

GARDNER ON PARALLEL UNIVERSES • INDIA'S 'MONKEY MAN' HYSTERIA • CHIROPRACTIC QUACKERY

# Skeptical Inquirer

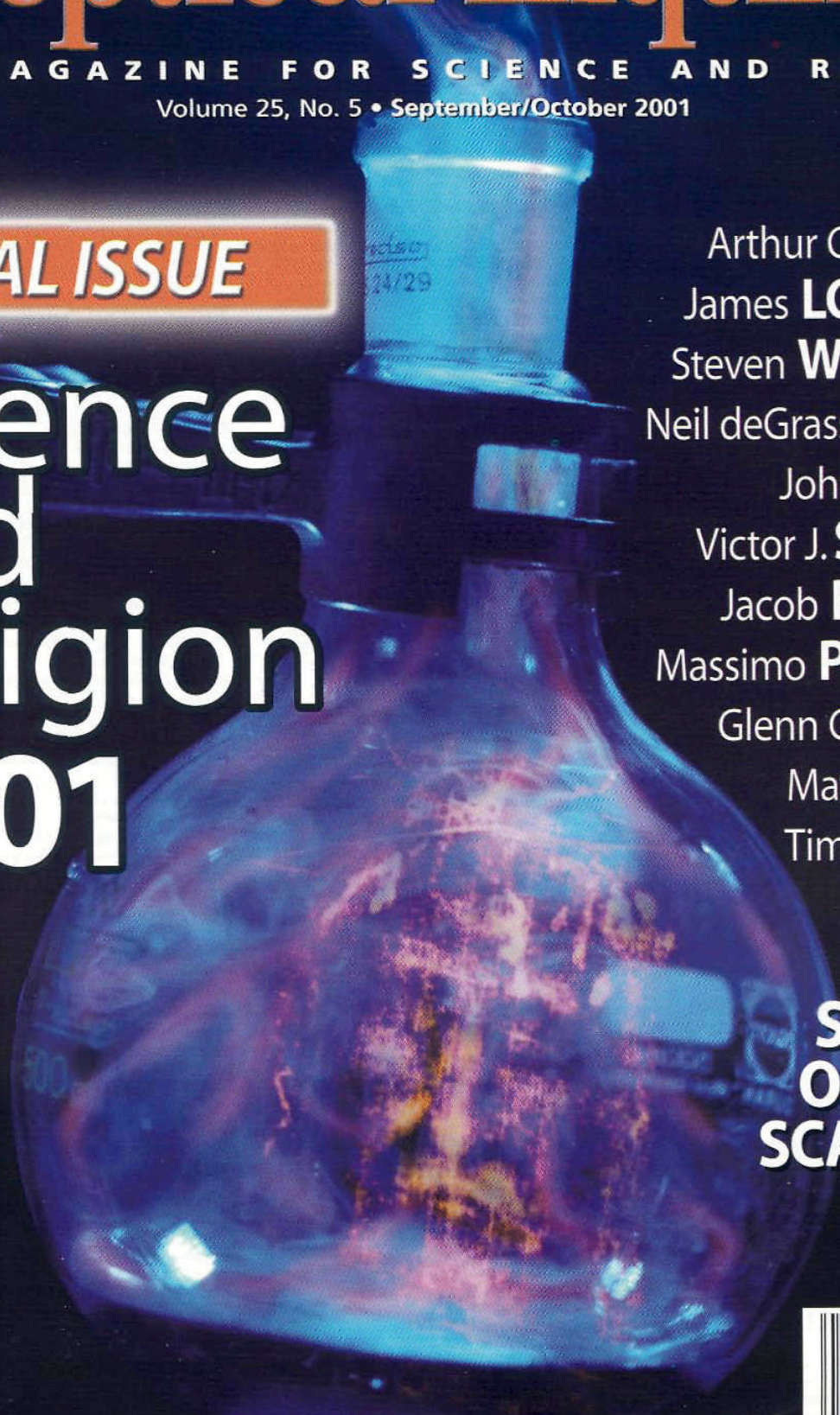
THE MAGAZINE FOR SCIENCE AND REASON  
Volume 25, No. 5 • September/October 2001

**SPECIAL ISSUE**

## Science and Religion 2001

- Arthur C. **CLARKE**
- James **LOVELOCK**
- Steven **WEINBERG**
- Neil deGrasse **TYSON**
- John C. **AVISE**
- Victor J. **STENGER**
- Jacob **PANDIAN**
- Massimo **PIGLIUCCI**
- Glenn G. **SPARKS**
- Matt **YOUNG**
- Timothy **MOY**

### SHROUD OF TURIN SCANDALS





# THE COMMITTEE FOR THE SCIENTIFIC INVESTIGATION OF CLAIMS OF THE PARANORMAL

AT THE CENTER FOR INQUIRY—INTERNATIONAL (ADJACENT TO THE STATE UNIVERSITY OF NEW YORK AT BUFFALO)

## AN INTERNATIONAL ORGANIZATION

**Paul Kurtz**, Chairman; professor emeritus of philosophy, State University of New York at Buffalo

**Barry Karr**, Executive Director

**Joe Nickell**, Research Fellow

**Massimo Polidoro**, Research Fellow

**Richard Wiseman**, Research Fellow

**Lee Nisbet**, Special Projects Director

## FELLOWS

**James E. Alcock**,\* psychologist, York Univ., Toronto

**Jerry Andrus**, magician and inventor, Albany, Oregon

**Marcia Angell**, M.D., former editor-in-chief, *New England Journal of Medicine*

**Robert A. Baker**, psychologist, Univ. of Kentucky

**Stephen Barrett**, M.D., psychiatrist, author, consumer advocate, Allentown, Pa.

**Barry Beyerstein**,\* biopsychologist, Simon Fraser Univ., Vancouver, B.C., Canada

**Irving Biederman**, psychologist, Univ. of Southern California

**Susan Blackmore**, psychologist, Univ. of the West of England, Bristol

**Henri Broch**, physicist, Univ. of Nice, France

**Jan Harold Brunvand**, folklorist, professor emeritus of English, Univ. of Utah

**Vern Bullough**, professor of history, California State Univ. at Northridge

**Mario Bunge**, philosopher, McGill University

**John R. Cole**, anthropologist, editor, National Center for Science Education

**Frederick Crews**, literary and cultural critic, professor emeritus of English, Univ. of California, Berkeley

**F. H. C. Crick**, biophysicist, Salk Inst. for Biological Studies, La Jolla, Calif; Nobel Prize laureate

**Richard Dawkins**, zoologist, Oxford Univ.

**Cornelis de Jager**, professor of astrophysics, Univ. of Utrecht, the Netherlands

**Paul Edwards**, philosopher, editor, *Encyclopedia of Philosophy*

**Kenneth Feder**, professor of anthropology, Central Connecticut State Univ.

**Antony Flew**, philosopher, Reading Univ., U.K.

**Andrew Fraknoi**, astronomer, Foothill College, Los Altos Hills, Calif.

**Kendrick Frazier**,\* science writer, editor, *SKEPTICAL INQUIRER*

**Yves Galifret**, vice-president, Affiliated Organizations: France

**Martin Gardner**,\* author, critic

**Murray Gell-Mann**, professor of physics, Santa Fe Institute; Nobel Prize laureate

**Thomas Gilovich**, psychologist, Cornell Univ.

**Henry Gordon**, magician, columnist, Toronto

**Stephen Jay Gould**, Museum of Comparative Zoology, Harvard Univ.

**Saul Green**, PhD, biochemist, president of ZOL Consultants, New York, NY

**Susan Haack**, Cooper Senior Scholar in Arts and Sciences, prof. of philosophy, University of Miami

**C. E. M. Hansel**, psychologist, Univ. of Wales

**Al Hibbs**, scientist, Jet Propulsion Laboratory

**Douglas Hofstadter**, professor of human understanding and cognitive science, Indiana Univ.

**Gerald Holton**, Mallinckrodt Professor of Physics and professor of history of science, Harvard Univ.

**Ray Hyman**,\* psychologist, Univ. of Oregon

**Leon Jaroff**, sciences editor emeritus, *Time*

**Sergei Kapitzka**, former editor, Russian edition, *Scientific American*

**Philip J. Klass**,\* aerospace writer, engineer

**Edwin C. Krupp**, astronomer, director, Griffith Observatory

**Paul Kurtz**,\* chairman, CSICOP

**Lawrence Kusche**, science writer

**Leon Lederman**, emeritus director, Fermilab; Nobel laureate in physics

**Scott Lilienfeld**, psychologist, Emory Univ.

**Lin Zixin**, former editor, *Science and Technology Daily* (China)

**Jere Lipps**, Museum of Paleontology, Univ. of California, Berkeley

**Elizabeth Loftus**, professor of psychology, Univ. of Washington

**Paul MacCreedy**, scientist/engineer, AeroVironment, Inc., Monrovia, Calif.

**John Maddox**, editor emeritus of *Nature*

**David Marks**, psychologist, City University, London

**Walter C. McCrone**, microscopist, McCrone Research Institute

**Mario Mendez-Acosta**, journalist and science writer, Mexico City, Mexico

**Marvin Minsky**, professor of media arts and sciences, M.I.T.

**David Morrison**, space scientist, NASA Ames Research Center

**Richard A. Muller**, professor of physics, Univ. of Calif., Berkeley

**H. Narasimhaiah**, physicist, president, Bangalore Science Forum, India

**Dorothy Nelkin**, sociologist, New York Univ.

**Joe Nickell**,\* senior research fellow, CSICOP

**Lee Nisbet**,\* philosopher, Medaille College

**Bill Nye**, science educator and television host, Nye Labs

**James E. Oberg**, science writer

**Irmgard Oepen**, professor of medicine (retired), Marburg, Germany

**Loren Pankratz**, psychologist, Oregon Health Sciences Univ.

**John Paulos**, mathematician, Temple Univ.

**Steven Pinker**, cognitive scientist, MIT

**Massimo Polidoro**, science writer, author, executive director CICAP, Italy

**Milton Rosenberg**, psychologist, Univ. of Chicago

**Wallace Sampson, M.D.**, clinical professor of medicine, Stanford Univ., editor, *Scientific Review of Alternative Medicine*

**Amardeo Sarma**, engineer, head of dept. at T-Nova Deutsche Telekom, executive director, GWUP, Germany.

**Evry Schatzman**, former president, French Physics Association

**Eugenie Scott**, physical anthropologist, executive director, National Center for Science Education

**Thomas A. Sebeok**, anthropologist, linguist, Indiana Univ.

**Robert Sheaffer**, science writer

**Elie A. Shneour**, biochemist, author, director, Biosystems Research Institute, La Jolla, Calif.

**Dick Smith**, film producer, publisher, Terrey Hills, N.S.W., Australia

**Robert Steiner**, magician, author, El Cerrito, Calif.

**Jill Cornell Tarter**, astronomer, SETI Institute, Mountain View, Calif.

**Carol Tavris**, psychologist and author, Los Angeles, Calif.

**David Thomas**, physicist and mathematician, Peralta, New Mexico

**Stephen Toulmin**, professor of philosophy, Univ. of Southern California

**Neil deGrasse Tyson**, astrophysicist and director, Hayden Planetarium, New York City

**Marilyn vos Savant**, *Parade* magazine contributing editor and CBS News correspondent

**Steven Weinberg**, professor of physics and astronomy, Univ. of Texas at Austin; Nobel Prize laureate

**Richard Wiseman**, psychologist, University of Hertfordshire

**Marvin Zelen**, statistician, Harvard Univ.

\* Member, CSICOP Executive Council (Affiliations given for identification only.)

• • • Visit the CSICOP Web site at <http://www.csicop.org> • • •

The *SKEPTICAL INQUIRER* (ISSN 0194-6730) is published bimonthly by the Committee for the Scientific Investigation of Claims of the Paranormal, 1310 Sweet Home Rd., Amherst, NY 14228. Printed in U.S.A. Periodicals postage paid at Buffalo, NY. Subscription prices: one year (six issues), \$35; two years, \$58; three years, \$81; single issue, \$4.95. Canadian and foreign orders: Payment in U.S. funds drawn on a U.S. bank must accompany orders; please add US\$10 per year for shipping. Canadian and foreign customers are encouraged to use Visa or MasterCard.

Inquiries from the media and the public about the work of the Committee should be made to Paul Kurtz, Chairman, CSICOP, Box 703, Amherst, NY 14226-0703. Tel.: 716-636-1425. FAX: 716-636-1733.

Manuscripts, letters, books for review, and editorial inquiries should be addressed to Kendrick Frazier, Editor, *SKEPTICAL INQUIRER*, 944 Deer Drive NE, Albuquerque, NM 87122. FAX 505-828-2080. For Guide for Authors, see page 64 in the September / October 2000 issue, or send a fax request to the Editor. It is also available on the Web at <http://www.csicop.org/si/guide-for-authors.html>.

Articles, reports, reviews, and letters published in the *SKEPTICAL INQUIRER* represent the views and work of individual authors. Their publication does not necessarily constitute an endorsement by CSICOP or its members unless so stated.

Copyright ©2001 by the Committee for the Scientific Investigation of Claims of the Paranormal. All rights reserved. The *SKEPTICAL INQUIRER* is available on 16mm microfilm, 35mm microfilm, and 105mm microfiche from University Microfilms International and is indexed in the Reader's Guide to Periodical Literature.

Subscriptions and changes of address should be addressed to: *SKEPTICAL INQUIRER*, Box 703, Amherst, NY 14226-0703. Or call toll-free 1-800-634-1610 (outside U.S. call 716-636-1425). Old address as well as new are necessary for change of subscriber's address, with six weeks advance notice. *SKEPTICAL INQUIRER* subscribers may not speak on behalf of CSICOP or the *SKEPTICAL INQUIRER*.

Postmaster: Send changes of address to *SKEPTICAL INQUIRER*, Box 703, Amherst, NY 14226-0703.

