

SCIENCE UNDER SIEGE: DEFENDING SCIENCE, EXPOSING PSEUDOSCIENCE.
Edited by Kendrick Frazier. Amherst, NY: Prometheus Books, 2009.
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Science Under Siege is a collection of articles previously published in *The Skeptical Inquirer* (*SI*), most of them within the last 5 years. In some cases, updated commentary is provided, and some new material, including a transcript of a question and answer session following a keynote address by Carl Sagan, is included.

The first contribution, by Paul Kurtz, the chairman of the Committee for Skeptical Inquiry (CSI), formerly known as the Committee for Scientific Investigation of Claims of the Paranormal (CSICOP), is a review of the accomplishments in the first 30 years of *SI*. Among them, Kurtz cites the now infamous investigation of Michel Gauquelin's astrological research. Curiously, Kurtz does not mention the controversies over CSICOP's own botched investigation in what has become known as the STARBABY scandal.

Kurtz notes that popular interest in the paranormal has declined, at least as measured by book sales.

The next contribution is by the book's editor, Kendrick Frazier (also the editor of *SI*). Like Kurtz, he notes a reduction in irrationalism since the founding of CSICOP 30 years ago. He notes that a much more insidious threat today is the rise of religious fundamentalism. Indeed, the retitling of CSICOP as CSI was intended to reflect a wider focus on all types of irrationalism. This is reflected in the fact that only 10 of the 39 contributions in the book deal directly with parapsychology. I will focus on those that are either directly or indirectly relevant to parapsychology.

The first such contribution is Mario Bunge's "The Philosophy Behind Pseudoscience." Bunge classifies both psychoanalysis and computational psychology as pseudosciences. He asserts that whether or not one studies the brain depends on one's philosophy, noting in particular that idealists will not consider brain states. He states that psychoanalysis posits an immaterial soul that interacts with the physical body. This may come as a surprise to readers of Freud's *The Future of an Illusion* and *Civilization and Its Discontents*, in which he dismisses religion as a pathetic infantile fantasy.

Bunge further notes that psychoanalysts do not perform empirical tests and that Freud explicitly divorces psychoanalysis from experimental psychology and neuroscience. This ignores Freud's 1885 *Project for a Future Psychology*, in which he lays out his vision for a unification of psychoanalysis and neuroscience.

Bunge asserts that computational psychologists also ignore the brain, asserting that all that matters are the computations themselves, not the hardware or "wetware" that implements them.

While Bunge criticizes others for their prejudgment, he asserts that "there is no genuine explanation without mechanism" and that "all

mechanisms are material" (p. 246). It is good to see that Bunge is taking his own advice and is keeping an open mind.

Finally, he classifies both sociobiology and work relating to the anthropic principle in cosmology as borderline examples of pseudoscience.

The next contribution is Bruce Flamm's "The Columbus University Miracle Study." The study in question found that women who were prayed for became pregnant (via *in vitro* fertilization) at twice the rate as women who were not the recipients of prayer. Flamm notes that two of the three authors listed on the report had only minimal or no involvement in the study and that the third author, Daniel Wirth, has been charged with bilking the cable provider Adelphia out of \$2.1 million. He reports that Wirth has used aliases (such as John Wayne Truelove, the name of a child who died at the age of 5) and that his research associate Joseph Horvath has also been accused of fraud, bringing the total amount to \$3.4 million between them. Thus, Flamm concludes that the primary researcher in the Columbia study may not be entirely trustworthy.

The next contribution is by Amir Raz, a neuroscientist new to parapsychology, who reviews a conference entitled "Meeting of the Minds" held in Vancouver, aimed at inspiring a dialogue between parapsychology and its critics. Raz offers little of substance, but his essay is followed by a review of the same conference by Ray Hyman, a more seasoned critic. Hyman focuses on lack of replicability of experimental results in his rejection of the claims of parapsychology.

Stanley Jeffers then presents a skeptical review of the research on the psychokinetic influence on random event generators (REGs) conducted by the Princeton Engineering Anomalies (PEAR) research group. Jeffers notes that the cumulative control baseline in the PEAR experiments is significant at the 0.04 level, which brings into question the randomness of the REG. In some instances, the variance in the baseline data of the PEAR REG is significantly low, which also calls into question the randomness of the REG used in the PEAR research.

Harriet Hall (the "SkepDoc") discusses Gary Schwartz's experiments on psychic healing. In her rejection of Schwartz's findings, she cites nonsignificant findings in research on the effectiveness of therapeutic touch.

