

**Chaos Theory in the Social Sciences.**



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expected to be fair, but his decisions in the field of civil rights and liberties were certainly informed by deeply held convictions. More recently, Justice Antonin Scalia delivered a scathing attack on the forces of secularism, which to his thinking is disingenuously dressed as sophistry. The modern world views Christians as "fools," he remarked to a prayer breakfast sponsored by the Christian Legal Society at the Mississippi College School of Law, and "we must pray for the courage to endure the scorn of the sophisticated world" (Joan Biskupic, "Scalia Makes the Case for Christianity; Justice Proclaims Belief in Miracles," *Washington Post*, April 10, 1996. p. A1). He, for one, apparently intends to keep the faith.

These two books demonstrate the difficulty of taking on complex issues, and overall Greenawalt's presentations and arguments are better than most. Those interested in First Amendment problems will find both books very useful.

**Chaos Theory in the Social Sciences.** Edited by L. Douglas Kiel and Euel Elliott. Ann Arbor: University of Michigan Press, 1996. 349p. \$54.50.

Courtney Brown, *Emory University*

Across many disciplines, chaos theory is currently one of the most watched subfields of the more general area of nonlinear dynamics. The social sciences have been similarly influenced by this broader interest in nonlinear thinking. This edited volume by Kiel and Elliott is an outstanding demonstration of how deeply nonlinear thinking has penetrated into some elements of the current generation of social scientists. The articles contained therein range from general discussions of chaotic dynamics as they may be manifest in social scientific data to specific area discussions relevant to political science and economics. The book is certainly worth careful study by all who are methodologically inclined. Its potential audience should be much wider, however, including (but not limited to) those who wish to understand the broader philosophical contribution nonlinear thinking is making to our understanding of how we live and organize ourselves.

The linear paradigm is dominant across all social scientific circles today. Its dominance is an historical artifact, however, not at all based on any real inherent superior value in linear thinking. In short, linearity is dominant today because linear mathematics and programming were the only feasible approaches to quantitative studies in the decades past, when slow mainframe computers were the only game in town. All that has changed. Computational speed and capacities have increased to the point that the original reasoning for the restricted use of only linear mathematics approaches can be abandoned in its entirety. It is not that we need to abandon linear mathematics; rather, the intellectual thinking that lifted linearity to its paradigmatic dominance restricts our view of the greater complexities in the reality surrounding us.

Fundamentally, human behavior is as nonlinear as are the physical and natural behaviors of the rest of the universe. Indeed, linearity is only a very narrow subset of the universal nonlinear condition. That we tend to look at ourselves through a linear computational lens in no way changes the fact that we are inherently nonlinear creatures. This is the challenging premise of *Chaos Theory in the Social Sciences*. This is a bold book. Its goal is more than to present a collection of interesting ideas. Indeed, the contributors act collectively to address one of the greatest inadequacies in general social scientific thinking today. I think they do so successfully, in a broad and audacious fashion.

While there are too many contributors to this volume for me to discuss individually, a few comments directed at specific articles are worthwhile. The introductory article by Kiel and Elliott has particular value to scholars not so technically inclined as well as to students new to quantitative approaches. Their treatment avoids complex computational algorithms. Instead, they demonstrate chaotic behavior using commonly available spreadsheet software, the same type used, say, to balance departmental budgets. McBurnett's article on spectral analysis is one of the most easily understood treatments of that subject currently in print. It is useful for anyone wanting to study frequency components in time-series data. Moreover, McBurnett demonstrates some of the techniques applicable to chaotic data using real political data. The article by Richards on aggregation effects of social scientific data with chaotic elements is as solidly clear and provocative as much of her other writing presented elsewhere. This particular piece would be of special interest to social choice theorists wanting to apply nonlinear and chaotic approaches to their own work.

In a section on chaos theory and political science, all three contributions are worth reading closely. Brown's piece is a solid appeal to the general idea of advancing nonlinear approaches to political phenomena. Saperstein's contribution addresses nonlinear and chaotic concepts in the realm of international relations. Finally, McBurnett presents a second piece which specifically draws the connection between nonlinear complexity and the evolution of public opinion. As with his other contribution, McBurnett uses real data to estimate and evaluate these chaotic dynamics. Those who want to get their feet wet in chaos theory must not miss these chapters.

The three contributors to the economics section are equally well chosen for this volume. Rosser examines the applicability of chaos theory in rationality as it is used in economics. Berry and Kim explore what has now nearly become a trademark for Berry, the senior author of this piece, the analysis of long waves in economic data using phase portrait methods. Dendrinis looks at cities as spatial chaotic attractors.

Each article in the volume makes a significant contribution to current discussions regarding chaos theory specifically, and to nonlinearity and complexity more generally. I recommend it to everyone interested in these issues. The book would certainly fit in a syllabus for a graduate class dealing with some of these philosophical issues. Moreover, the book is likely to warm up the healthy nonlinear versus linear debate that is current among methodologists.

**The Art of Bargaining.** By Richard Ned Lebow. Baltimore: Johns Hopkins University Press, 1996. 193p. \$24.95.

I. William Zartman, *Johns Hopkins University*

Since it was named, in the eighteenth century, the field of negotiations has been largely the subject of books of proverbs—wise but often contradictory maxims, unconnected to a conceptual model, that ground the wisdom in theory and that are free of intervening variables which tell when in the process to apply the wisdom. Over the past three and a half decades, there has been an explosion of literature on the subject, some of it more proverbs, but much of it a more scientific treatment of the nature of the process, yielding derivative analysis and prescriptions for ways of overcoming the initial deadlock or conflict and achieving positive results for one or both parties.

It is therefore a bit off-putting to see someone venture into a crowded field with the opener: "I searched in vain for a