

## HISTORY OF SCIENCE

## Heterodoxy and Its Discontents

Alex Wellerstein

The history of bad ideas is as interesting, and as important, as the history of good ones. Books on the histories of Creationism, eugenics, and Lysenkoism—to pick just a few famously bad ideas—have proven illuminating to those who want to know how science functions (or doesn't) on the margins and how it is co-opted into popular (and political) ends. Princeton historian of science Michael Gordin's *The Pseudoscience Wars* explores a lesser-known 20th-century movement, Velikovskism, and uses this as a lens with which to understand the power of pseudoscience in an age where scientific authority and funding have never been higher.

Gordin observes anecdotally that the name Immanuel Velikovsky is essentially unknown to anyone under the age of fifty. (It was meaningless to me.) Nonetheless, there is a story

book of Exodus, the planet Jupiter ejected a massive comet that became trapped in a gravitational and electromagnetic interaction with Earth. For the next several decades, these interactions caused the supernatural events described in the Old Testament (for example, the “manna from heaven” were hydrocarbons rained down by the comet's tail), as well as similar catastrophes described in other religious traditions. Eventually the comet settled into a stable orbit and as such became the planet we know as Venus.

For evidence of these extraordinary claims, Velikovsky cited meticulously correlated myths from ancient history (much of which he had redated according to his own

chronology), as well as his own idiosyncratic electromagnetic theory of gravity and a distinctly Freudian approach to the study of history. Moreover, Velikovsky was (again, in a nod to Freud) convinced that these catastrophes had been repressed as a form of collective amnesia, which explains (conveniently) why most of us who hear about his theories today vigorously reject them as implausible. (Gordin

consciously does not attempt to rebut them, in part because there are no longer any stakes in doing so.)

Under normal conditions, one might expect such a work to pass unnoticed among the other millions of pages of nonsense published in any given year. But, as Gordin chronicles, the conditions surrounding *Worlds in Collision* were just right for a controversy. The book had been released by Macmillan Press, a respected publisher of scientific monographs, which led to an outraged protest by numerous members of the American astronomical community (led in part by Harlow Shapley of Harvard). Their complaint that the book could not possibly

have been peer-reviewed was incorrect—the press had actually subjected it to two separate rounds, and it was tentatively approved even by scientists as interesting and entertaining

although not likely true. But their main objection was that it was being passed off as a work of “science” as opposed to a work of, say, speculative nonfiction. After a series of threats (never organized into a coherent movement) to boycott Macmillan textbooks, the publisher turned the book over to the popular press Double-

day, to the satisfaction of the astronomers. In attempting to draw public attention to the utterly erroneous nature of the book, however, the scientists gave it ample publicity, and it became a best-selling hit.

Gordin takes us through the many phases of the book's history: its origins, its contested publication, its resurgent popularity among antiestablishment college professors and students in the 1970s, and its drop into total obscurity following Velikovsky's death in 1979. This makes for interesting reading in and of itself: The Velikovsky affair is a story of major scientists trying to grapple with what to do about someone they deemed a serious crackpot. Velikovsky, for his part, attempted in fits and starts to find inroads into respectability. Velikovsky was not crazy, Gordin emphasizes. He was simply crankish—totally obsessed, completely convinced, interpersonally difficult. Gordin is extremely sensitive to Velikovsky the human being and makes good use of Velikovsky's expansive personal archives to flesh out the account with key details about his life, methods, and struggles.

The biggest question is, of course, why the scientists raised such an outcry in the first place. Velikovsky's book might have entered obscurity much faster had it not been given so much inadvertent publicity. The answer Gordin gives highlights the particular historical context of Velikovsky: It was a moment of high Cold War anxiety. American scientists had learned from watching the Lysenko affair from abroad that crackpots could be dangerous. In Cold War America, increased government involvement in the funding of science was taken by some to mean the possibility of increased government regulation of science. This Cold War context pervades the early sections of the narrative and crops back up in the reembrace of Velikovsky in years of popular ambivalence to technological progress.