The next article is Ray Hyman's "Testing Natasha." I can think of no better summary than that contained in the following letter I submitted to the Editor of *SI* at the time, which was not published:

To the Editor:
Re: "Testing Natasha"

In Ray Hyman's piece "Testing Natasha" (*SI*, May/June 2005), a new milestone in the debunking of

paranormal claims appears to have been crossed. Once, critics were content to wait for a parapsychologist to commit a methodological gaffe and then pounce on the experiment's shortcomings to refute the reality of the claimed effect. In a sense, the critics were content to act like a pack of hungry jackals (or noble lions, depending on one's political preference) circling a herd of antelopes (the parapsychological research community) waiting for a sick calf (methodologically incompetent researcher) to separate from the herd.

Hyman and his coworkers (Richard Wiseman and Andrew Skolnick) were apparently not content to wait for a sick calf to emerge on its own. They manufactured one of their own by designing and conducting a highly flawed experiment in which Natasha Demkina (the "Girl with the X-ray Eyes") attempted to match seven human subjects to their medical diagnoses. Natasha was not screened from the subjects, but could observe them at close hand. This procedure allows many sensory cues that would enable Natasha to match diagnoses to subjects (e.g., the person who was missing a large portion of her left lung might for instance breathe with somewhat more difficulty than the other subjects). Few members of the serious parapsychological research community would run a study with such poor safeguards against sensory cues (although, alas, some would). Hyman then attacks his own study on the basis of the methodological flaws just outlined. Thus, with no sick antelope in sight, Hyman has taken upon himself both the role of sick antelope and devouring lion. As he notes, there is really no way the psi hypothesis could be upheld given the methodological deficiencies of the experiment that he has both designed and attacked. One therefore wonders what point there is in running such a study.

Another point of interest is that Hyman, Wiseman and Skolnick declared the experiment a failure in any event, insofar as Natasha successfully matched "only" four of the seven subjects' diagnoses to the appropriate subject, whereas Hyman et al. had prespecified five correct matches as the criterion for success (by chance, one would expect only one correct match). However, assuming the experiment had been conducted with appropriate safeguards against sensory cues, the probability of matching four or more diagnoses to the correct subject is 0.01825 under the permutation-matching distribution. (The probability of four or more correct matches under

the binomial distribution is 0.01015; however, due to the violation of the assumption of independence of trials in Hyman et al.'s experiment, it is not really appropriate to use the binomial distribution in this case.) Thus, there is less than a 2% chance that Natasha could have done as well as she did by luck. Something more is involved (most likely, the amateurish design of Hyman, Weisman and Skolnick's experiment, which failed to isolate Natasha from sensory cues). It is, strictly speaking, true that the results of the experiment fell just short of statistical significance at the 0.01 level (presumably the unstated basis for Hyman's et al.'s five-match criterion for a successful experiment). However, given such a small number of trials, it would surely be more appropriate to use a 2% significance level to increase the power of the analysis.

In concluding, I would ask CSICOP not to manufacture any more sick antelopes; the parapsychological community already has all the staggering quadrupeds it can deal with.

In Kendrick Frazier's introduction to the present book, he notes that this investigation of psychic diagnosis by Hyman et al. was awarded CSI's Robert P. Balles Prize in Critical Thinking.

The next psi-relevant contribution is Joe Nickell's report of an investigation of the goings-on at Camp Chesterfield, a spiritualist enclave. Nickell reports that purported ghosts were played by human confederates as well as several other instances of garden-variety fraud.

Benjamin Radford reports the results of a haunting investigation in which mysterious sounds were found to originate from mundane causes such as leaf-raking.

Finally, Massimo Polidoro describes the legerdemain techniques used by him and James Randi to simulate the psychic reception of a drawing.

Consistent with the CSI's expanded focus, there are many contributions in this volume that deal primarily with issues other than psychic claims. Ann Druyan, Carl Sagan's wife, expresses the wish that the divorce between spirituality and science would end. This contribution is followed by a transcript of the question and answer period following a keynote address by Carl Sagan.

Other topics addressed include: the use of Bayesian statistical analysis to address the concern that extraordinary claims require extraordinary evidence, intelligent design, false memories, AIDS denial, global warming, the population's focus on the events of 9-11 while ignoring the many greater dangers, the anti-vaccination movement, the decentralization of electricity generation, allegations the Apollo moon landing was faked, magnet

therapy, oxygen therapy, and the “urban myth” regarding a patent officer who declared that all significant discoveries have already been made.

I believe that CSI's wider focus has made *SI* a more mature and relevant publication. CSICOP's early focus on the shakiest cases of outrageous paranormal claims led them to concentrate their debunking effort on phenomena that only the most desperate of parapsychologists would pursue.

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