# Skeptical Inquirer

September/October 2001 • VOL. 25, NO. 5

## SPECIAL ISSUE

### SCIENCE AND RELIGION 2001

- 21 **Introduction**  
*Introductory Thoughts*  
KENDRICK FRAZIER

#### ARTICLES

- 24 **Holy Wars**  
*An Astrophysicist Ponders the God Question*  
NEIL deGRASSE TYSON
- 28 **The Dangerous Quest for Cooperation Between Science and Religion**  
JACOB PANDIAN
- 34 **Design Yes, Intelligent No**  
*A Critique of Intelligent Design Theory and Neocreationism*  
MASSIMO PIGLIUCCI
- 40 **A Way of Life for Agnostics?**  
JAMES LOVELOCK
- 43 **Science, Religion, and the Galileo Affair**  
TIMOTHY MOY
- 46 **The God of Falling Bodies**  
*Galileo, Newton, Bentley, and Leibniz Chat on the Internet*  
VICTOR J. STENGER
- 50 **The Relationship Between Paranormal Beliefs and Religious Beliefs**  
GLENN G. SPARKS
- 57 **Science and Religion in an Impersonal Universe**  
MATT YOUNG

#### READINGS IN SCIENCE AND RELIGION

- 61 **Arthur C. Clarke's 'Credo'**  
ARTHUR C. CLARKE
- 64 **A Designer Universe?**  
STEVEN WEINBERG
- 69 **An Evolutionary-Genetic Wager**  
JOHN C. AVISE
- 70 **Previous Articles on Science and Religion in SKEPTICAL INQUIRER**



#### COLUMNS

- EDITOR'S NOTE ..... 4
- NEWS AND COMMENT**  
Mars 'Face' Dwindles in New Spacecraft Images / Facing Facts and Saving Face / Skeptical Commentary Wins Pulitzer Prize / Pediatric Chiropractic Found to be Mostly 'Quackery' in News Investigation / UFO Believers Sighted in Nation's Capital! / India's Monkey Man and the Politics of Mass Hysteria / Aztec UFO 2001 Symposium Short on Skepticism / Paul Kurtz Receives Norton Medal / Evolution Project to Air in 7 Programs on PBS ..... 5
- NOTES OF A FRINGE-WATCHER**  
Multiverses and Blackberries  
MARTIN GARDNER ..... 14
- INVESTIGATIVE FILES**  
Scandals and Follies of the 'Holy Shroud'  
JOE NICKELL ..... 17
- NEW BOOKS** ..... 76
- ARTICLES OF NOTE** ..... 76
- SCIENCE BEST SELLERS** ..... 77
- FORUM**  
Another Skeptical Inquiry  
RALPH ESTLING ..... 79
- LETTERS** ..... 81

#### BOOK REVIEWS

- Why God Won't Go Away*  
By Andrew Newberg  
and Eugene d'Aquili  
ANDREW THOMAS FYFE ..... 71

- A Biologist Looks at Religion*  
By Victor B. Scheffer  
KENDRICK FRAZIER ..... 72

- The Case for Faith: A Journalist Investigates the Toughest Objections to Christianity*  
By Lee Strobel  
BARRY FAGIN ..... 73

- The Triple Helix*  
By Richard Lewontin  
RICHARD EMERY ..... 74



## EDITOR'S NOTE

### *Science and Religion 2001: Controversies and Concerns*

This is a special, expanded issue on "Science and Religion 2001." It follows on the first such special issue two years ago, "Science and Religion: Conflict or Conciliation?" We published that first one, in July/August 1999, with a certain trepidation. Some expected we'd be heavily criticized for devoting so much space to a subject that may seem just barely on the edge of, or even just beyond, science's empirical reach. But the reaction, somewhat to our surprise, was highly positive, and the success of that issue has led to this second one, now in your hands.

It is clear that, among thoughtful people involved in science and in scientific approaches to controversies about pseudoscience, fringe-science, and the paranormal, there is deep interest in the issues of science and religion. My brief introduction on page 21 attempts to establish an appropriate tone for these considerations and provide some preliminary perspective.

Astrophysicist Neil deGrasse Tyson, director of the Hayden Planetarium, leads off the Articles section with "Holy Wars: An Astrophysicist Ponders the God Question." In contrast to some scientists, he argues that there is no common ground between science and religion, and he begins with a simple pragmatic argument: "I have yet to see a successful prediction about the physical world that was inferred or extrapolated from the content of any religious document."

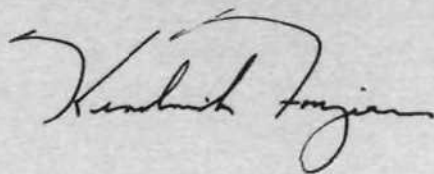
In this year of 2001, we are especially pleased to have Arthur C. Clarke, of 2001 fame, lead off the Readings in Science and Religion section with a forthright statement of his "Credo." This is the essay that I mentioned so favorably in my review of Sir Arthur's lively compilation, *Greetings, Carbon-Based Biped!* (SI, May/June 2000).

That is followed by other distinguished contributors: Nobel laureate physicist Steven Weinberg, in "A Designer Universe?"—his insightful take on the question of whether the universe shows signs of having been designed; and geneticist John C. Avise on an evolutionary-genetic view of Pascal's famous theistic wager about the existence of God.

Back to the Articles section. Anthropology professor Jacob Pandian, in "The Dangerous Quest for Cooperation Between Science and Religion," argues the point of his title and provides historical perspective. Independent scientist/inventor James Lovelock of Gaia fame suggests "A Way of Life for Agnostics." Ecologist and evolutionary biologist Massimo Pigliucci, in "Design Yes, Intelligent No," gives an up-to-date critique of intelligent design theory and neocreationism. In "The God of Falling Bodies" physicist Victor J. Stenger imagines a series of Internet exchanges among Galileo, Newton, Leibniz, and theologian Richard Bentley. Science historian Timothy Moy, in "Science, Religion, and the Galileo Affair," shows that Galileo's trouble with the church was a far more complex matter than the simple conflict of science and religion usually portrayed. Physicist Matt Young considers whether you can apply skeptical empiricism to religious belief and offers his own alternative to theism.

Finally, communications professor Glenn G. Sparks presents new data from a random sample survey that finds no substantial correspondence between paranormal belief and religious belief.

Our authors reflect a variety of viewpoints, but they all strongly respect open-minded inquiry, unfettered curiosity, and the use of logic, evidence, and reason—all marking a clear commitment to science and the scientific attitude. The science/religion controversy can only benefit from that.



## Skeptical Inquirer

THE MAGAZINE FOR SCIENCE AND REASON

### EDITOR

Kendrick Frazier

### EDITORIAL BOARD

James E. Alcock

Barry Beyerstein

Thomas Casten

Martin Gardner

Ray Hyman

Lawrence Jones

Philip J. Klass

Paul Kurtz

Joe Nickell

Lee Nisbet

Amardeo Sarma

Béla Scheiber

Eugenie Scott

### CONSULTING EDITORS

Robert A. Baker

Susan J. Blackmore

John R. Cole

Kenneth L. Feder

C. E. M. Hansel

E. C. Krupp

Scott O. Lilienfeld

David F. Marks

James E. Oberg

Robert Sheaffer

David E. Thomas

Richard Wiseman

### MANAGING EDITOR

Benjamin Radford

### ART DIRECTOR

Lisa A. Hutter

### PRODUCTION

Paul Loynes

Jason Mussachio

### CARTOONIST

Rob Pudim

### WEB PAGE DESIGNER

Patrick Fitzgerald

### PUBLISHER'S REPRESENTATIVE

Barry Karr

### CORPORATE COUNSEL

Brenton N. VerPloeg

### BUSINESS MANAGER

Sandra Lesniak

### FISCAL OFFICER

Paul Paulin

### CHIEF DEVELOPMENT OFFICER

Arthur Urrows

### DEVELOPMENT OFFICER

James Kimberly

### CHIEF DATA OFFICER

Michael Cione

### STAFF

Patricia Beauchamp

Jodi Chapman

Allison Cossitt

Michelle Keiper

Jennifer Miller

Matthew Nisbet

Heidi Sander

Ranjit Sandhu

Anthony Santa Lucia

John Sullivan

Vance Vigrass

### PUBLIC RELATIONS DIRECTOR

Kevin Christopher

### INQUIRY MEDIA PRODUCTIONS

Thomas Flynn

### DIRECTOR OF LIBRARIES

Timothy S. Binga

The SKEPTICAL INQUIRER is the official journal of the Committee for the Scientific Investigation of Claims of the Paranormal, an international organization.



## Mars 'Face' Dwindles in New Spacecraft Images

KENDRICK FRAZIER

The famous (notorious) "Face on Mars" has lost face again.

New images of the "Face"—by far the highest resolution ever—taken by the Mars Global Surveyor Spacecraft show the face for what it really is, says NASA, "a mesa."

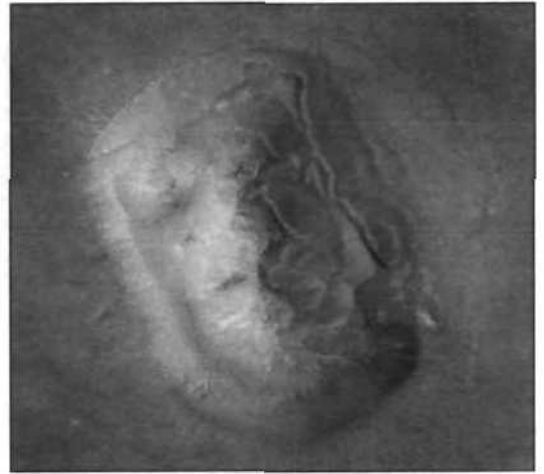
The image was taken on April 8, 2001—a clear cloudless day on the Cydonia region of Mars—and issued by NASA on May 24.

"It's not easy to target Cydonia," said Jim Garvin, chief scientist for NASA's Mars Exploration Program. "In fact, it's hard work. . . . We just don't pass over the Face very often."

Nevertheless Michael Malin and his team in charge of the spacecraft's Mars

Orbiter Camera managed to get the best-ever image of the Face. "We had to roll the spacecraft 25 degrees to center the Face in the field of view," Garvin said. "Malin's team captured an extraordinary photo using the camera's absolute maximum resolution." Each pixel in the 2001 images spans 1.56 meters, compared to 43 meters to pixel for the best photos taken by the Viking orbiter in 1976, the Discovery photos.

Some of the features that had looked a bit like a face are still slightly discernible, but in general the area doesn't look much like a face in the new high-resolution images. NASA says



High-resolution image of the "Face on Mars" taken by Mars Global Surveyor's Mars Orbiter Camera April 8, 2001, and issued by NASA on May 24. Both images courtesy NASA/JPL/Malin Space Science Systems.

the picture actually shows the Martian equivalent of a butte or mesa—landforms common around the American West. "It

### Facing Facts and Saving Face

With each new generation of NASA photographs, the so-called Face on Mars, popularized most prominently by Richard C. Hoagland (see *SKEPTICAL INQUIRER* November/December 2000 and May/June 2001), is becoming less and less recognizable as such. NASA's latest image, obtained on April 8, 2001 (see photo above), had even Art Bell (during his nationwide radio program on the night of May 25) suggesting to Hoagland that it might be time to admit defeat. But Hoagland replied that even if this latest NASA photo "had shown nothing—that [the "Face"] was just a hole—I would not have been fazed in the slightest, because you can't undo the mathematical matrix in which this thing is embedded" (a reference to his "tetrahedral geometry" linking the Face to additional artificial structures within the surrounding landscape).

NASA's new three-dimensional elevation map, based upon laser altimetry data also obtained in April (see photo on page 6), reveals the Martian landform to be absent both the vertical contours of a face/head and the organs (eyes, nose, mouth) that some have imagined to be present. Unlike overhead photographs, altimetry readings are not subject to the illusions created by quirks of light and shadow. (For more about NASA's newest findings, see [http://science.nasa.gov/headlines/y2001/ast24may\\_1.htm](http://science.nasa.gov/headlines/y2001/ast24may_1.htm).)

A curious addendum: During the same Art Bell show, Hoagland and Bell both referred to my May/June *SI* Follow-up column (expanding upon my original article and clarifying a few points) as a "retraction" in which, according to Bell, I had gone "out of [my] way to say [Hoagland] shouldn't be ridiculed." Bell even pretended to read a nonexistent passage in which I allegedly wrote, "The idea, therefore, that Richard C. Hoagland should be ridiculed for stating that the new [i.e., 1998 light-reversed] Face on Mars photo shows an eastern-side lion head, is ridiculous." And Hoagland played along: "The most amazing thing is Gary Posner's reaction. I mean, the *SKEPTICAL INQUIRER* can never be considered a prejudiced source in favor of our model, right? For him to say that I shouldn't be ridiculed for proposing this, I believe, and the reason they did the retraction, is they had an inside track from the political side—not the NASA side, but the political side—that there *is* a Face on Mars, it *does* have dual [humanoid-lion] imagery, and we're going to go there [with a manned mission] and find out what it means."

—Gary P. Posner

*Gary Posner is founder of the Tampa Bay Skeptics.*



3-D perspective view of the Face on Mars landform produced from the April 8, 2001, Mars Orbital Camera image and all the available laser altimeter elevation measurements by Mars Global Surveyor's MOLA laser altimeter.

reminds me most of Middle Butte in the Snake River Plain of Idaho," Garvin said.

The Mars Global Surveyor science team also has used a laser altimeter, called MOLA, aboard the spacecraft to take hundreds of altitude measurements of the mesa-like features around Cydonia, including the Face. It is similar to other mesas, said Garvin. "It's not exotic in any way."

The laser altimetry data are probably even more compelling than the optical images in showing the Face is natural,

NASA says. "3-D elevation maps reveal the formation from any angle, unaltered by lights and shadow. There are no eyes, no nose, and no mouth."

The latest MGS images are so detailed that Garvin, an avid climber, has detailed a route he would take in climbing up the 800-foot formation. NASA even issued his prospective trail map.

*Kendrick Frazier is editor of the SKEPTICAL INQUIRER.*

## Skeptical Commentary Wins Pulitzer Prize

The Pulitzer Prize board awarded the 2001 Pulitzer Prize for Distinguished Commentary to Dorothy Rabinowitz of the *Wall Street Journal* "for her articles on American society and culture." Notable among the ten articles cited by the board were five articles challenging questionable allegations of sexual abuse. (Four of the cited articles commented on the 2000 U.S. presidential election and the remaining article discussed Rudolph Giuliani's recommending a pardon for Michael Milken.) A jury of seven journalists nominated Rabinowitz among four finalists, from which the Pulitzer Prize board chose her as the winner.

Rabinowitz has long used her *Wall Street Journal* editorial page column to criticize dubious sex-abuse prosecutions and champion the falsely accused. She was previously nominated for a Pulitzer in

1996 for Distinguished Commentary "for her columns effectively challenging key cases of alleged child abuse." For "her journalistic achievements and . . . her writing on false sexual abuse charges" the National Association of Criminal Defense Lawyers awarded her its 1997 Champion of Justice Award. Rabinowitz was also nominated for the Pulitzer Prize in Criticism in 1995 and 1998 for her television critiques, and in 1993 the American Society of Newspaper Editors awarded her a Distinguished Writing Award for Commentary.

Of the five skeptical columns cited by the Pulitzer board, two dealt exclusively with the Fells Acres day-care prosecution of Malden, Massachusetts, for which Gerald Amirault was imprisoned. Amirault remains imprisoned at press time, though clemency has been recommended. One dealt with the difficult aftermath of those who have been released after long struggles to prove their innocence in the dubious

prosecutions of alleged sex-rings that occurred in places such as Wenatchee, Washington, and Dade County, Florida. The freedom of Violet Amirault (Gerald's mother) was short-lived, but others had to find jobs and deal with residual legal problems on long-depleted finances. Grant Snowden required an attorney to get his name removed from a list of sex offenders. Carol and Mark Doggett fought to have their children returned. Cheryl Amirault (Gerald's sister) made a deal with prosecutors for her release, and so must endure the indignities of probation while forbidden to speak with television reporters. They all must face the fact that no one will be held accountable for their prosecutions, or for tenaciously fighting against their releases (even when the technique used to build the cases against them—the leading and often coercive questioning of children—was discredited).