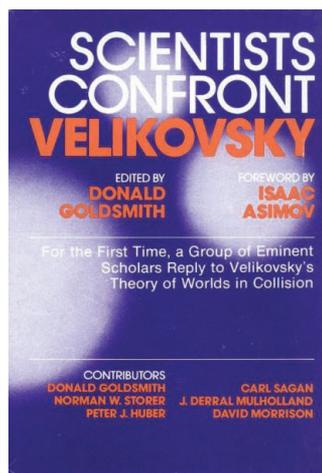
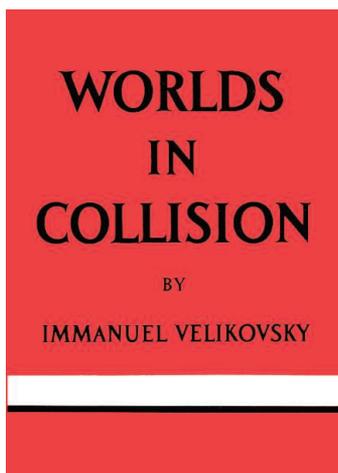
The Velikovsky story also intersects with many other “fringe” communities. Velikovsky's writings and correspondence

## The Pseudoscience Wars

Immanuel Velikovsky  
and the Birth of the  
Modern Fringe

by Michael D. Gordin

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Chicago, 2012. 301 pp. \$29,  
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**Clash of views.** The covers of *Worlds in Collision* (1950) and a 1970s critique (2).

of historical and present import in the history of Velikovsky's unusual ideas and the efforts of mainstream scientists to explain their erroneous nature to what they perceived to be an unwitting and easily misled public. That such an interesting story could emerge out of what superficially appears to be a very obscure topic is one of the unexpected joys of the book.

The thesis of Velikovsky's major work, *Worlds in Collision* [1950; (1)], sounds so ludicrous that its immense popularity seems incredible: At the time of the events in the

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give Gordin the opportunity to discuss the “rehabilitation” of eugenics, the birth of scientific creationism, and the aforementioned Lysenkoism. In some cases (eugenics in particular), this feels like a bit of a narrative stretch, but it does end up adding breadth to the discussion of pseudoscience in general, and Gordin’s take on each of these topics is original.

Velikovsky cosmic catastrophism is, for Gordin, also a case study on the famously intractable demarcation problem, the difficulty of coming up with firm criteria for what separates science from nonscience, or science from pseudoscience. Along with most philosophers and historians of science, he concludes that the problem is probably impossible to resolve unambiguously: “‘Pseudoscience’ is an empty category, a term of abuse, and there is nothing that necessarily links those dubbed pseudoscientists besides their separate alienation from science at the hands of the establishment.”

This is not to say that Gordin takes an anything-goes approach, that all forms of knowledge are equally valuable. He just doesn’t think there are some magic criteria that will let you sort science from pseudoscience in anything like a purely rational fashion. And indeed, as Gordin notes, the entire meaning of “pseudoscience” is that it mimics “science.” Come up with a criterion—peer review, say—and those eager to prove that they really do science will find ways to implement it as well. (Gordin does, however, hint at a possible strict line between those dubbed “pseudoscientists” and those who are “denialists”—the latter of which he sees as essentially dishonest about their work to cloud consensus on issues affecting monied interests, such as big tobacco or big coal.)

Gordin is careful not to prescribe any pat answers to the question of what to do with pseudoscience. Nonetheless, those who are interested in how bad ideas start, how they diffuse, how they covet and resist confrontation, and how they wax and wane in popularity over time will find much food for thought in this gripping book.

#### References and Notes

1. I. Velikovsky, *Worlds in Collision* (Macmillan, New York, 1950).
2. D. Goldsmith, Ed., *Scientists Confront Velikovsky* (Cornell Univ. Press, Ithaca, NY, 1977).

