BOOK REVIEW

JOHN J. HISNANICK

*Critical Mass: How One Thing Leads to Another.* Philip Ball. London: Arrow Books, 2005, 644 pp. including notes, bibliography, and index, ISBN: 009-9-45786-5, Pb. $16.00 USD.

A striking feature of the social sciences over the last decade has been a breaking down of traditional barriers between disciplines. This has entailed the transference of methodologies from such disciplines as physics and economics to other social sciences such as sociology and psychology. This transfer of methods across disciplines has been most effective when looking at the behavior of groups, the idea being that the behavior of a group can be accurately captured in a mathematical model even though this may not be possible for the behavior of any particular individual. For example, consider the ideal gas analogy. The individual gas particles trace out intricate paths, interacting with each other and any walls that contain it, but all this intricacy cancels-out to an extraordinary extent allowing the aggregate properties of such a gas to be captured by a relatively simple equation. The fact that we can not trace out the individual gas particles is not a barrier to the description of the aggregate behavior of the collection of particles. It is from this premise that Philip Ball focused his attention in writing his recent book *Critical Mass: How One Thing Leads to Another.* This book spans close to 600 pages and provides both a historical and current perspective looking at how “en masse behavior” holds the prospect that the social sciences can become more like the pure sciences—a social physics.

From a historical perspective, Ball’s book traces the development of social physics all the way back to Hobbes, the 17th-century philosopher who first sought to make political thought a more certain science and who sought to relate how the properties of individuals might relate to those of the society they compose. From there it takes a broad sweep through familiar areas discussed over the last two decades, including such topics as small world networks, power laws, phase transition, the minority game, self-organized criticality, and the iterated prisoner’s dilemma. Clearly, Ball’s book is the first popular science book that covers the relevant material in the area of social physics, as well as presenting a substantial section of social simulation and talks about many of the main figures that have contributed to the recent literature in the area of social physics.

The whole book is an elaboration that has been repeatedly made in the sciences of complexity: that complex behavior can result from the interaction of lots of simple parts. This is now well established, but the implied corollary that the complexity we observe is the result of lots of simple interactions does not, of
course, follow. Physics-type models may be impressive in terms of their formal content and analysis, but vague social interpretations are insufficient to ensure that they are about social phenomena. Assumptions and modeling styles used in physics will tend to exacerbate this problem if they are not adapted to the different demands of social phenomena. However, physics has a lot to teach to the social sciences, which tend to be top-heavy in terms of abstract paradigms and theories and relatively lacking in data collection and descriptive modeling.

This book is well written and provides a careful, historical account of the development of social physics and abstract social simulation. It gives a good overview of several fields of application and an accessible, entry-level description of many simulation models that can be interpreted as forming the basis for social physics. But do not be beguiled into thinking that the simple computational models presented actually represent social phenomena or are reliable models of those phenomena just because they make for attractive analogies. The strength of this book is its careful account of the scope and development of social physics, but its weakness lies in not providing an insight into the skills that allow one to differentiate between modeling group behavior and computational facility that provides for the analogies.