Another column cited by the Pulitzer board details the case of New York City doctor Patrick Griffin. A patient accused him of oral sodomy after he refused to testify in a lawsuit filed against the patient's landlord that her medical condition was caused by her landlord's wrongdoing. The last cited column tells the story of David Schaer, and the lack of due process he received from Brandeis University when he was accused of sexual misconduct.

Rabinowitz is the author of *New Lives: Survivors of the Holocaust Living in America* and co-author, with Yedida Nielsen, of *Home Life: A Story of Old Age*. Her prize-winning work can be read at the Pulitzer Web site: [www.pulitzer.org/year/2001/commentary](http://www.pulitzer.org/year/2001/commentary), and her continuing work can be read at: [www.opinionjournal.com/medialog](http://www.opinionjournal.com/medialog) and on the editorial and television pages of the *Wall Street Journal*.

—Douglas E. Hill

*Douglas E. Hill, e-mail at [dehill@uci.edu](mailto:dehill@uci.edu), is a graduate student in logic and philosophy of science, University of California, Irvine, and president of Students for Science and Skepticism at UC Irvine, <http://spirit.dos.uci.edu/ss>.*



## Pediatric Chiropractic Found to be Mostly 'Quackery' in News Investigation

Judy Matthews is an active eleven-year-old girl who plays baseball and soccer. She is apparently happy and healthy. At least her mother thought so, until she took her daughter to a chiropractor in the Toronto area.

Then she discovered Judy suffered from osteoarthritis, mild scoliosis (curvature of the spine), pronounced asymmetry, and multiple subluxations that could lead to serious health problems. The cost of chiropractic therapy to deal with these problems, she was told, would be approximately \$5,000.

However, Judy's mother did not panic and pull out her checkbook. In fact, she was not alarmed at all, unlike most parents upon hearing such news. For she had taken her daughter to five chiropractors as part of an undercover investigation. Judy Matthews (a pseudonym to protect the youngster's identity) was further examined by Dr. John Wedge, chief of surgery for Toronto's famed Hospital for Sick Children, and found to be a "perfectly healthy girl" who needed no immediate or ongoing treatment. Yet four out of five chiropractors in the Toronto area had found "serious" problems with Judy's spine—specifically subluxations that needed chiropractic treatment.

Judy's experience with chiropractors was part of the research undertaken by a team of journalists, headed by veteran reporters Paul Benedetti and Wayne MacPhail, to investigate pediatric chiropractic. Their investigation, which concluded that most chiropractic treatment of infants and children is "quackery," was reported in a week-long series in Canada's Sun Media newspapers and on the Canoe.ca news Web site in March.

Among their findings were that as

many as half the chiropractors in Canada may be using illegal tools for diagnosis; chiropractors often employ scare tactics on parents of young children to build their practices; and more than 70 percent of Toronto-area chiropractors contacted in a random phone survey claim to be able to treat ear infections with chiropractic adjustments. Some chiropractors were found to claim they could treat attention-deficit disorder, hyperactivity, asthma, learning disabilities, and even autism.

More damning, the journalists could find no evidence that subluxations even exist or that the treatments cured the problems said to be caused by subluxations.

The cost to Canadian taxpayers through medical insurance plans and user fees for pediatric chiropractic was estimated at \$40 million (Canadian) a year (much of which is covered by government-funded medicare in Canada).

Not all chiropractors were found wanting. The articles noted that not all chiropractors treat infants and children and that some restrict their practices to musculoskeletal problems.

In recognition of their work, Benedetti and MacPhail received on March 28 the Ontario Skeptics' first Award for Critical Media Reporting, "exemplifying the skeptical ideals of open-minded investigation, critical thinking, and alerting the public to the dangers of pseudoscience."

The Ontario Skeptics also wrote the Ontario minister of health and other government officials to demand an investigation of pediatric chiropractic and to "put an end to the tragic waste of taxpayers' dollars which are urgently needed for established treatments for actual medical conditions." The government has not responded.

The investigative series can be found online at [www.canoe.ca/PedChiro/home.html](http://www.canoe.ca/PedChiro/home.html).

—Eric McMillan

*Eric McMillan is chair of the Ontario Skeptics.*

## UFO Believers Sighted in Nation's Capital!

A group of people who believe in UFOs held a news conference in Washington May 9 that established beyond the shadow of a doubt—that reached levels of credibility so high as to constitute actual proof—that there really do exist people who believe in UFOs.

*This was the big day for the Disclosure Project*, an attempt to incite the government to admit that unidentified flying objects are piloted by creatures from another world. The organizer, Steven Greer, a Charlottesville emergency room physician, announced that this was a moment of historic, indeed planetary, significance: "This is the end of the childhood of the human race. It is time for us to become mature adults among the cosmic civilizations that are out there."

He arranged an impressive venue, the main ballroom of the National Press Club. Upward of a hundred people were there, along with more than a dozen TV cameras. At a long table up front sat twenty witnesses, most of them gray-haired men who'd served in the military.

As they took turns at the microphone, it quickly became apparent that this was a rather old-fashioned event—a return to the fundamentals of *UFOlogy*, the discussion of aerial anomalies. At one point a witness flashed two black-and-white photos of a saucer-shaped craft. The tales were set, for the most part, in the 1940s through the 1960s; there was no talk of alien abductions, or an alien-human hybridization program, or the implantation of alien fetuses, or any of those extremely intimate close encounters that have dominated the *UFO mythology in recent years*.

These guys were from the hardware wing of the movement. They'd seen things in the sky they couldn't explain and that suggested, to their minds, extraterrestrial visitors. They'd seen objects. Lights. Radar blips moving at extraordinary speed. What they didn't see, in almost every case, were any actual aliens.

Only one witness, Clifford Stone, a retired Army sergeant, told of having directly seen aliens. He'd seen them both dead and alive at the scenes of crashed saucers. Asked if he could describe their appearance, he said, "I could, but it would probably take a whole lot of time." He did stipulate that there are fifty-seven alien species, including three types of "grays." Many aliens are humanoid, and, indeed, are indistinguishable from members of our own species. Some can touch an object in a dark room and tell its color.

There were a few other unverified bombshells. One speaker claimed that George Bush the elder, when director of the Central Intelligence Agency, refused to give newly inaugurated President Carter the top-secret files on UFOs. Greer, meanwhile, assured the audience that the military has already developed spacecraft that can travel faster than the speed of light.

The Disclosure Project is part of a long—and so far unsuccessful—effort to incite congressional hearings on the UFO issue. Greer says he has conducted interviews with 400 people with intimate knowledge of the alien phenomenon and the government "coverup." Many, he claimed, are afraid to come forward without congressional immunity. "We know lethal force has been used to keep this secret," he said.

There was nothing presented at the news conference that could be considered forensic evidence. Instead, the audience heard what is known as the Argument from Authority. The evidence on the table was essentially in the form of résumés. The witnesses vouched for their credibility and said they'd like to tell their stories to Congress. Maybe that's not as impressive as someone coming forward with an actual alien tentacle, but you have to start somewhere.

If nothing else, this was an interesting glimpse of the corrosive side effects of government secrecy. The witnesses have been burdened by suspicion for decades. Some said they were told by superiors to stay silent about what they'd seen.

"Such things do exist. Please believe me," said retired Air Force Lt. Col. Charles L. Brown, who once analyzed UFO sightings and saw, just two years ago, "two inexplicable objects."

Graham Bethune, a retired Navy pilot, told of seeing a glow near Iceland that turned into a circle of lights with a dome. This was 1951. He's ready to testify under oath.

Robert Salas, a retired Air Force captain, said a "bright, glowing red object" hovered outside the gate of a nuclear weapons site in Montana in 1967. The weapons suddenly went into a "no go" condition. Did the aliens disable them?

The UFO narrative has innumerable subplots, some of which emerged yesterday. There are people who believe that the Bush administration wants to build a missile defense shield as part of its covert war with the aliens. There is a rumor that the oil industry wants to suppress knowledge of a secret, stunning energy source that can be harvested from the quantum soup all around us. If we know the truth about the aliens, our energy crisis will be solved. "It will cause such vast and profound changes on this planet that there is nothing to equal it in human history," Greer said.

Who's running this cover-up? Greer said that's a complex matter. He said there are compartmentalized elements of a secret government operation in multiple intelligence and defense agencies and throughout corporate America.

The bad guys are everywhere.

We live in a world of lies.

(Are you sure the Apollo astronauts really went to the moon, and not just to a Hollywood back lot?)

Scientists who work on "exobiology" endure the stigma of being experts in a field with no known subject matter. They'd be thrilled beyond words to find a tiny fragment of alien life. They'd like to know if extraterrestrial life is carbon-based, if it uses oxygen in its metabolism, if it stores genetic information in the form of the DNA molecule. They'd like to know the evolutionary history of an alien biosphere, so they could com-

pare it to the history of life on Earth. Now we hear that all the scientists need to do is start poking around in government freezers.

When the news conference was over, rational observers were faced with two scenarios:

- Intelligent creatures have piloted spaceships across trillions of miles to visit our planet. They have the ability to elude detection by scientific investigators and mainstream news organizations, but have also been seen by thousands of people.

Secret forces within our government have masterfully covered up the alien presence for half a century, although sometimes the cover-up is imperfect, which is why, at Safeway, you can buy Chef Boy-ar-dee Flying Saucers and Aliens canned pasta.

People like Steven Greer, the crusading emergency room physician, have seen through the lies and are going to help us enter the era of cosmic brotherhood.

- Some people believe in things that aren't true.

Your call.

Note: To get the story of the news conference directly from the organizers, go to [www.disclosureproject.org](http://www.disclosureproject.org). For a scientific approach to the question of extraterrestrial intelligence, try [www.seti.org](http://www.seti.org).

—Joel Achenbach

Joel Achenbach is a staff writer for the Washington Post, where this column originally appeared. He is also author of a skeptical book on the topic, *Captured by Aliens*, reviewed by David Morrison in the March/April 2000 *SKEPTICAL INQUIRER*.

© 2001 The Washington Post Company.  
Reprinted by permission.

## India's Monkey Man and the Politics of Mass Hysteria

A mysterious creature dubbed the Monkey Man allegedly attacked people in the Indian capital of New Delhi during May 2001—this intruder apparently



a combination of Superman and Batman as it is reported to have extraordinary physical agility (like flying from one rooftop to another) and prefers darkness to light. Its ambushes were most noticeable in and around the congested colonies of lower middle class people in East Delhi, where panic spread like wildfire. Innocent people were either harassed or arrested and newsmen were beaten up. People even organized night patrols and began to invoke Hanuman or Bajrangbali—the Hindu Monkey God of Prowess—to save them from the Monkey Man!

Several handsome rewards were offered for information leading to the arrest of the Monkey Man. The All India Sadbhavana Sangathan (AISS) had offered around \$760; the police offered a similar amount. The AISS—which aims to promote peace and harmony—said the public has a civic obligation to help apprehend this mysterious half-man-half-animal.

Routine police operations had ground to a standstill since the beginning of this baseless panic as there were hundreds of crank calls, false alarms, and incidents of simple mischief. An inebriated person called the local police station, claiming that the Monkey Man had stolen his mobile telephone! Other people faked injuries to attract media coverage, while even educated and supposedly responsible professionals like doctors and lawyers had joined in the charade. The police, at an early stage in their investigation, had even concluded that these creatures of the night were actually remote-controlled robots being maneuvered by Pakistan's Inter-Services Intelligence!

Delhi police, moreover, were confident after a while that they were close to solving the Monkey Man mystery. They said they had narrowed down their area of investigation and were confident of making early arrests. They also claimed that the attacks were being made not by a mysterious animal but by human miscreants dressed in crash helmets, leather jackets, and dark glasses.

The Monkey Man was blamed for hundreds of attacks. The city's Joint Commissioner of Police, Suresh Roy, told the media, "We have already narrowed down our suspicion on the people involved in the mischief. We should be able to end this soon." However, reports of Monkey Man attacks in New Delhi became less frequent after a few weeks of mass hysteria, although hoax telephone calls continued almost unabated. New Delhi's Joint Police Commissioner said that the situation was inching back to normal, and his force would keep strict vigil over any rumor-mongering detrimental to public interest.

Tales of violent nocturnal attacks had spread through a city known for its affinity for urbane culture and information technology when this official stricture was finally announced, and many people claimed to have been injured by this nightmarish intruder. Officials later conceded that the problem was entirely concocted by mischief makers fueling mass hysteria. Forensic officers had been investigating alleged incidents, along with volunteers and counselors, explaining to the panic-stricken people that the Monkey Man was not real.

The number of attacks attributed to the Monkey Man began to decrease as a result. Several arrests were made for making bogus claims about the attacks though others still claimed that they had been terrorized. Residents of Delhi had even claimed that the Monkey Man had killed two persons and injured scores of others.

Police brought in medical experts to examine the injuries allegedly caused by the Monkey Man. Joint Police Commissioner Roy said on-the-spot examinations would help people "overcome the delusion." In many cases wounds supposed to have been recently sustained were actually two to three days old!

Academics and counselors were also involved in police efforts to fight the widespread panic. Reports of Monkey Man attacks declined after New Delhi police arrested a dozen people for

spreading rumors. The police said they received more than 260 hoax calls since this bizarre incident had begun first in nearby Ghaziabad and then in New Delhi. Those caught in the act of spreading rumors were threatened with heavy fines and six months of imprisonment.

India's Monkey Man syndrome clearly demonstrates the palpable dangers of mass hysteria, how people tend to believe whatever they are made to believe or, even worse, what they would actually prefer to believe. This is dangerous mob mentality and cannot be allowed to spread by rational and responsible individuals. India has also witnessed similar incidents in the recent past—an identical intruder called the Stoneman had allegedly killed street people many years ago in Calcutta. This was later exposed in the press as a cover-up operation by none other than a certain section of the police force! We have to constantly remind ourselves of the virtues of citizens' vigil and conscious community policing underpinned by an enlightened sense of collective responsibility and well-being.

—Prasenjit Maiti

*Prasenjit Maiti is in the Department of Political Science, Burdwan University, India.*

## Aztec UFO 2001 Symposium Short on Skepticism

The fourth annual Aztec UFO Symposium, UFO 2001, was held March 22–23 in Aztec, New Mexico. I was one of the invited speakers, along with UFO enthusiasts Stanton Friedman, Peter Gersten, Ted Loman, Dennis Balthazar, and Peter Davenport. Most of the presenters discussed aspects of UFOlogy quite unrelated to the alleged 1948 crash of an alien saucer (said to be exactly 99.99 feet in diameter, and including sixteen alien bodies) near Aztec. For example, Friedman

HOLLYWOOD

The Bunk  
STOPS  
Here

4733 Hollywood Boulevard  
HOLLYWOOD, CALIFORNIA



It's the *Ultimate*  
**Rallying Point**

Now it depends on **you.**



**CENTER FOR INQUIRY**  
*West* and the Center for Inquiry  
National Media Center



## THE PROJECT IS LAUNCHED.

No longer a dream, reality has begun for our permanent Center for Inquiry – West. After a five-year search we have purchased a building at 4773 Hollywood Boulevard, in the heart of Hollywood. This ultimate Rallying Point for skeptics will house CFI-West's regional programs as well as Center for Inquiry's™ new national Media Center. This development has enormous importance for supporters of critical thinking everywhere, especially readers of *Skeptical Inquirer*.