#### Supplementary Materials

A symposium at the February 1974 AAAS annual meeting pitted Velikovsky against several critics. Recordings of the talks given there by Velikovsky, J. Derral Mulholland, and Carl Sagan (along with the subsequent question-and-answer exchanges) are available at [www.sciencemag.org/content/338/6104/194/suppl/DC1](http://www.sciencemag.org/content/338/6104/194/suppl/DC1).

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## SOCIAL PSYCHOLOGY

# To Endow Trust

Benedikt Herrmann

When the extent of the financial crisis came to light in 2008, former chair of the U.S. Federal Reserve Alan Greenspan had to admit to Congress that he had “made a mistake in presuming that the self interest of organizations ... was such that they were best capable of protecting their own shareholders and the equity in the firms”—a mistake that turned out to be very costly, and not only to the American economy. It might be unfair to blame Greenspan for his misperception of the self-interest of organizations. Until very recently, there was no way for someone to objectively and impartially measure the nature of human social behavior. From Aristotle to George W. Bush, decisions have been made based on personal beliefs about how selfishly or cooperatively other people will act.

However, the situation is changing. Aided by replicable experiments and game-theoretical analysis, intriguing research in a range of disciplines is illuminating the actual nature of human social behavior. Unfortunately, the increasingly specialized language within disciplines makes it difficult for an interested public to follow these advances. Thus it helps to have a lucid and informative account such as Bruce Schneier’s *Liars and Outliers*. The book provides an interesting and entertaining summary of the state of play of research on human social behavior, with a special emphasis on trust and trustworthiness.

Trust forms the fundamental ingredient for the functioning of modern societies and economies. Each day, they involve millions of interactions between strangers. As Schneier nicely demonstrates with many lively examples, our social and economic activities require a high level of trust. If everyone has to be actively monitored to ensure that she or he keeps commitments, our societies could hardly develop.

Schneier (a cryptographer, security specialist, and writer) has a personal interest in

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the issue of how trust and trustworthiness can evolve in societies where people increasingly interact anonymously with one another. The book demonstrates that he has thoroughly surveyed the existing academic literature. Free from preoccupations and personal attachments to any of the scientific disciplines working on the topic, he has compiled a well-structured overview of what research can tell us about how trust and trustworthiness accumulate (although some academic readers may find their publications presented in an unexpected context). This he enlivens by adding real-life experiences on how to build trust and keep trustworthiness alive.

Step by step, Schneier elaborates the evolution of trust from the “atom” of trust, the individual, through to the top level of trust systems, entire societies. At times, the steps are rather large—as, for instance, when he covers in a few pages the whole discussion on the evolutionary history of human social behavior. On other occasions, the steps turn very small, and he may spend many pages explaining specific features of trust and trustworthiness in extensive detail. But in this way, readers become acquainted with doz-

ens of insightful examples of social dilemmas on the levels of the individual, family, firms, and entire societies. In addition, they gain an easy and intuitive introduction to the game-theoretical framework behind much of the academic dispute on the nature of human social behavior.

Some relevant points are, however, missing. With its focus on selfish and social behavior, the book neglects very recent developments in experimental research on the “dark side” of humans—features such as competitive spite and pure aggression. People not only fear falling victim to selfish exploiters of their readiness to behave in a trustworthy manner, they also dread irrational attackers. This raises an additional hurdle to instilling security: Some security technologies adopted to combat overaggression can by themselves damage innocent people, thus increasing distrust. It also would have been nice if Schneier had extended his perspective beyond the United States, as recent research demonstrates that, for instance, norms of cooperation may vary considerably across societies.

Nevertheless, overall *Liars and Outliers* offers a good introduction to human social behavior. Most likely, Greenspan would have enjoyed a read before 2008.

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#### Liars and Outliers

Enabling the Trust That Society Needs to Thrive

by Bruce Schneier

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