

# Perplexing Complexity

## Human Modelling and Primacy of the Group as Essence of Complexity

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### Extended Abstract

This paper describes the emergence of complexity as duplicated evolutionary process. The first procedural source of complexity is the quantum jump of the evolution of the human species when it started to maintain certain brain-internal models of its environment. The second - parallel - procedural origin is the evolution of a communication structure, a language, with which an already existing group of primates could frame their internal models. In contrast to definitions of complexity which use the concept in the context of theoretical physics, this approach reveals some perplexing properties of model-building for a special subject of investigation; namely the human species: All adequate models of political economy (economics is just the sub-discipline that freezes political dynamics) have to be complex. Since today's mainstream economic theory lends its formal apparatus from the mathematics of Newtonian physics, it misses the most essential features characterizing human social dynamics, i.e. its complexity.

The signum of a living system is that contrary to the 2<sup>nd</sup> law of thermodynamics, which rules all material systems, it is able to exist as temporary decrease of entropy<sup>1</sup>. Living systems are episodes rendering the 2<sup>nd</sup> law its probabilistic character, they are born and they die, which coincides with the usefulness of concepts like 'consciousness' and 'time' as they are experienced by living entities. As modern biology has discovered the basic process that randomly emerged on earth as living system seems to be a disequilibrium process being able to *reproduce* itself in its local environment some 4 billion years ago<sup>2</sup>. Reproduction is the emergence of a copy, of circumstances that allow for a mirroring of the original disequilibrium process. The spreading of copies, all of them in nearby places and thus imperfect mutations, is the precondition for the setting in of evolutionary selection mechanisms. The step from this first mirror mechanism providing living mechanism to the next step, the grand evolutionary jump forward to the human species can be imagined as a second mirror mechanism, which projects – better: reflects - biological evolution into the brains of the individual members of the human species<sup>3</sup>. Again the reflected copies are imperfect, a plethora of filters sorts out what has been evolutionary learned as essential from the chaos of perceived impressions. Such a second mirror, such a set of filters can only emerge if it is able to survive substantially

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<sup>1</sup> Compare Schrödinger's view in 'What is Life?'

<sup>2</sup> Compare part 2 of Nick Lane's book 'The Vital Question'.

<sup>3</sup> A very revealing narrative of hard-wired evolutionary selection mechanisms in the animal kingdom as compared to soft selection mechanisms in a species maintaining sophisticated internal models in its individual members is told by the game theoretic models used to describe this evolutionary step.

longer than the lifespan of individual members of the species. In other words, the human species has been bound to use a shared language to become an enduring social entity. It is the exchange of perception filters, in the communicative capacity of tribes of human individuals, which enables and constitutes individual consciousness. The existence of this second mirror is built on the primacy of the group<sup>4</sup>. Note, that like the first mirror also this second mirror provides imperfect copies in individual brains. In this context a variety of diverse copies is regulated by the syntax and semantics of the shared language.

The first part of the chapter will develop these ideas in more detail and with some transdisciplinary reference support. In the second part - having convinced the reader that all social science necessarily has to put the diversity of internal modelling of individuals and their communicative exchange in its centre, i.e. has to be 'complex' – some proposals how to proceed (e.g. by agent-based modelling) and which problems (e.g. algorithmic language evolution, use of Complex Numbers, Quaternions and Octonions) will have to be overcome are provided. It turns out that the existing formal apparatus of economics is just supporting a distorted caricature of social dynamics while the perspectives of developing complex political economy are indeed perplexing. We only have started to discover its theoretical potential.

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<sup>4</sup> It is remarkable that already Darwin was puzzled by the 'origin of species', and not by the origin of individual consciousness.