And now it's up to our readers and friends. Only you can help us fulfill this bold potential. Purchasing the building took \$1.6 million, which we must pay back over three years. Renovation will require another \$500,000 – creating a 99-seat auditorium, library, exhibit area, media production center, and offices. We're even looking into solar panels so we can generate our own electricity! An additional \$495,000 will equip the Media Center and fund its first three years of operation. Finally we must add millions more to endowment, so the new Center will always be fiscally stable.

All told, we need **\$5.85 million**, of which less than \$2 million has already been raised. It's the greatest challenge skeptics and secular humanists have faced since our community gave more than \$5 million to build and endow the Center for Inquiry – International in Amherst, N.Y., from 1991–1995.

## MAJOR GIVING OPPORTUNITIES STILL AVAILABLE!

A major goal demands major gifts. While gifts in any amount are welcome, we urgently need five-, six-, and even seven-figure gifts **now**, early in the campaign, when they can do the most to slash interest costs and spur additional contributions. Fortunately, larger gifts can be made as **pledges** payable over three years. Attractive opportunities exist to name various parts of the new building for oneself or a loved one:

MEMORIAL ITEM:	COMMITMENT:	MONTHLY*:
Name CFI-W: your choice	\$1,000,000	\$27,778
Entrance Hall Atrium	500,000	13,889
Meeting Room	275,000 [Already taken!]	
Bookstore	150,000	4,167
Display Area	150,000	4,167
Library	75,000 [Already taken!]	
Reception area and lobby	100,000	2,778
Café	50,000	1,389
Stage	50,000	1,389
Reading room	25,000 [Already taken!]	

Each donor is guaranteed two identical plaques: one for the donor's home or workplace and the other for permanent display at CFI-West.

\*Pledge payments are billed quarterly in the interest of economy.

The new CFI-West and its National Media Center will make skepticism and critical thinking more central than ever to national and worldwide debates. **Make your commitment today!** Send your most generous gift to the address below. For more information, especially for confidential assistance in structuring a major gift, return the postcard in this magazine or contact us directly.

All gifts to the Center for Inquiry™ are tax-deductible as provided by law. Free brochure available. **Southern California residents and visitors: Building tours available. Call 805-969-4828.**

### CENTER FOR INQUIRY – WEST

Regional Headquarters and National Media Center

A joint project of the Center for Inquiry™,

the Committee for the Scientific Investigation of Claims of the Paranormal, and the Council for Secular Humanism, each a 501(c)(3) tax-exempt educational corporation

P.O. Box 741 • Amherst NY 14226-0741 • (716)636-4869 ext. 311 • FAX 716-636-1733

spent most of his time on his favorite case, the Roswell Incident, while Peter Davenport talked mostly about the "Phoenix Lights" sightings of 1997, and the bright meteor photographed by Sandia National Laboratories in 1999.

I have spoken at the Aztec UFO symposia on two previous occasions (see "The Aztec UFO Symposium: How the Saucer Story Started As a Con Game," David E. Thomas, *SKEPTICAL INQUIRER* 22[5]:12-13). For the 2001 meeting, I presented the audience with new details that have turned up, such as an image from the October 14, 1952, *Denver Post* that blared the headline "Saucer Scientist in \$50,000 Fraud," and showed the con man responsible for the "UFO," Silas Newton, talking with the author of the Aztec UFO book, Frank Scully. I also discussed the Roswell case, and how it was most likely a misidentified balloon experiment launched from Alamogordo.

UFO author/speaker Stanton Friedman gave his standard spiel, "Flying Saucers are Real." He is certainly an effective salesman for Roswell. Friedman is extremely good at all the psychological tricks of the trade useful for making one's arguments seem logical and compelling. Part of Friedman's pitch is to criticize the skeptics for the four tricks he claims they always employ to cast doubt on UFOs:

1. What the public doesn't know, we are not going to tell them.

2. Don't bother us with the facts, our minds are made up.

3. If we can't attack the data, we will attack the people; it is much easier.

4. Do one's research by proclamation, rather than investigation. It is much easier and most people won't know the difference.

It's ironic that Friedman's list applies very well to most UFO promoters, including Friedman himself. For example, regarding the third point, he accused skeptics (whom he labeled "noisy negativists") of trying to discredit people (witnesses) instead of tackling the data, yet in almost the same breath, dismissed skeptic Phil Klass as a "nattering nabob

of negativism," borrowing the old line from Spiro Agnew. Likewise, when I mentioned the testimony of weather officer Irving Newton during my talk, Friedman dismissed this by loudly snickering "Newton lied." (Newton testified that Major Marcel, the central figure of Roswell, tried to convince him that the crumpled radar target fragments shown in the famous photographs with General Ramey really did have alien writing, thus demonstrating that the radar target debris in the photographs was indeed *the* Roswell "debris," and not just material brought in by the Air Force to cover up the "real UFO.")

I told the people of Aztec that their UFO was just a con game, but I also assured them that they had no reason to be jealous of Roswell's UFO, which was simply a physics experiment launched by New York University researchers (see "The Roswell Incident and Project Mogul," David E. Thomas, *SKEPTICAL INQUIRER* 19[4]:15-18). In my talk, I mentioned the interview that rancher Mac Brazel gave to the Roswell paper published on July 9, 1947. It is here that Brazel said he first found the "debris" stuff on June 14, 1947. After the symposium, Friedman and others told me I needed to do my homework, and that "everybody" knows that that Brazel article was written after the government "re-programmed" him, and therefore cannot be trusted. (Except that part where Brazel says "It was not a weather balloon" *can* be trusted?) No, I was wrong to cite that real news story, Friedman said, and instead should rely on second- and third-hand reports that place Brazel's discovery of the debris weeks after June 14, 1947.

UFO investigator Karl Pflock (who doesn't think Roswell was anything other than a Mogul balloon train) told me later that Brazel wasn't held incommunicado by the army, but rather by an over-eager radio station manager, Walt Whitmore, who had Brazel stay overnight at his house so as to obtain the exclusive interview for his radio station. The "detention" by Whitmore evolved

into a lengthy military "reprogramming" as the Roswell mythology developed and solidified.

When Friedman was interviewed two years ago for Albuquerque television station KOAT-TV Channel 7, he stated quite firmly that there was no UFO recovered at Aztec in 1948. However, at this year's symposium, Friedman changed his tune, declaring that he wasn't sure about the Aztec UFO, that there wasn't enough information, and that he wouldn't be surprised if there *was* a crash there; he thought the possibility more likely than not.

Likewise, other presenters chose to ignore the evidence I presented supporting the con-game explanation in favor of the 99.99-foot saucer story. Reporter Debra Mayeux of *The Farmington Daily Times* wrote in the March 25, 2001, edition that "[Dave] Thomas's argument against the Aztec crash is a dozen newspaper articles documenting a connection between Scully and Denver oil promoter Silas Newton, who was charged with fraud in the 1950s for trying to sell pieces of a flying saucer. Newton had spun the tale that three saucers had crashed in 1948, and one of those was the Aztec saucer, Thomas said. However, those who believe in UFOs say that Thomas's evidence is nothing. Top secret military documents received through the Freedom of Information Act prove that the Aztec UFO must have been the real thing, they point out. One of these men is Ted Loman, the host of an Arizona television show on UFOs. Loman, who did some investigating of his own, said that Scully's story pans out. The crash was caused by radar, and Loman has documents that prove microwave radar stations existed in this area in 1948. . . ."

Move over, Roswell. It looks like your kid brother, Aztec, is here to stay.

—David E. Thomas

*Dave Thomas is a physicist, president of New Mexicans for Science and Reason, SKEPTICAL INQUIRER consulting editor, and a newly elected CSICOP Fellow.*



## Paul Kurtz Receives Norton Medal, University's Highest Award



Paul Kurtz

CSICOP founding chairman Paul Kurtz, professor emeritus of philosophy at the State University of New York at Buffalo, received the university's highest award—the Chancellor Charles P. Norton Medal—May 13.

University President William Greiner and University Council Chairman Jeremy Jacobs presented the medal to Kurtz as part of the University at Buffalo's 155th commencement ceremonies.

Kurtz is the founder and chairman of both the Council for Secular Humanism and the Committee for the Scientific Investigation of Claims of the Paranormal. The citation recognizes Kurtz as "a world-renowned philosopher" and "an authority in the fields of secular humanism and rational inquiry."

In 1969, he founded Prometheus Books, one of the world's foremost publishers in such areas as philosophy, science, and critical thinking. A fellow of the American Association for the Advancement of Science, he is the author or editor of more than thirty

books, sixty book chapters, and 650 articles or reviews. Among his most influential writings is his book *The Transcendental Temptation* (Prometheus 1986), a seminal work on the subject of secular humanism. Kurtz's observations on the paranormal—translated into many languages—have generated lively debates, and he is a highly sought guest lecturer in the United States and abroad.

The Norton Medal is presented annually in recognition of a person who, in Norton's words, "performed some great thing which is identified with Buffalo . . . a great civic or political act, a great book, a great work of art, a great scientific achievement, or any other thing which, in itself is truly great or ennobling, and which dignifies the performer and Buffalo in the eyes of the world."

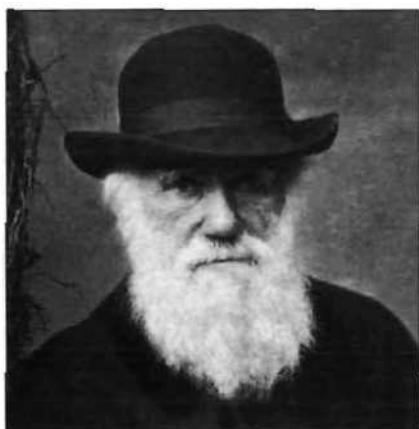
Kurtz received his Ph.D. from Columbia University in 1952. In addition to writing *The Transcendental Temptation*, Kurtz is the author or editor of *Skepticism & Humanism: The New Paradigm* (Transaction, 2001), *Skeptical Odysseys* (2001), *Embracing the Power of Humanism* (Rowman & Littlefield, 2000), *Humanist Manifesto 2000* (1999), *The Courage to Become* (Praeger/Greenwood 1997), *Toward a New Enlightenment: The Philosophy of Paul Kurtz* (Transaction 1994), *The New Skepticism* (Prometheus 1992), *The Transcendental Temptation* (Prometheus 1986), and *Philosophical Essays in Pragmatic Naturalism* (Prometheus 1991).

Kurtz makes frequent appearances on national TV and radio programs, including *Larry King Live*, *MSNBC Investigates*, *Nightline*, *Nightwatch*, *CBS World of Religion*, National Public Radio, ABC News, CBS News, NBC News, CNN News, BBC Radio, Associated Press Radio, and *All Things Considered*.

—Kevin Christopher

Kevin Christopher is Public Relations Director for CSICOP.

## Evolution Project to Air in 7 Programs on PBS



Charles Darwin kept his theory of evolution a secret for twenty-one years. © 2001 WGBH Educational Foundation and Clear Blue Sky Productions, Inc.

The Evolution Project, a multimedia initiative, kicks off with an eight-hour television series that will air on PBS September 24–27 (check local listings). Produced by WGBH Boston and Clear Blue Sky Productions, the program will explore this simple yet remarkable theory that ranks as one of the greatest breakthroughs in the annals of science.

In addition to the broadcast series, The Evolution Project offers a wide range of multimedia resources for high school biology teachers and students. Visit the preview Web site at [www.pbs.org/evolution](http://www.pbs.org/evolution) for more information and to order a free teacher's guide (available in September).

The seven different broadcasts in the series are: Program 1: Darwin's Dangerous Idea (two hour premiere); Program 2: Great Transformations; Program 3: Extinction!; Program 4: The Evolutionary Arms Race; Program 5: Why Sex?; Program 6: The Mind's Big Bang; and Program 7: What About God?

The entire seven-part, eight-hour television series as well as single videos and a special curriculum kit for educators will be available from WGBH Boston Video. To place an order, for more information, or to request a free catalogue, call WGBH Boston Video at 1-800-949-8670. □



# Multiverses and Blackberries

There be nothing so absurd but that some philosopher [or cosmologist? —M.G.] has said it.

—Cicero

The American philosopher Charles Sanders Peirce somewhere remarked that unfortunately universes are not as plentiful as blackberries. One of the most astonishing of recent trends in science is that many top physicists and cosmologists now defend the wild notion that not only are universes as common as blackberries, but even *more* common. Indeed, there may be an infinity of them!

It all began seriously with an approach to quantum mechanics (QM) called "The Many Worlds Interpretation" (MWI). In this view, widely defended by such eminent physicists as Murray Gell-Mann, Stephen Hawking, and Steven Weinberg, at every instant when a quantum measurement is made that has more than one possible outcome, the number specified by what is called the Schrödinger equation, the universe splits into two or more universes, each corresponding to a possible

future. Everything that *can* happen at each juncture happens. Time is no longer linear. It is a rapidly branching tree. Obviously the number of separate universes increases at a prodigious rate.

If all these countless billions of parallel universes are taken as no more than abstract mathematical entities—worlds that could have formed but didn't—then the only "real" world is the one we are in. In this interpretation of the MWI the theory becomes little more than a new and whimsical language for talking about QM. It has the same mathematical formalism, makes the same predictions. This is how Hawking and many others who favor the MWI interpret it. They prefer it because they believe it is a language that simplifies QM talk, and also sidesteps many of its paradoxes.

There is, however, a more bizarre way to interpret the MWI. Those holding what I call the realist view actually believe that the endlessly sprouting new universes are "out there," in some sort of vast super-space-time, just as "real" as the universe we know! Of course at every instant a split occurs each of us becomes one or more close duplicates, each traveling a new universe. We have no awareness of this happening because the many universes are not causally connected. We simply travel along the endless branches of time's monstrous tree in a series of universes, never aware that billions upon billions of our replicas are springing into existence somewhere out

there. "When you come to a fork in the road," Yogi Berra once said, "take it."

It is true that the MWI, in this realist form, avoids some of the paradoxes of QM. The so-called "measurement problem," for example, is no longer a problem because whenever a measurement occurs, there is no "collapse of the wave function" (or rotation of the state vector in a different terminology). All possible outcomes take place. Schrödinger's notorious cat is never in a mixed state of alive and dead. It lives in one universe, dies in another. But what a fantastic price is paid for these seeming simplicities! It is hard to imagine a more radical violation of Occam's razor, the law of parsimony which urges scientists to keep entities to a minimum.

