

## EMERGENCE AND DOWNWARD CAUSATION

### AN INTRODUCTION TO A SPECIAL NUMBER OF PRINCIPIA

Although emergentism has flourished during the first half of this century as the first systematic formulation of non-reductive physicalism, emergentist philosophies underwent a long period of oblivion. In 1990, Kim wrote that the emergence debate had been forgotten, and appeared to have had negligible effects on the then current debates in metaphysics, philosophy of mind, and philosophy of science (in Kim 1993: 134). Nonetheless, seven years after that statement, Kim (1997: 271) himself acknowledged that emergentism was coming back into the philosophical scene, and the terms 'emergent', 'emergence', and the expressions 'emergent property', 'emergent phenomenon', and so on were increasingly employed in an unapologetic way by both philosophers and scientists (also Kim 1999). This re-emergence of the emergence debate is directly related to the great development of the sciences of complexity, interdisciplinary fields of research concerned with the complex properties of life and mind, in the 1990s. Another reason for the strong comeback of this philosophical doctrine lies in the collapse of positivistic reductionism and the related ideal of an unified science since the 1970s. The very term 'emergence' and its derivatives have become popular in the context of computer models of non-linear dynamical systems, complex systems research, Artificial Life, consciousness studies etc. As the concept of emergence and related notions are increasingly used, it becomes more and more important to keep the exact meaning of the central ideas involved clear, inasmuch as the notion of emergence is often regarded with suspicion by both philosophers and scientists, despite its intuitive appeal. In recent years, the emergence debate has been going on, with several philosophers and scientists trying to make it clear what is at stake in the notion of emergence as well as in

related notions, such as 'downward causation', 'supervenience', 'levels', etc. We can say that this debate currently comprises at least four distinct lines of discussion: (i) the treatments of emergence which follow the approach of the analytical school in philosophy, (ii) historically and scientifically informed discussions which avoid being compromised with some underlying metaphysical assumptions involved in the emergence debate and assume the strategy of weighing alternatives and crafting new lines through mergers, (iii) contributions from the Artificial Life tradition, which typically assume that emergence is genuine and of central importance in understanding and modeling complex adaptive systems, and (iv) contributions from philosophers of physics, which typically think that there is no problem of emergence as emergence is simply a fact. In this issue, there are no papers of this latter approach, while Gillett's, Mendonça's, and Symons' papers can be regarded as representatives of (i), El-Hani's and Pihlstrom's, of (ii), and Bedau's, as a mixture of (i) and (iii).

In this special number of *Principia*, we intend to offer a broad view of the issues discussed in the emergence debate and the variety of philosophical (and also metaphilosophical) positions one can assume when involved in it. Bedau's, El-Hani's, Pihlstrom's, and Symons' papers were presented at the 2001 meeting of the International Society for the History, Philosophy, and Social Studies of Biology, at Quinnipiac University, Hamden-CT, USA, in the session "Levels I Emergence", organized by C. N. El-Hani (for further information, please check <http://www.phil.vt.edu/ISHPSSB/2001/program.htm>). The other two papers were also presented in important conferences, and bring further contributions to the comprehensive view of the emergence debate this special number intends to provide. Gillett's paper was presented in a special panel on emergence at the 1999 conference of the Society for Chaos Theory in Psychology and the Life Sciences, while Mendonça's was given at the Third International Colloquium on Philosophy of Mind, which took place at João Pessoa, Brazil, in 2002.

*Principia* readers will have a general and informed view about emergence by reading the papers gathered here. We hope these papers can foster a widespread interest in the engaging controversies about emergentist philosophies, contributing to make emergence fi-

nally become a visible part of the problematics of mainstream philosophy of science. At last, the issues at stake in the emergence debate are clearly relevant to central problems in the philosophy and methodology of science.

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### References

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