
A Beautiful Math: John Nash, Game Theory, and the Modern Quest for a Code of Nature

by Tom Siegfried

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REVIEWED BY SANFORD SEGAL

Tom Siegfried's *A Beautiful Math* is informally and popularly written. The title, of course, is taken from Sylvia Nasar's *A Beautiful Mind*, and John Nash (featured on the dust jacket) has a role to play in the book, though not as great as first indicated. In fact, Siegfried's breezy pop-cultural style, while making the book easy to read today, may, in fact, detract from its influence in the not-too-distant future, when off-the-cuff references to "Gilligan's Island," or other television remarks, are less familiar. In fact, the book is very dependent on American television for many of its side remarks.

The book is an attempt to show how mathematical game theory influences the search for a "Code of Nature," describing the laws of human behavior. There is no mathematics in this book (except in an appendix

involving calculation of mixed strategies to yield a Nash equilibrium in two-person games; actually two different games). Nash equilibria are much talked about, but not computed; in fact in many situations where they are mentioned they cannot be computed.

Siegfried's book is *about* mathematics and his belief that game theory provides the glue cementing together the various attempts to understand (aspects of) human nature. At the very end of his book he quotes the neuroscientist Joshua Greene:

The idea is really to have, in the end, a seamless understanding of the universe, from the most basic physical elements, the chemistry, the biochemistry, the neurobiology, to individual human behavior, to macroeconomic behavior—the whole gamut seamlessly integrated Not in my lifetime, though.

Throughout the book, Siegfried shows how game theory *might* be linked to social networks, anthropology, quantum theory, statistics, biology, economics and neuroeconomics, and many other things. He discusses game theory "standards" like repeated Prisoner's Dilemma, tit-for-tat strategies, mixed strategies, and others. For example, he quotes Schelling's work, which began in the 1950s and produced the 1960 book, *The Strategy of Conflict*, but which won (one-half of) the Nobel Prize in Economics in 2005. Siegfried's book is, in fact, very influenced by the behavioral game theory of Colin Camerer.

Elucidations of some of the chapter titles, which are examples of his

playfulness, are perhaps in order. Chapter 1, "Smith's Hand," refers to Adam Smith's "invisible hand" of *Wealth of Nations* fame, but Chapter 4, "Smith's Strategies," refers to the biologist John Maynard Smith who was a pioneer in evolutionary game theory. Again, Chapter 8, "Bacon's Links," refers not to Francis Bacon or Roger Bacon but the actor Kevin Bacon and the now familiar notion of six links of connection. Siegfried's book was inspired by Isaac Asimov's Foundation trilogy, as he makes clear. Chapter 6, "Seldon's Solution," refers to the character Hari Seldon in Asimov's creation, and Chapter 9, "Asimov's Vision," takes up the issue of whether Hari Seldon's "psychohistory" or sociophysics is the appropriate discipline for discovering the "Code of Nature." Chapter 10, "Meyer's Penny," refers to David Meyer, who is very interested in quantum computing and the possible merger of quantum theory with game theory.

This is a charming and speculative book that is an "easy read" and can introduce people to ideas about game theory and its possible centrality in investigations of all sorts, leading *perhaps* to a "Code of Nature."

But no one should expect to learn any game theory from it.

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