The MWI was first put forth by Hugh Everett III in a Princeton doctoral thesis written for John Wheeler in 1956. It was soon taken up and elaborated by Bryce DeWitt. For several years John Wheeler defended his student's theory, but finally decided it was "on the wrong track," no more than a bizarre language for QM and one that carried "too much metaphysical baggage." However, recent polls show that about half of all QM experts now favor the theory, though it is seldom clear whether they think the other worlds are physically real or just abstractions such as numbers and triangles. Apparently both Everett and DeWitt took the realist approach. Roger Penrose is among many famous

---

*Martin Gardner's latest book, Martin Gardner's Favorite Poetic Parodies, is to be published in October by Prometheus. The most recent collection of his SKEPTICAL INQUIRER columns (and other material) is Did Adam and Even Have Navels? (W.W. Norton, 2000).*

physicists who find the MWI appalling. The late Irish physicist John S. Bell called the MWI "grotesque" and just plain "silly." Most working physicists simply ignore the theory as nonsense.

In an article on "Quantum Mechanics and Reality" (in *Physics Today*, September 1970), DeWitt wrote with vast understatement about his first reaction to Everett's thesis: "I still recall vividly the shock I experienced on first encountering the multiverse concept. The idea of  $10^{100}$  slightly imperfect copies of oneself all constantly splitting into further copies, which ultimately become unrecognizable, is not easy to reconcile with common sense. This is schizophrenia with a vengeance!"

In the MWI, most of its defenders agree, there is no room for free will. The multiverse, the universe of all universes, develops strictly along deterministic lines, always obeying the deterministically evolving Schrödinger equation. This equation is a monstrous wave function which never collapses unless it is observed and collapsed by an intelligence outside the multiverse, namely God.

In recent years David Deutsch, a quantum physicist at Oxford University, has become the top booster of the MWI in its realist form. He believes that quantum computers, using atoms or photons and operating in parallel with computers in nearby parallel worlds, can be trillions of times faster than today's computers. He is convinced that many famous QM paradoxes, such as the double slit experiment and a similar one involving two half-silvered mirrors, are best explained by assuming an interaction with twin particles in a parallel world almost identical with our own. For example, in the double slit experiment, when both slits are open, our particle goes through one slit while its twin from the other world goes through the other slit to produce the interference pattern on the screen.

Deutsch calls our particle the "tangible" one, and the particle coming from the other world a "shadow" particle. Of course in the adjacent universe our particle is the shadow of their tangible particle. Because communication between

universes is impossible, it is hard to imagine why a particle would bother to jump from one universe to another just to produce interference.

Deutsch believes that the results of calculating simultaneously in parallel worlds can somehow be brought back here to coalesce. Critics argue that QM paradoxes, as well as quantum computers, are



David Lewis



David Deutsch

just as easily explained by conventional theory or by such rivals as the pilot wave theory of David Bohm. In any case, Deutsch's 1997 book *The Fabric of Reality: The Science of Parallel Universes—and Its Implications* is the most vigorous defense yet of a realistic MWI.

Deutsch is fully aware that the MWI forces him to accept the reality of endless copies of himself out there in the infinity of other worlds. "I may feel

subjectively," he writes (p. 53), "that I am distinguished among the copies as the 'tangible' one, because I can directly perceive myself and not the others, but I must come to terms with the fact that all the others feel the same about themselves. Many of those Davids are at this moment writing these very words. Some are putting it better. Others have gone for a cup of tea." And he is puzzled by the fact that so few physicists are as enthralled as he about the MWI!

Theoretical and experimental work on quantum computers is now a complex, controversial, rapidly growing field with Deutsch as its pioneer and leading theoretician. You can keep up with this research by clicking on Oxford's Centre for Quantum Computation's Web site [www.Qubic.org](http://www.Qubic.org).

The MWI should not be confused with a more recent concept of a multiverse proposed by Andrei Linde, a Russian physicist now at Stanford University, as well as by a few other cosmologists such as England's Martin Rees. This multiverse is essentially a response to the anthropic argument that there must be a Creator because our universe has so many basic physical constants so finely tuned that, if any one deviated by a tiny fraction, stars and planets could not form—let alone life appear on a planet. The implication is that such fine tuning implies an intelligent tuner.

Linde's multiverse goes like this. Every now and then, whatever that means, a quantum fluctuation precipitates a Big Bang. A universe with its own space-time springs into existence with randomly selected values for its constants. In most of these universes those values will not permit the formation of stars and life. They simply drift aimlessly down their rivers of time. However, in a very small set of universes the constants will be just right to allow creatures like you and me to evolve. We are here not because of any overhead intelligent planning but simply because we happen by chance to be one of the universes properly tuned to allow life to get started.

We come now to a third kind of multiverse, by far the wildest of the three. It has been set forth not by a scientist but by a peculiar philosopher, now at



Princeton University, named David Lewis. In his best-known book, *The Plurality of Worlds* (Oxford, 1986), and other writings, Lewis seriously maintains that every logically possible universe—that is, one

of the *Quantum Cats*. Jorge Luis Borges played with the theme in his story “The Garden of Forking Paths.” There is a quotation from this tale at the front of *The Many Worlds Interpretation of*

somewhere, *everything must be true.*”

\* \* \*

“And there are an infinite number of universes, of course, in which we don’t exist at all—that is, no creatures similar to us exist at all. In which the human race doesn’t exist at all. There are an infinite number of universes, for instance, in which flowers are the predominant form of life—or in which no form of life has ever developed or will develop.

“And infinite universes in which the states of existence are such that we would have no words or thoughts to describe them or to imagine them.”

**What a fantastic price is paid for these seeming simplicities! It is hard to imagine a more radical violation of Occam’s razor, the law of parsimony which urges scientists to keep entities to a minimum.**

with no logical contradictions such as square circles—is somewhere out there. The notion of logical possible worlds, by the way, goes back to Leibniz’s *Theodicy*. He speculated that God considered all logically possible worlds, then created the one He deemed best for His purposes.

Both the MWI and Lewis’s possible worlds allow time travel into the past. You need never encounter the paradox of killing yourself, yet you are still alive, because as soon as you enter your past the universe splits into a new one in which you and your duplicate coexist.

Most of Lewis’s worlds do not contain any replicas of you, but if they do they can be as weird as you please. You can’t, of course, simultaneously have five fingers on each hand and seven on each hand because that would be logically contradictory. But you could have a hundred fingers, and a dozen arms, or seven heads. Any world you can think of without contradiction is real. Can pigs fly? Certainly. There is nothing contradictory about pigs with wings. In an infinity of possible worlds there are lands of Oz, Greek gods on Mount Olympus, *anything* you can imagine. Every novel is a possible world. Somewhere millions of Ahabs are chasing whales. Somewhere millions of Huckleberry Finns are floating down rivers. *Every* kind of universe exists if it is logically consistent.

David Lewis’s mad multiverse was anticipated by hordes of science-fiction writers long before the MWI of QM came from Everett’s brain. More recent examples include Larry Niven’s 1969 story “All the Myriad Ways” and Frederick Pohl’s 1986 novel *The Coming*

*Quantum Mechanics* (1973), a standard reference by DeWitt and Neill Graham. For other examples of multiverses in science fiction and fantasy see the entry on “Parallel Worlds” in *The Encyclopedia of Science Fiction* (1995) by John Clute and Peter Nicholls.

Fredric Brown, in *What Mad Universe* (1950), described Lewis’s multiverse this way:

There are, then, *an infinite number of coexistent universes.*

“They include this one and the one you came from. They are equally real, and equally true. But do you conceive what an infinity of universes means, Keith Winton?”

“Well—yes and no.”

“It means that, out of infinity, *all conceivable universes exist.*”

“There is, for instance, a universe in which this exact scene is being repeated except that you—or the equivalent of you—are wearing brown shoes instead of black ones.

“There are an infinite number of permutations of that variation, such as one in which you have a slight scratch on your left forefinger and one in which you have purple horns and—”

“But are they all me?”

Mekky said, “No, none of them is you—any more than the Keith Winton in this universe is you. I should not have used that pronoun. They are separate individual entities. As the Keith Winton here is; in this particular variation, there is a wide physical difference—no resemblance, in fact.”

\* \* \*

Keith said thoughtfully, “If there are infinite universes, then all possible combinations must exist. Then,

I have here looked at only the three most important versions of a multiverse. There are others, less well known, such as Penn State’s Lee Smolin’s universes which breed and evolve in a manner similar to Darwinian theory. For a good look at all the multiverses now being proposed, see British philosopher John Leslie’s excellent book *Universes* (1989).

I find it hard to believe that so many academics take Lewis’s possible worlds seriously. As poet Armand T. Ringer has put it in a clerihow:

David Lewis  
Is a philosopher who is  
Crazy enough to insist  
That all logically possible worlds  
actually exist.

Alex Oliver, reviewing Lewis’s *Papers in Metaphysics and Epistemology*, in *The London Times Literary Supplement* (January 7, 2000), closes by calling Lewis “the leading metaphysician at the start of this century, head and beard above his contemporaries.”

The stark truth is that there is not the slightest shred of reliable evidence that there is any universe other than the one we are in. No multiverse theory has so far provided a prediction that can be tested. In my layman’s opinion they are all frivolous fantasies. As far as we can tell, universes are not as plentiful as even *two* blackberries. Surely the conjecture that there is just one universe and its Creator is infinitely simpler and easier to believe than that there are countless billions upon billions of worlds, constantly increasing in number and created by nobody. I can only marvel at the low state to which today’s philosophy of science has fallen. □



## Scandals and Follies of the 'Holy Shroud'

The Shroud of Turin continues to be the subject of media presentations treating it as so mysterious as to imply a supernatural origin. One recent study (Binga 2001) found only ten credible skeptical books on the topic versus over 400 promoting the cloth as the authentic, or potentially authentic, burial cloth of Jesus—including most recently a revisionist tome, *The Resurrection of the Shroud* (Antonacci 2000). Yet since the cloth appeared in the middle of the fourteenth century it has been at the center of scandal, exposés, and controversy—a dubious legacy for what is purported to be the most holy relic in Christendom.

### Faked Shrouds

There have been numerous “true” shrouds of Jesus—along with vials of his mother’s breast milk, hay from the manger in which he was born, and countless relics of his crucifixion—but the Turin cloth uniquely bears the apparent imprints of a crucified man. Unfortunately the cloth is incompatible with New Testament accounts of Jesus’ burial. John’s gospel (19:38–42, 20:5–7) specifically states that the body was “wound” with “linen clothes” and a large quantity of burial spices (myrrh and aloes). Still another cloth (called “the napkin”) covered his

face and head. In contrast, the Shroud of Turin represents a *single, draped* cloth (laid under and then over the “body”) without any trace of the burial spices.

Of the many earlier purported shrouds of Christ, which were typically about half the length of the Turin cloth,

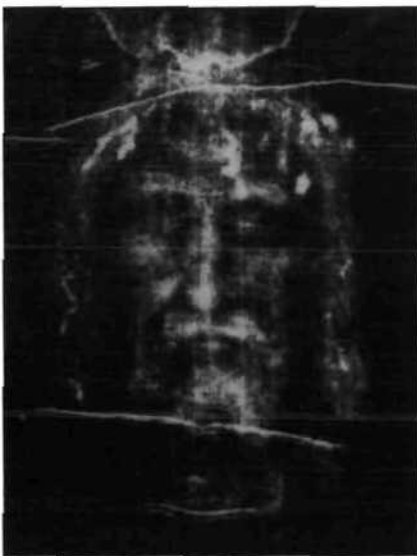


Image on the Turin Shroud.

one was the subject of a reported seventh-century dispute on the island of Iona between Christians and Jews, both of whom claimed it. As adjudicator, an Arab ruler placed the alleged relic in a fire from which it levitated, unscathed, and fell at the feet of the Christians—or so says a pious tale. In medieval Europe alone, there were “at least forty-three ‘True Shrouds’” (Humber 1978, 78).

### Scandal at Lirey

The cloth now known as the Shroud of Turin first appeared about 1355 at a little church in Lirey, in north central France. Its owner, a soldier of fortune named Geoffroy de Charney, claimed it as the authentic shroud of Christ, although he was never to explain how he acquired such a fabulous possession. According to a later bishop’s report, written by Pierre D’Arcis to the Avignon pope, Clement VII, in 1389, the shroud was being used as part of a faith-healing scam:

The case, Holy Father, stands thus. Some time since in this diocese of Troyes the dean of a certain collegiate church, to wit, that of Lirey, falsely and deceitfully, being consumed with the passion of avarice, and not from any motive of devotion but only of gain, procured for his church a certain cloth cunningly painted, upon which by a clever sleight of hand was depicted the twofold image of one man, that is to say, the back and the front, he falsely declaring and pretending that this was the actual shroud in which our Savior Jesus Christ was enfolded in the tomb, and upon which the whole likeness of the Savior had remained thus impressed together with the wounds which He bore. . . . And further to attract the multitude so that money might cunningly be wrung from them, pretended miracles were worked, certain men being hired to represent themselves as healed at the moment of the exhibition of the shroud.

---

Joe Nickell is author of many books on the paranormal, including *Inquest on the Shroud of Turin*.





recumbent figure, and the physique is so unnaturally elongated (similar to figures in Gothic art!) that one pro-shroud pathologist concluded Jesus must have suffered from Marfan's syndrome (Nickell 1989)!

STURP lacked experts in art and forensic chemistry—with one exception: famed microanalyst Walter C. McCrone. Examining thirty-two tape-lifted samples from the shroud, McCrone identified the "blood" as tempera paint containing red ocher and vermilion along with traces of rose madder—pigments used by medieval artists to depict blood. He also discovered that on the image—but not the background—were significant amounts of the red ocher pigment. He first thought this was applied as a dry powder but later concluded it was a component of dilute paint applied in the medieval *grisaille* (monochromatic) technique (McCrone 1996; cf. Nickell 1998). For his efforts McCrone was held to a secrecy agreement, while statements were made to the press that there was no evidence of artistry. He was, he says, "drummed out" of STURP.

STURP representatives paid a surprise visit to McCrone's lab to confiscate his samples, then gave them to two late additions to STURP, John Heller and Alan Adler, neither of whom was a forensic serologist or a pigment expert. The pair soon proclaimed they had "identified the presence of blood." However, at the 1983 conference of the prestigious International Association for Identification, forensic analyst John F. Fischer explained how results similar to theirs could be obtained from tempera paint.

A more recent claim concerns reported evidence of human DNA in a shroud "blood" sample, although the Archbishop of Turin and the Vatican refused to authenticate the samples or accept any research carried out on them. University of Texas researcher Leoncio Garza-Valdez, in his *The DNA of God?* (1999, 41), claims it was possible "to clone the sample and amplify it," proving it was "ancient" blood "from a human being or high primate," while Ian Wilson's *The Blood and the Shroud* (1998, 91) asserted it was "human blood."

Actually the scientist at the DNA lab, Victor Tryon, told *Time* magazine that he

could not say how old the DNA was or that it came from blood. As he explained, "Everyone who has ever touched the shroud or cried over the shroud has left a potential DNA signal there." Tryon resigned from the new shroud project due to what he disparaged as "zealotry in science" (Van Biema 1998, 61).

