PERIODS OF ORDER AND DISORDER IN EVOLVING SYSTEMS

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In any developing system (evolution of stars and galaxy's, evolution of biological species and associations, historical evolution of national and social groups etc.) it is possible to establish periods of **"order"** and **"disorder".** From the point of view of the theory of dynamical systems **"order"** means stability of the system trajectories concerning to weak fluctuations and the possibility to control the system - to bring it in the desirable state. **Disorder** corresponds to the periods of evolution, where the system is unstable concerning to fluctuations, gives a "great" unpredictable respond to weak effects, gets uncontrolled.

Periods of **ordered** evolution correspond to stable quantitative growth and relative homogeneity of types of individual behavior of the elements of the system. The majority of the elements choose the active life strategy, optimal for these conditions. In the vicinity of this tumpike way of the evolution there appear the phase (living) scope of the system, which could be called **"Immunity"** scope.

The system could not be brought out of this scope by any control effects. At this stage of the evolution outer effects practically can not change the system.

As the time passed, the parameters of the system change; the density of the elements in its living scope increases and gets more than some critical value, resources go exhausted, metabolizes pile up. Unfavorable mutations get accumulated. Quantitative growth goes slower and finally stops. Diversity of parameters and living strategies of individuals grow up. On the language of dynamical theory the system comes close to the bifurcation boundary in the parameter scope. The system is before the choice, its quantitative growth stops, it is **"hanging"** close to the dangerous boundary. The classical description of such situation is presented in the novel "LE RIVAGE DES SYRTES' by Julien Gracq. A country before a war or before a revolution - this is an example of such situation.

In **disordered** period system gets sensitive to outer influences. Individual behavior of the separate elements gets rather essential. Favorable for these new conditions mutations and changes in individual strategies accumulate and after some lag-period of uncertainty stimulate the new stage of quantitative growth and immunity - the other period of **order-.**

The highlights of the paper are illustrated with the results of the author on research of dynamics of algae population, examples from biological evolution, history of Russia in 20th century and analysis of global environmental situation.