POPA, April 1, 2001
Bob Cahn
On Promoting Courses on Science/Pseudoscience

Faculty contemplating teaching such a course could benefit from several things we could provide on the web:

- A list of potential topics
- An annotated list of references to books, articles, and websites
- Narratives from others who have taught such courses

Undoubtedly each instructor will want to fashion a course to his/her own goals and to the level of the students. Some thought needs to be given to how a website offering materials should be organized. A serious question is how the website would be maintained.

My own inclination was use the experience the class acquired in addressing topics like creationism, homeopathy, cold fusion, etc. as input into more philosophical questions:

- What is science? How can pseudoscience be distinguished from science?
- What is the difference between pseudoscience and "bad" science?
- What kind of obligation do scientists have to investigate apparently impossible claims?
- Can all natural phenomena be explained, in principle, by physical laws, derivable from fundamental physics?

Attached is some of the material we provided at the outset of the course.

Science, Pseudoscience, and Anti-science
Material from a freshman seminar led by R. Cahn and W. Chinowsky at U. C. Berkeley, Spring, 2000

Context

Contemporary society celebrates the achievements of science, its silicon chips and DNA sequences. Yet at the same time, there are persistent challenges to science from creationists, and more broadly, challenges to the scientific establishment asserting that science is inherently subjective and culturally determined. There are challenges, too, from the fringe, from those firmly convinced that we are visited by aliens and UFO's. Scientific orthodoxy is attacked by proponents of alternative medicine, by those who offer cures with magnets, homeopathy, herbalism... There are controversies over public policy issues that depend on scientific judgments: Do electrical power lines constitute a health hazard? Are race and intelligence correlated? How serious a risk is posed by nuclear power plants?

Proposed topics and order of presentation:

- What is science? A discussion led by the instructors.
- Evidence and statistics. R. Cahn
- Error and fraud. See, for example, "Too Hot to Handle : The Race for Cold Fusion," F. Close, Princeton Univ. Press, 1991
- UFO's and Aliens. See, for example, "UFO's: a Scientific Debate," eds. C. Sagan and T. Page, Norton, 1972.
- Parapsychology. See, for example, "Science: Good, Bad, and Bogus," M. Gardner, Prometheus Books, New York, 1981.
- Power lines and cancer clusters. See, for example, articles by Paul Brodeur in the New Yorker in June 1989.
- Alternative medicine and quackery. Herbs, magnets, etc.
- Creation Science. See, for example, books by Phillip Johnson of the U.C. Berkeley Law School.

- Race and intelligence. See, for example, "The Bell Curve : Intelligence and Class Structure in American Life" Richard J. Herrnstein, Charles Murray; "The Mismeasure of Man" by Stephen Jay Gould;
- Misappropriation of Science. See, for example A. Sokol and Jean Bricmont, "Fashionable Nonsense: Postmodern Intellectuals' Abuse of Science," St. Martin's, 1998
- The intellectual case against science. See, for example, G. Holton, "Science and Anti-Science," Harvard University Press, 1993.
- Risks and Benefits of Technology. Is nuclear power too dangerous? Should Berkeley be a nuclear-free zone?

Some other references

- Betrayers of the Truth, W. Broad and N. Wade
- "Enhance healing with magnetic bracelets from Homedics," adv. in S.F. Chronicle, Nov. 19, 1999, p. 5
- "Wireless America Costs more than a cell phone bill.." The EMR Network
- S. Weinberg, articles in the New York Review of Books:
  - 1. Weinberg, Steven A designer universe? New York Review of Books v46, n16 (Oct 21, 1999):46 (3 pages). Abstract: The presence of fundamental principles that govern nature is the most compelling evidence that the universe had a designer. Constants of nature are more believable than religious theories because they are less flexible and reveal mysterious fine-tuning. The presence of misery and injustice in the world make it hard to belive in a benevolent creator.
  - 2. Weinberg, Steven The revolution that didn't happen. New York Review of Books v45, n15 (Oct 8, 1998):48 (5 pages). Abstract: Thomas Kuhn's book entitled 'The Structure of Scientific Revolution' serves as a rich source of information regarding normal science. The book contends that scientific theories and their

corresponding standards from which they are measured change during scientific revolutions.

  - 3. Weinberg, Steven Sokal's hoax. (mathematical physicist Alan Sokal) New York Review of Books v43, n13 (August 8, 1996):11 (4 pages). Abstract: The hoax played by mathematical physicist Alan Sokal of New York University on the editors and readers of 'Social Text' served a lesson. Its satirical jab at 'academic commentators who question the claim of science to objectivity' exposed the extent to which 'standards of rigor' have dropped.
  - 4. Weinberg, Steven Nature's Imagination: The Frontiers of Scientific Vision. New York Review of Books v42, n15 (Oct 5, 1995):39 (4 pages). Pub type: Review

- The Meaning of It All : Thoughts of a Citizen Scientist, R. P. Feynman