### Pollen Fraud?

McCrone would later refute another bit of pro-shroud propaganda: the claim of a Swiss criminologist, Max Frei-Sulzer, that he had found certain pollen grains on the cloth that "could

## McCrone would later refute another bit of pro-shroud propaganda: the claim of a Swiss criminologist, Max Frei-Sulzer, that he had found certain pollen grains on the cloth that "could only have originated from plants that grew exclusively in Palestine at the time of Christ."

only have originated from plants that grew exclusively in Palestine at the time of Christ." Earlier Frei had also claimed to have discovered pollens on the cloth that were characteristic of Istanbul (formerly Constantinople) and the area of ancient Edessa—seeming to confirm a "theory" of the shroud's missing early history. Wilson (1979) conjectured that the shroud was the fourth-century Image of Edessa, a legendary "miraculous" imprint of Jesus' face made as a gift to King Abgar. Wilson's notion was that the shroud had been folded so that only the face showed and that it had thus been disguised for centuries. Actually, had the cloth been kept in a frame for such a long period there would have been an age-yellowed, rectangular area around the face. Nevertheless Frei's alleged pollen evidence gave new support to Wilson's ideas.

I say *alleged* evidence since Frei had credibility problems. Before his death in 1983 his reputation suffered when, representing himself as a handwriting expert, he pronounced the infamous "Hitler diaries" genuine; they were soon exposed as forgeries.

In the meantime an even more serious question had arisen about Frei's pollen

evidence. Whereas he reported finding numerous types of pollen from Palestine and other areas, STURP's tape-lifted samples, taken at the same time, showed few pollen. Micropaleontologist Steven D. Schafersman was probably the first to publicly suggest Frei might be guilty of deception. He explained how unlikely it was, given the evidence of the shroud's exclusively European history, that thirty-three different Middle Eastern pollens could have reached the cloth, particularly only pollen from Palestine, Istanbul, and the Anatolian steppe. With such selectivity, Schafersman stated, "these would

be miraculous winds indeed." In an article in *SKEPTICAL INQUIRER* Schafersman (1982) called for an investigation of Frei's work.

When Frei's tape samples became available after his death, McCrone was asked to authenticate them. This he was readily able to do, he told me, "since it was easy to find red ocher on linen fibers much the same as I had seen them on my samples." But there were few pollen other than on a single tape which bore "dozens" in one small area. This indicated that the tape had subsequently been "contaminated," probably deliberately, McCrone concluded, by having been pulled back and the pollen surreptitiously introduced.

McCrone added (1993):

One further point with respect to Max which I haven't mentioned anywhere, anytime to anybody is based on a statement made by his counterpart in Basel as head of the Police Crime Laboratory there that Max had been several times found guilty and was censured by the Police hierarchy in Switzerland for, shall we say, overenthusiastic interpretation of his evidence. His Basel counterpart had been on the investigating committee and expressed surprise in a letter to me that Max was able to continue in his position as Head of the Police Crime Lab in Zurich.

## C-14 Falsehoods

The pollen "evidence" became especially important to believers following the devastating results of radiocarbon dating tests in 1988. Three laboratories (at Oxford, Zurich, and the University of Arizona) used accelerator mass spectrometry (AMS) to date samples of the linen. The results, formally published by twenty-one authors in *Nature* (Damon et al. 1989), were in close agreement and were given added credibility by the use of control samples of known dates. The resulting age span was circa A.D. 1260–1390—consistent with the time of the reported forger's confession.

Shroud enthusiasts were devastated, but they soon rallied, beginning a campaign to discredit the radiocarbon findings. Someone put out a false story that the AMS tests were done on one of the patches from the 1532 fire, thus supposedly yielding a late date. A Russian scientist, Dmitrii Kuznetsov, claimed to have established experimentally that heat from a fire (like that of 1532) could alter the radiocarbon date. But others could not replicate his alleged results and it turned out that his physics calculations had been plagiarized—complete with an error (Wilson 1998, 219–223). (Kuznetsov was also exposed in *SKEPTICAL INQUIRER* for bogus research in a study criticizing evolution [Larhammar 1995].)

A more persistent challenge to the radiocarbon testing was hurled by Garza-Valdez (1993). He claimed to have obtained samples of the "miraculous cloth" that bore a microbial coating, contamination that could have altered the radiocarbon date. However that notion was effectively disproved by physicist Thomas J. Pickett (1996). He performed a simple calculation which showed that, for the shroud to have been altered by thirteen centuries (i.e., from Jesus' first-century death to the radiocarbon date of  $1325 \pm 65$  years), there would have to be twice as much contamination, by weight, as the cloth itself.

## Shroud of Rorschach

Following the suspicious pollen evidence were claims that plant images had been identified on the cloth. These were allegedly discerned from "smudgy" appear-

ing areas in shroud photos that were subsequently enhanced. The work was done by a retired geriatric psychiatrist, Alan Whanger, and his wife Mary, former missionaries who have taken up image analysis as a hobby. They were later assisted by an Israeli botanist who looked at their photos of "flower" images (many of them "wilted" and otherwise distorted) and exclaimed, "Those are the flowers of Jerusalem!" Apparently no one has thought to see if some might match the flowers of France or Italy or even to try to prove that the images are indeed floral (given the relative scarcity of pollen grains on the cloth).

The visualized "flower and plant images" join other perceived shapes seen—Rorschach-like—in the shroud's mottled image and off-image areas. These include "Roman coins" over the eyes, head and arm "phylacteries" (small Jewish prayer boxes), an "amulet," and such crucifixion-associated items (cf. John, ch. 19) as "a large nail," a "hammer," "sponge on a reed," "Roman thrusting spear," "pliers," "two scourges," "two brush brooms," "two small nails," "large spoon or trowel in a box," "a loose coil of rope," a "cloak" with "belt," a "tunic," a pair of "sandals," and other hilarious imaginings including "Roman dice"—all discovered by the Whangers (1998) and their botanist friend.

They and others have also reported finding ancient Latin and Greek words, such as "Jesus" and "Nazareth." Even Ian Wilson (1998, 242) felt compelled to state: "While there can be absolutely no doubting the sincerity of those who make these claims, the great danger of such arguments is that researchers may 'see' merely what their minds trick them into thinking is there."

## Conclusion

We see that "Shroud science"—like "creation science" and other pseudosciences in the service of dogma—begins with the desired answer and works backward to the evidence. Although they are bereft of any viable hypothesis for the image formation, sindonologists are quick to dismiss the profound, corroborative evidence for artistry. Instead, they suggest that the "mystery" of the shroud implies a miracle, but of course that is

merely an example of the logical fallacy called arguing from ignorance.

Worse, some have engaged in pseudoscience and even, apparently, outright scientific fraud, while others have shamefully mistreated the honest scientists who reported unpopular findings. We should again recall the words of Canon Ulysse Chevalier, the Catholic scholar who brought to light the documentary evidence of the shroud's medieval origin. As he lamented, "The history of the shroud constitutes a protracted violation of the two virtues so often commended by our holy books: justice and truth."

## References

- Antonacci, Mark. 2000. *The Resurrection of the Shroud: New Scientific, Medical and Archeological Evidence*. New York: M. Evans and Co.
- Binga, Timothy. 2001. Report in progress from the Director of the Center for Inquiry Libraries, June 19.
- Damon, P. E., et al. 1989. Radiocarbon dating of the Shroud of Turin. *Nature* 337:611–615 (February 16).
- D'Arcis, Pierre. 1389. Memorandum to the Avignon Pope, Clement VII; translated from Latin by Rev. Herbert Thurston, reprinted in Wilson 1979, 266–272.
- Garza-Valdez, Leoncio A. 1993. *Biogenic Varnish and the Shroud of Turin*. Cited in Garza-Valdez 1999, 37.
- . 1999. *The DNA of God?* New York: Doubleday.
- Gove, Harry E. 1996. *Relic, Icon, or Hoax? Carbon Dating the Turin Shroud*. Philadelphia: Institute of Physics Publishing.
- Humber, Thomas. 1978. *The Sacred Shroud*. New York: Pocket Books.
- Larhammar, Dan. 1995. Severe flaws in scientific study criticizing evolution. *SKEPTICAL INQUIRER* 19(2):30–31.
- McCrone, Walter C. 1993. Letters to Joe Nickell, June 11 and 30.
- . 1996. *Judgement Day for the Turin "Shroud"*. Chicago: Microscope Publications.
- Nickell, Joe. 1998. *Inquest on the Shroud of Turin: Latest Scientific Findings*. Amherst, N.Y.: Prometheus Books. (Except as otherwise noted, information is taken from this source.)
- . 1989. Unshrouding a Mystery: Science, Pseudoscience, and the Cloth of Turin. *SKEPTICAL INQUIRER* 13(3):296–299.
- Pickett, Thomas J. 1996. Can contamination save the Shroud of Turin? *Skeptical Briefs*, June.
- Schafersman, Steven D. 1982. Science, the public and the Shroud of Turin. *SKEPTICAL INQUIRER* 6(3):37–56.
- Whanger, Mary, and Alan Whanger. 1998. *The Shroud of Turin: An Adventure of Discovery*. Franklin, Tenn.: Providence House.
- Wilcox, Robert K. 1977. *Shroud*. New York: Macmillan.
- Wilson, Ian. 1979. *The Shroud of Turin*, rev. ed.. Garden City, N.Y.: Image Books.
- . 1998. *The Blood and the Shroud*. New York: The Free Press. □

# Science and Religion 2001: Introductory Thoughts

KENDRICK FRAZIER

Of all the "borderland" areas involving science, the interface between science and religion remains one of the most intriguing and troubling. Scientists, scholars, and laymen continue to ponder the personal and public issues revolving around science and religion. Nearly everyone somehow strives to come to terms both intellectually and emotionally with the array of rich issues involving personal belief on the one hand and commitment to science and reason on the other. Everyone resolves these issues and conflicts in a different way. The spectrum is broad. The issues complex.

At either end of the spectrum, to be sure, beholders have clarity. Evangelical and fundamentalist believers see a black-and-white world. They know the truth. All who do not see it their way are responsible for the world's ills and therefore must be fought with every trick and tactic imaginable. Atheists are equally certain of the correctness of their non-belief, and everyone else is deluded or at least a bit foolish. Most people are somewhere in between. Most people accommodate a complex system of multilevel, multidimensional, semi-compartmentalized beliefs and values.

That is true of many scientists and scientifically oriented people as well—although those involved in science probably do tend to have fewer adherents to blind belief and more who value and appreciate open-minded inquiry.

Many of the issues are private and personal. In the abstract, what you and I believe (or don't) are each our own business and no one else's. Some of the issues are intellectual. Eminent theologians, great philosophers, Nobel laureate scientists have considered them in depth and shared their insights at length. But others have profound effects on the world—on society, on education, on public policy (and, unfortunately in some cultures where the conflicts have often gone to extremes, on life and limb).

The most troublesome example in the United States (which befuddles those elsewhere) is creationism. Creationists and their sympathizers would expunge from our schools even any mention of evolution—the central unifying idea of the biological sciences and one of the most beautiful

and most powerfully explanatory concepts in the history of science. They do so in part because they mistakenly fear that evolution somehow undermines human values and dignity. Most of us may see that they are wrong about that, but at least we can see why they are so motivated.

Creationism and its latest spiffed-up manifestation, the "Intelligent Design" (ID) movement, have almost nothing to do with real science and real scientific controversies and everything to do with belief-laden personal and religious politics. But their promoters use scientific language and pretend they are presenting politicians, school board members, and *the media valid alternative scientific views*. All the while they denigrate every value that science holds dear. These values include unmitigated curiosity, a love of learning, a questioning attitude, an abhorrence of ideology and dogma, a commitment to open-minded inquiry, and an honest acknowledgment that all knowledge is tentative and open to revision (a subtle strength opponents portray and exploit as a serious weakness). Another essential value is a determination to let balanced assessments of facts and evidence guide policy judgments rather than using predetermined ideological views to decide which facts and evidence may be allowed to enter.

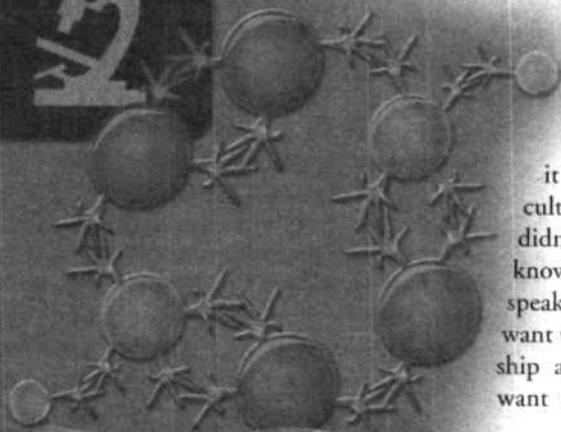

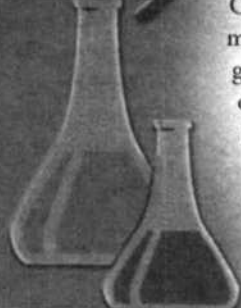

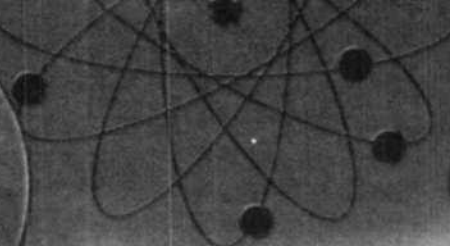

I was able to see creationist tactics at work first-hand earlier this year when leading ID proponent Phillip Johnson did a *whirlwind speaking tour in New Mexico*, where I live and work. Johnson is a UC Berkeley law professor, and as critics predicted before his appearances, he showed that he's very clever at using rhetoric and tactics honed in the legal arena to argue a pretended case against evolution. He distorted, trivialized, and mischaracterized modern evolutionary science to a degree I found shameful. He presented a comic-book-like caricature of evolution that would be laughable if it were not so reprehensible. He bashed an entire broad field of vital science, and he was doing so not as an expert in biology or even in science but as a nonscientist author and ideologue.

But if you think this is clearly an instance where scientifically trained people are able to see through his techniques and

---

*Kendrick Frazier is editor of the SKEPTICAL INQUIRER.*






realize the intellectual emptiness of the ID argument, you will be surprised. For I heard him at one of the nation's foremost national scientific and engineering laboratories, a huge multi-program government-funded laboratory that is advancing the frontiers of advanced technology daily, and the overwhelming sentiment of the audience of nearly 400 people there—virtually all scientists and engineers—was on his side. They ate it up. They laughed at his frequent jabs at “materialistic” science, as if their own engineering research was not based on the same science. It was astonishing in a way. In another sense I was not surprised at all.

A glimpse at some of the behind-the-scenes side issues surrounding his appearance shows just how complex and difficult the science and religion issue can be. His invitation to speak did not come from the national lab itself. The lab's upper management was not even aware of his planned appearance until alerted a few weeks before his talk. He was invited by the lab's Christians in the Workforce Networking Group, and most of the attendees were members of the group. The group had been officially sanctioned by the laboratory only as a result of legal action it pressed against the lab for such recognition. The group's official status thus comes under the mandated equal employment opportunity/affirmative action (EEO/AA) part of the lab's administrative operations, not anything to do with science. Furthermore, the group, despite its name, does not represent mainstream Christians at all, but a fundamentalist, evangelical wing. It requires a belief statement to join—ironic, given its EEO/AA home.


