molecular basis) is water inter-acting with non-aqueous molecules. Recent evidence demonstrates that in such aqueous systems water is represented by at least two phases: dynamically organized (coherent) liquid crystalline water coexisting with non-coherent quazi chaotic (bulk) water. Different energy gradients exist between these phases. In particular electrical charge separation between organized and bulk water provides for the development of reactions in which organized water donates electrons for oxygen reduction initiating branching chain processes capable of self-organization and transformation of high entropy and low density energy into low entropy and high density energy. Aqueous systems do not feel shortage of energy for the performance of this function because high entropy and low density energy is always abundant in their environment. Ability of aqueous system to self-organize is displayed on all the levels – from nanoscopic (Del Giudice) through microscopic (Pollack) to macroscopic (Schauberger). They evolve in the direction of increasing their complexity, free energy content, and efficiency in using this energy for both sustaining in non-equilibrium state and performing external work over their environment. Thus experimentally verified physical chemical properties of seemingly non-alive aqueous systems represent necessary and sufficient condition for the realization of the Lamarckian principle of evolution as the perfection of intrinsic activity of living systems at all the levels of their organization.