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Presentation

THE STUDY of the properties of collective phenomena (set of molecules in a gas, swarms of insects, flocks of birds, human groups) have established remarkable intellectual challenges for researchers from different eras. When J. C. Maxwell was immersed in the construction of classical thermodynamics, he confessed to his friend L. Campbell that he was having insurmountable difficulties in the use of Newton's mechanics in describing the fundamental properties of gases. Later, he communicates:[1] "... therefore, we are obliged to abandon the strict historical method[2] and adopt statistical methods."

It is from this branch of physics, which Albert Einstein considered the most perfectly conceived, from which come most of the methodological metaphors that have helped us understand the main properties of collective phenomena. Some of these properties have the feature of universality, that is, they do not depend on the particular details of the system under study, which is manifested in the mathematical simplicity of their formulations.

To the extent that biology or social sciences began to build interdisciplinary bridges with other branches of knowledge, the use of thermodynamic methods proposed questions such as the following: Is it possible to describe the functioning of complex biological systems, such as a cell, or the brain, from a universal family of simple laws? Can we understand the essence of social phenomena through simple models, borrowed from statistical physics? It is in this way that the concept of criticality enters into interdisciplinary research areas as dissimilar as biology and sociology.

The works that appear in this issue show different lines of research where their models are inspired by the critical phenomena of physics. The panorama shown is very wide: from a proposal of critical self–organization for natural languages, to the ubiquity of certain power laws in the structure of living beings. We hope you enjoy them.

Ricardo Mansilla
Editor

1 R. Mansilla, «De Galileo a Walras: el largo idilio entre las ciencias sociales y naturales.» *Interdisciplina*, 1(1): 99, 2013.
2 The historical method was the way in which Newton's mechanics was designated at the time of Maxwell.