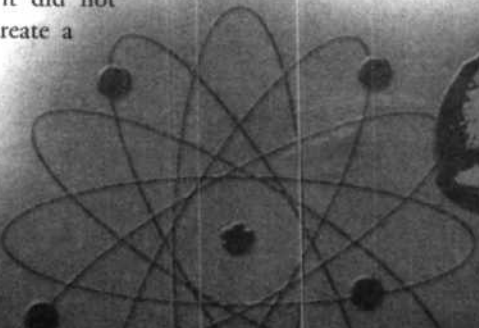
Once the lab's management became aware of Johnson's imminent appearance, it found itself in a difficult position. Management didn't like having a person known for antisience views speak at the lab, but it did not want to be accused of censorship and it did not want to create a

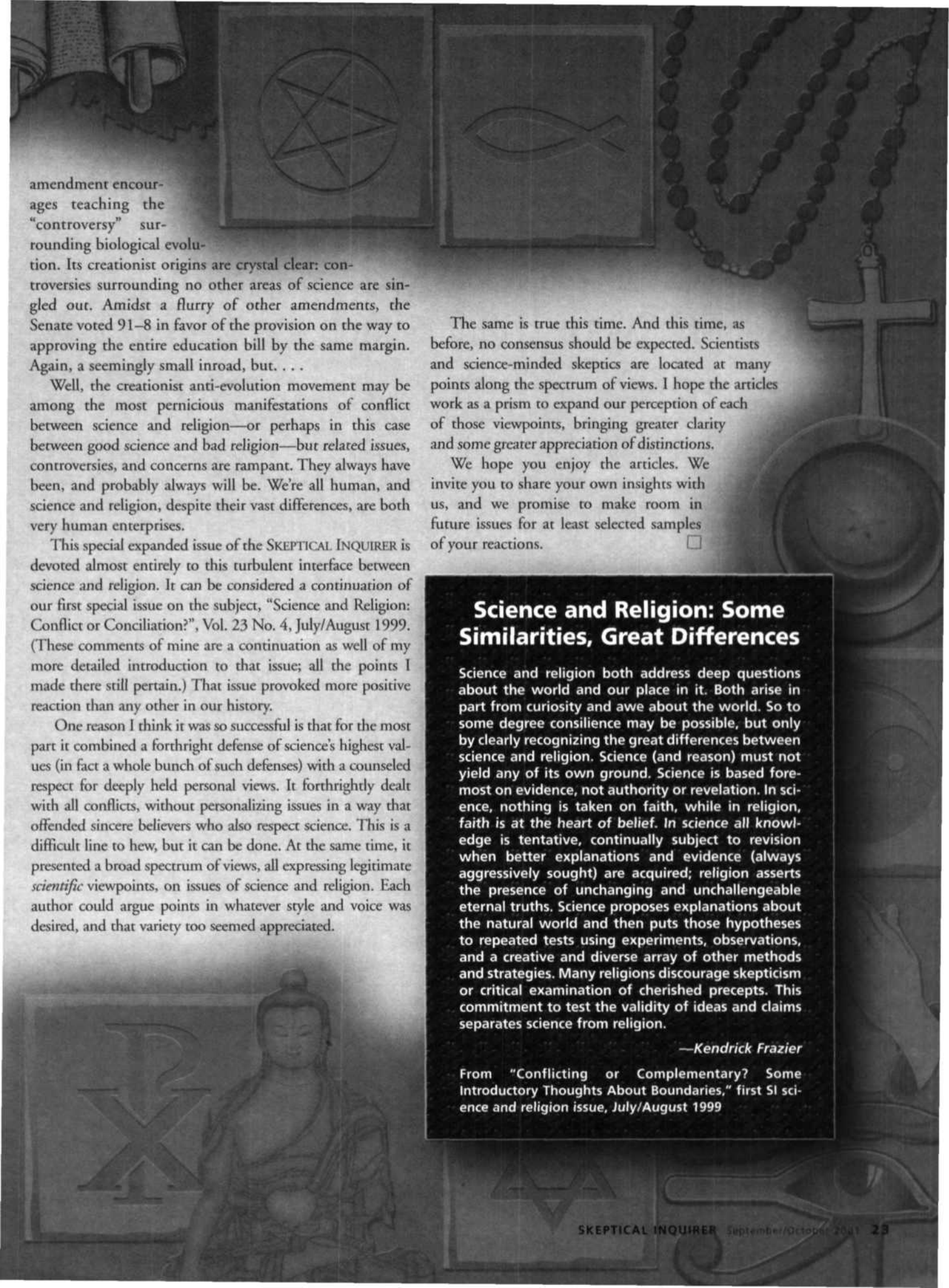


controversy that would call attention to Johnson's appearance. It decided to lay low and hope all would pass. Management did require the Christians in the Workforce Group to add a disclaimer to its official lab's Web page. The disclaimer said the talk's location in the lab's main auditorium did not imply any laboratory or government agency “endorsement or approval of any of the concepts or ideas expressed.” (This disclaimer was not presented at the talk, however.) In the meantime, a quickly arranged talk by a pro-evolution scientist who some scientists had invited to counter the Johnson talk was canceled by management, on the grounds that *that* talk didn't have any official sanction—but mainly to avoid overt controversy. Johnson's appearances at other, more public forums in the area got the public attention, and so the lay-low strategy, in a way, worked. But modern biology got roundly bashed at a national laboratory, without refutation.

This example is just a microcosm of how religiously motivated critics of evolution are making inroads in scientific and intellectual arenas. But it wouldn't have happened without a strongly sympathetic potential audience. The example shows that, in the United States at least, scientifically trained people themselves come from a broad spectrum of religious backgrounds, including fundamentalism, and quick generalizations are doomed to failure. If antievolution can be welcomed uncritically in a scientific setting, its acceptance is far easier among other parts of society. Leaders in politics (local to national), education, business, and media are no less diverse and no less vulnerable to distorted arguments against science, if the assertions fit preconceived viewpoints and well-formed mental templates.

The creationist cause continues to be pressed at all levels. In Kansas, where vigilant scientists and educators finally were able to overthrow a creationist takeover of the Kansas State Board of Education, word comes that creationist politicians and supporters are already gearing up to re-take control. At the national level, a comprehensive U.S. Senate education bill debated for six weeks had attached to it at the last minute a two-sentence amendment drafted by evolution opponents. The innocent-sounding





amendment encourages teaching the "controversy" surrounding biological evolution. Its creationist origins are crystal clear: controversies surrounding no other areas of science are singled out. Amidst a flurry of other amendments, the Senate voted 91–8 in favor of the provision on the way to approving the entire education bill by the same margin. Again, a seemingly small inroad, but. . .

Well, the creationist anti-evolution movement may be among the most pernicious manifestations of conflict between science and religion—or perhaps in this case between good science and bad religion—but related issues, controversies, and concerns are rampant. They always have been, and probably always will be. We're all human, and science and religion, despite their vast differences, are both very human enterprises.

This special expanded issue of the SKEPTICAL INQUIRER is devoted almost entirely to this turbulent interface between science and religion. It can be considered a continuation of our first special issue on the subject, "Science and Religion: Conflict or Conciliation?," Vol. 23 No. 4, July/August 1999. (These comments of mine are a continuation as well of my more detailed introduction to that issue; all the points I made there still pertain.) That issue provoked more positive reaction than any other in our history.

One reason I think it was so successful is that for the most part it combined a forthright defense of science's highest values (in fact a whole bunch of such defenses) with a counseled respect for deeply held personal views. It forthrightly dealt with all conflicts, without personalizing issues in a way that offended sincere believers who also respect science. This is a difficult line to hew, but it can be done. At the same time, it presented a broad spectrum of views, all expressing legitimate *scientific* viewpoints, on issues of science and religion. Each author could argue points in whatever style and voice was desired, and that variety too seemed appreciated.

The same is true this time. And this time, as before, no consensus should be expected. Scientists and science-minded skeptics are located at many points along the spectrum of views. I hope the articles work as a prism to expand our perception of each of those viewpoints, bringing greater clarity and some greater appreciation of distinctions.

We hope you enjoy the articles. We invite you to share your own insights with us, and we promise to make room in future issues for at least selected samples of your reactions. □

## Science and Religion: Some Similarities, Great Differences

Science and religion both address deep questions about the world and our place in it. Both arise in part from curiosity and awe about the world. So to some degree concilience may be possible, but only by clearly recognizing the great differences between science and religion. Science (and reason) must not yield any of its own ground. Science is based foremost on evidence, not authority or revelation. In science, nothing is taken on faith, while in religion, faith is at the heart of belief. In science all knowledge is tentative, continually subject to revision when better explanations and evidence (always aggressively sought) are acquired; religion asserts the presence of unchanging and unchallengeable eternal truths. Science proposes explanations about the natural world and then puts those hypotheses to repeated tests using experiments, observations, and a creative and diverse array of other methods and strategies. Many religions discourage skepticism or critical examination of cherished precepts. This commitment to test the validity of ideas and claims separates science from religion.

—Kendrick Frazier

From "Conflicting or Complementary? Some Introductory Thoughts About Boundaries," first SI science and religion issue, July/August 1999

# Holy Wars

## *An Astrophysicist Ponders the God Question*

.....

*A virtual sub-industry has blossomed to encourage harmony between science and religion, but there is virtually no common ground. When people have used religious documents to make detailed predictions about the physical world they have been famously wrong. Science, in contrast, works.*

NEIL deGRASSE TYSON

**A**t nearly every public lecture that I give on the universe, I try to reserve adequate time at the end for questions. The succession of subjects is predictable. First, the questions relate directly to the lecture. They next migrate to sexy astrophysical subjects such as black holes, quasars, and the Big Bang. If I have enough time left over to answer all questions, and if the talk is in America, the subject eventually reaches God. Typical questions include "Do scientists believe in God?" "Do you believe in God?" and "Do your studies in astrophysics make you more or less religious?"

Publishers have come to learn that there is a lot of money in God, especially when the author is a scientist and when the book title includes a direct juxtaposition of scientific and





religious themes. Successful books include Robert Jastrow's *God and the Astronomers*, Leon M. Lederman's *The God Particle*, Frank J. Tipler's *The Physics of Immortality: Modern Cosmology, God, and the Resurrection of the Dead*, and Paul Davies's two works *God and the New Physics* and *The Mind of God*. Each author is either an accomplished physicist or astronomer and, while the books are not strictly religious, they encourage the reader to bring God into conversations about astrophysics. Even Stephen Jay Gould, a Darwinian pitbull and devout agnostic, has joined the title-parade with his work *Rocks of Ages: Science and Religion in the Fullness of Life*. The financial success of these published works indicates that you get bonus dollars from the American public if you are a scientist who openly talks about God. After the publication of *The Physics of Immortality*, which suggested whether the law of physics could allow you and your soul to exist long after you are gone from this world, Tipler's book-tour included many well-paid lectures to Protestant religious groups. This lucrative sub-industry has further blossomed in recent years due to efforts made by the wealthy founder of the Templeton investment fund, Sir John Templeton, to find harmony and concision between science and religion. In addition to sponsoring workshops and conferences on the subject, Templeton seeks out (among other recipients) widely published religion-friendly scientists to receive an annual award whose cash value exceeds that of the Nobel Prize.

Let there be no doubt that as they are currently practiced, there is no common ground between science and religion. As was thoroughly documented in the nineteenth century tome *A History of the Warfare of Science with Theology in Christendom*, by the historian and onetime president of Cornell University Andrew D. White, history reveals a long and combative relationship between religion and science, depending on who was in control of society at the time. The claims of science rely on experimental verification, while the claims of religions rely on faith. These approaches are irreconcilable approaches to knowing, which ensures an eternity of debate wherever and whenever the two camps meet. Just as in hostage negotiations, it's probably best to keep both sides talking to each other. The schism did not come about for want of earlier attempts to bring the two sides together. Great scientific minds, from Claudius Ptolemy of the second century to Isaac Newton of the seventeenth, invested their formidable intellects in attempts to deduce the nature of the universe from the statements and philosophies contained in religious writings. Indeed, by the time of his death, Newton

---

*Neil deGrasse Tyson, an astrophysicist, is the Frederick P. Rose Director of New York City's Hayden Planetarium and a visiting research scientist at Princeton University. His recently published memoir is titled *The Sky Is Not the Limit: Adventures of an Urban Astrophysicist*. This article was adapted from an essay that first appeared in *Natural History* magazine.*

had penned more words about God and religion than about the laws of physics, all in a futile attempt to use the Biblical chronology to understand and predict events in the natural world. Had any of these efforts succeeded, science and religion today might be largely indistinguishable.

The argument is simple. I have yet to see a successful prediction about the physical world that was inferred or extrapolated from the content of any religious document. Indeed, I can make an even stronger statement. Whenever people have used

## **I have yet to see a successful prediction about the physical world that was inferred or extrapolated from the content of any religious document.**

religious documents to make detailed predictions about the physical world they have been famously wrong. By a prediction, I mean a precise statement about the untested behavior of objects or phenomena in the natural world, that gets logged *before* the event takes place. When your model predicts something only after it has happened then you have instead made a "postdiction." Postdictions are the backbone of most creation myths and, of course, the "Just So" stories of Rudyard Kipling, where explanations of everyday phenomena explain what is already known. In the business of science, however, a dozen postdictions are barely worth a single successful prediction.

Topping the list of predictions are the perennial claims about when the world will end, none of which have yet proved true. But other claims and predictions have actually stalled or reversed the progress of science. We find a leading example in the trial of Galileo (which gets my vote for the trial of the millennium) where he showed the universe to be fundamentally different from the dominant views of the Catholic Church. In all fairness to the Inquisition, however, an Earth-centered universe made a lot of sense observationally. With a full complement of epicycles to explain the peculiar motions of the planets against the background stars, the time-honored, Earth-centered model had conflicted with no known observations. This remained true long after Copernicus introduced his Sun-centered model of the universe a century earlier. The Earth-centric model was also aligned with the teachings of the Catholic Church and prevailing interpretations of the Bible, wherein Earth is unambiguously created before the Sun and the Moon as described in the first several verses of Genesis. If you were created first, then you must be in the center of all motion. Where else could you be? Furthermore, the Sun and Moon themselves were also presumed to be smooth orbs. Why would a perfect, omniscient deity create anything else?

All this changed, of course, with the invention of the telescope and Galileo's observations of the heavens. The new optical device revealed aspects of the cosmos that strongly conflicted with people's conceptions of an Earth-centered, blemish-free, divine universe: The Moon's surface was bumpy and rocky; the Sun's surface had spots that moved across its surface; Jupiter had moons of its own that orbited Jupiter and

not Earth; and Venus went through phases, just like the Moon. For his radical discoveries, which shook Christendom, Galileo was put on trial, found guilty of heresy, and sentenced to house arrest. This was mild punishment when one considers what happened to the monk Giordano Bruno. A few decades earlier Bruno had been found guilty of heresy, and then burned at the stake, for suggesting that Earth may not be the only place in the universe that harbors life.

