



## The Bioeconomics of Social Behavior: Introduction

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The papers comprising this special issue of the *Journal of Bioeconomics* are exciting explorations along several frontiers of bioeconomics. The two contributions, by Cort Pedersen and William McKelvey, are adapted from presentations at the conference *Evolution and Social Behavior* organized by Jack Hirshleifer and Paul J. Zak and held at UCLA April 20, 2001. The paper by Gordon Getty, an invited editorial, represents, like the other two, a biology-based approach to impart new understanding on an important issue.

Pedersen's paper, 'How Love Evolved from Sex and Gave Birth to Intelligence and Human Nature', is a radically new analysis of the sources of our humanity. The confluence of events that produced the large prefrontal cortex (PFC) distinguishing humans from the great apes and other mammals is an open issue in evolutionary biology. Standard arguments for rapid PFC development include: (a) development of language (which resides in phylogenetically older brain regions); (b) access to meat, which provided a consistent protein source; or (c) a combination of these (Deacon 1997). In contrast, Pedersen argues that ancient neurophysiological systems that enable sexual reproduction in fish by reducing fear responses associated with nonspecific approach evolved in mammals to facilitate maternal offspring bonding. In some mammal species, including humans, this attachment system led to pair-bonding, as well as to the ability to temporarily attach to unrelated conspecifics. The result, Pedersen argues, is the development of modern civilization and modern industrial economies.

McKelvey's paper, 'Toward a 0<sup>th</sup> Law of Thermodynamics: Order-Creation Complexity Dynamics from Physics and Biology to Bioeconomics', asks how spontaneous order emerges, a question brought to the fore especially in the work of Friedrich Hayek (1952). Although Hayek built on biology to argue for an 'order of the mind', McKelvey draws on modern thermodynamics. He suggests that a 0<sup>th</sup> law of thermodynamics that defines order creation before the 1<sup>st</sup> and 2<sup>nd</sup> laws of thermodynamics take effect. His thesis is that physical, biological, and economic systems are conservative, so that excess energy gives rise to dissipative structures that induce order

creation. He supports this hypothesis with a survey of the literature on order creation. Understanding order creation is essential for both biology and economics since the spontaneous appearance of beings and the physical or abstract structures they inhabit (e.g. anthills, or firms, or markets) precede, and McKelvey argues may supersede, evolutionary selection.

Gordon Getty's paper, 'Duplication, Growth and 'Total Return Economics'' uses a biological approach to propose an alternative to the national accounts. Getty offers new definitions for consumption, profit, and return on investment. In this contribution, he separates maintenance consumption from consumption that increases capacity or human capital. This leads to a set of 'duplication rules' through which resources not required for maintenance add value. Informal tests of the model's predictions show support for a variety of its propositions. Getty concludes that all growth is due to productivity gains, not to thrift, and thus the attempt by policy-makers to raise the low US savings rate to stimulate growth is misplaced. Indeed, he shows that the return to thrift is purely a function of biological nature of beings, including human beings.

We hope that you will find the papers in this special issue of the *Journal of Bioeconomics* provocative and enlightening. We certainly have.

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