I do not mean to imply that competent scientists, soundly following the scientific method, have not also been famously wrong. They have. Most scientific claims made on the frontier will ultimately be disproved, due primarily to bad or incomplete data. But this scientific method, which allows for expeditions down intellectual dead ends, also promotes ideas, models, and predictive theories that can be spectacularly correct. No other enterprise in the history of human thought has been as successful at decoding the ways and means of the universe.

Science is occasionally accused of being a closed-minded or stubborn enterprise. Often people make such accusations when they see scientists swiftly discount astrology, the paranormal, Sasquatch sightings, and other areas of human interest that routinely fail double-blind tests or that possess a dearth of reliable evidence. But this same level of skepticism is also being applied to ordinary scientific claims in the professional research journals. The standards are the same. Look what happened when the Utah chemists B. Stanley Pons and Martin Fleischmann claimed in a press conference to create "cold" nuclear fusion on their laboratory table. Scientists acted swiftly and skeptically. Within days of the announcement it was clear that no one could replicate the cold fusion results that Pons and Fleischmann claimed for their experiment. Their work was summarily dismissed. Similar plot-lines unfold almost daily (minus the press conferences) for nearly every new scientific claim. The ones that make headlines tend to be the ones that could affect the economy.

With scientists exhibiting such strong levels of skepticism, some people may be surprised to learn that scientists heap their largest rewards and praises upon those who do discover flaws in established paradigms. These same rewards also go to those who create new ways to understand the universe. Nearly all famous scientists, pick your favorite one, have been so praised in their own lifetimes. This path to success in one's professional career is antithetical to almost every other human establishment—especially to religion.

None of this is to say that the world does not contain religious scientists. In a recent survey of religious beliefs among math and science professionals, 65 percent of the mathematicians (the highest rate) declared themselves to be religious, as did 22 percent of the physicists and astronomers (the lowest rate). The national average among all scientists was around 40 percent and has remained largely unchanged over the past century. For reference, 90 percent of the American public claims to be religious (among the highest in Western society), so

either nonreligious people are drawn to science or studying science makes you less religious.

But what of those scientists who are religious? One thing is for certain, successful researchers do not get their science from their religious beliefs. On the other hand, the methods of science have little or nothing to contribute to ethics, inspiration, morals, beauty, love, hate, or aesthetics. These are vital elements of civilized life, and are central to the concerns of nearly every religion. What it all means is that for many scientists there is no conflict of interest.

*When scientists do talk about God, they typically invoke him at the boundaries of knowledge where we should be most humble and where our sense of wonder is greatest. Examples of this abound. During an era when planetary motions were on the frontier of natural philosophy, Ptolemy couldn't help feeling a religious sense of majesty when he wrote, "When I trace at my pleasure the windings to and fro of the heavenly bodies, I no longer touch the earth with my feet. I stand in the presence of Zeus himself and take my fill of ambrosia."*

Note that Ptolemy was not weepy about the fact that the element mercury is liquid at room temperature, or that a dropped rock falls straight to the ground. While he could not have fully understood these phenomena either, they were not seen at the time to be on the frontiers of science.

In the thirteenth century, Alfonso the Wise (Alfonso X), the King of Spain who also happened to be an accomplished academician, was frustrated by the complexity of Ptolemy's epicycles. Being less humble than Ptolemy, Alfonso is widely credited with having mused, "Had I been around at the creation, I would have given some useful hints for the better ordering of the universe."

In his 1687 masterpiece *The Mathematical Principles of Natural Philosophy*, Isaac Newton lamented that his new equations of gravity, which describe the force of attraction between pairs of objects, might not maintain a stable system of orbits for multiple planets. Under this instability, planets would either crash into the Sun or get ejected from the solar system altogether. Worried about the long-term fate of Earth and other planets, Newton invoked the hand of God as a possible restoring force to maintain a long-lived solar system. Over a century later, the French mathematician Pierre Simon de Laplace invented a mathematical approach to gravity, published in his four-volume treatise *Celestial Mechanics*, which extended the applicability of Newton's equations to complex systems of planets such as ours. Laplace showed that our solar system was stable and did not require the hand of a deity after all. When queried by Napoleon Bonaparte on the absence of any reference to an "author of the universe" in his book, Laplace replied, "I have no need of that hypothesis."

In full agreement with King Alfonso's frustrations with the universe, Albert Einstein noted in a letter to a colleague, "If God created the world, his primary worry was certainly not to make its understanding easy for us." When Einstein could not

figure out how or why a deterministic universe could require the probabilistic formalisms of quantum mechanics, he mused, "It is hard to sneak a look at God's cards. But that he would choose to play dice with the world... is something that I cannot believe for a single moment." When an experimental result was shown to Einstein that, if correct, would have disproved his new theory of gravity Einstein commented, "The Lord is subtle, but malicious he is not." The Danish physicist Niels Bohr, a contemporary of Einstein, heard one too many of Einstein's God-remarks and declared that Einstein should stop telling God what to do!

**I, like Ptolemy, am humbled in the presence of our clockwork universe. When I am on the cosmic frontier, and I touch the laws of physics with my pen, or when I look upon the endless sky from an observatory on a mountaintop, I well up with an admiration for its splendor.**

Today, you hear the occasional astrophysicist (maybe one in a hundred) invoke God when asked where did all our laws of physics come from, or what was around before the Big Bang. As we have come to anticipate, these questions comprise the modern frontier of cosmic discovery and, at the moment, they transcend the answers our available data and theories can supply. Some promising ideas, such as inflationary cosmology and string theory, already exist. These could ultimately give to the answers to those questions, thereby pushing back our boundary of awe.

My personal views are entirely pragmatic, and partly resonate with those of Galileo who, during his trial, is credited with saying, "The Bible tells you how to go to heaven, not how the heavens go." Galileo further noted, in a 1615 letter to the Grand Duchess of Tuscany, "In my mind God wrote two books. The first book is the Bible, where humans can find the answers to their questions on values and morals. The second book of God is the book of nature, which allows humans to use observation and experiment to answer our own questions about the universe."

I simply go with what works. And what works is the healthy skepticism embodied in scientific method. Believe me, if the Bible had ever been shown to be a rich source of scientific answers and understanding, we would be mining it daily for cosmic discovery. Yet my vocabulary of scientific inspiration strongly overlaps with that of religious enthusiasts. I, like Ptolemy, am humbled in the presence of our clockwork universe. When I am on the cosmic frontier, and I touch the laws of physics with my pen, or when I look upon the endless sky from an observatory on a mountaintop, I well up with an admiration for its splendor. But I do so knowing and accepting that if I propose a God beyond that horizon, one who graces our valley of collective ignorance, the day will come when our sphere of knowledge will have grown so large that I will have no need of that hypothesis. □



# The Dangerous Quest for Cooperation Between Science and Religion

*Religion is a subcategory of supernaturalism that was formulated during the medieval period with the spurious and dangerous quest to link supernaturalism with scientific knowledge, and this quest has continued.*

JACOB PANDIAN

Recently, misleading articles have appeared in newspapers and news magazines claiming that religion and science are cooperating to explore the nature of reality. Gregg Easterbrook (1999) noted that "Signs of renewed interest in science and religion are numerous. The topic has recently been a top-selling cover for both *Newsweek* and *U.S. News and World Report*. Universities such as Princeton and Cambridge, which in the 1960s didn't even offer courses in the relationship between science and

Gerald Fried

religion, have established chairs for its study.”

Easterbrook points to the central role of the John Templeton Foundation in encouraging the cooperation between science and religion. The Foundation publishes *Progress in Theology* magazine but more importantly awards millions of dollars to people who reflect their philosophy of cooperation.

The 2001 Templeton prize, \$1 million, was announced March 9. It went to the Rev. Arthur Peacocke, a British biochemist and Anglican priest who has written widely about God and science. The Templeton Award recipient for 2000 was Freeman J. Dyson, an emeritus professor of physics at the Institute of Advanced Study in Princeton. As reported by Larry Stammer (2000), Dyson was “baffled” at receiving the award because the Templeton prize is awarded for “Progress in Religion” and not for progress in science. Dyson claimed that he was “not a theologian” and “not a saint.” In his reflections on science and religion, Dyson noted that “The universe has a mind of its own. We know mind plays a big role in our own lives. It’s likely, in fact, that mind has a big role in the way the whole universe functions. If you like, you call it God. It all makes sense.”

Before that, \$1.2 million was awarded to Ian G. Barbour, a retired professor from Carleton College. At Carleton he was professor of physics, professor of religion, and Bean Professor of Science, Technology and Society. His book *Religion and Science* (1997) is described by its publisher (Harper San Francisco) as “a definitive contemporary discussion of the many issues surrounding our understanding of God and religious truth and experience in our scientific age.” Earlier recipients of the Templeton Award include the Protestant Christian evangelist Billy Graham, the Catholic Christian nun Mother Teresa, the campus crusader William Bright, and the Russian novelist Alexander Solzhenitsyn. Ian Barbour, according to Gregg Easterbrook, “promptly announced he would give \$1 million of his award to the Berkeley, California, Center for Theology and the Natural Sciences, an affiliate of Berkeley’s Graduate Theological Union, and an organization whose own 1981 founding and rising importance are indicators of the science-and-religion trend.”

Ralph Estling, in an essay called “Templeton and AAAS” in the *SKEPTICAL INQUIRER* (2000), pointed out that the American Association for the Advancement of Science has “a problem”: This association, which “has been promoting a study known as the ‘Program of Dialogue on Science, Ethics and Religion,’” received for four years cash contributions of over one million dollars from the Templeton Foundation. As many board members of AAAS are also associated with the Templeton Foundation, Estling is right in raising questions about “conflict of interest,” and he advises the AAAS “to get the hell out from under the John Templeton Foundation.”

I suggest that the problem is a much larger one than the Templeton Foundation’s attempt to influence the scope of science through monetary awards to scientific organizations and scientists. The more serious problem stems from our profound misunderstanding of why and how the concept of religion was developed by the church fathers of the early medieval period out of the Roman/Latin concept of *religio*. It is this understand-

ing that opens the door to organizations such as the Templeton Foundation, and to arguments that science and religion should cooperate in understanding the nature of the universe.

### **Religio, Religion, and Supernaturalism**

Supernaturalism (i.e., beliefs and practices associated with supernatural beings and supernatural power) is a cultural universal. Religion, however, is not a cultural universal; it is a subset of supernaturalism that developed during the medieval period of the Christian tradition to represent Christian supernaturalism as scientific truth. During this period, the Roman/Latin concept of *religio* changed its meaning and significance from ritual activities to doctrinal statements about the nature of the world and humankind.

An excellent discussion of why and how the Roman/Latin concept of *religio* was transformed by the church fathers into religion (attributing different characteristics to *religio*) is offered in William Cantwell Smith’s very important book on the



subject of religion, *The Meaning and End of Religion* (1991). The concept of religion was developed in the Christian tradition to represent Christian truths as opposed to the untruths of "pagan" traditions of the Greeks and Romans and the satanic or demonic distortions that, from the Christian theory of religion, prevailed in non-Christian traditions.

The concept of religion that had become the theoretical framework for explaining Greco-Roman and non-Western traditions as false was also opposed to and contrasted with the supernaturalism of the non-Christians in general. Christian supernaturalism was conceptualized within the framework of religion as the scientific truth about the world and humankind. Christianity established an epistemological link between science and supernaturalism by conceptualizing reli-

**The concept of religion was developed  
in the Christian tradition to represent  
Christian truths as opposed to the untruths  
of "pagan" traditions of the Greeks and  
Romans and the satanic or demonic distortions  
that, from the Christian theory of religion,  
prevailed in non-Christian traditions.**

gion as the framework to explain natural phenomena and to explain the nature of the relationship between God and humankind. In such a view, the religious framework of Christianity was aligned with scientific naturalism, and non-Christian supernaturalism was aligned with superstition.

For over fifteen hundred years we have been using the term *religion* without fully realizing its origin and development. Scholars have used the term to identify and discuss the supernaturalism of both non-Christian and Christian traditions. But while ancient civilizations such as the Greeks, Romans, Chinese, and Hindus had elaborate beliefs and activities that we associate with supernaturalism, they did not have "religion," i.e., a formulation that combines scientific knowledge and supernaturalism. Thus labels such as Greek religion, Roman religion, Chinese religion, Hindu religion, and so on are erroneous. It would be more appropriate to discard the use of the term *religion* and instead attempt to define and discuss Christian supernaturalism, just as we describe and discuss other supernaturalisms.

Is there conflict or cooperation between supernaturalism and science? No. Supernaturalism belongs to the pan-human myth-making activity that generates models of personal/cultural coherence and integration through the formulations of supernatural beings and supernatural power. Science belongs

---

*Jacob Pandian is professor of anthropology at California State University, Fullerton. He can be reached at the Department of Anthropology, California State University, Fullerton, California 92834-6846; telephone number 714-278-3294; or e-mail at jpandian@fullerton.edu.*

to the pan-human analytic activity that generates accurate models to approximate, explain, and use nature.

Is there conflict or cooperation between Christian religion and science? Yes. Some cultural traditions, including the Christian tradition, have attempted to merge supernaturalism and science. Religion is the product of such an attempt, and the debate on cooperation between religion and science is a renewed attempt to subordinate science to supernaturalism. The first special issue of the SKEPTICAL INQUIRER devoted to science and religion (Frazier 1999) failed to note the fact that religion was a conceptual framework, a cultural category, which the church fathers of the medieval period developed to link science and supernaturalism epistemologically in order to proclaim Christianity as the true explanation of the world and humankind.

Many respected scientists appear to be unaware of this epistemological link. Stephen Jay Gould (1999a) notes that "Science and religion should be equal, mutually respecting partners, each the master of its own domain and with each domain vital to human life in a different way." In his book *Rocks of Ages: Science and Religion in the Fullness of Life* (1999b), Gould writes: "I do not see how science and religion could be unified, or even synthesized, under any common scheme of explanation or analysis; but I also do not

understand why the two enterprises should experience conflict. Science tries to document the factual character of the natural world, and to develop theories that coordinate and explain these facts. Religion, on the other hand, operates in the equally important, but utterly different, realm of human purposes, meanings and values—subjects that the factual domain of science might illuminate, but never resolve."

We can agree with Gould's assessment of the relationship (or the lack of relationship) between science and religion *only* if the term *supernaturalism* is substituted for the term *religion*. I am surprised and puzzled that Gould, who has delved into historical issues in many of his essays, failed to make note of the reasons why and how the framework of religion developed.

Arising in the Roman cultural tradition, the Latin term *religio* had multiple meanings such as "the acquisition and possession of supernatural power" and "the performance of rituals for supernatural beings." *Religio* referred to activities that dealt with supernatural powers and beings, and not with a conceptual model of the world. *Religio* was not linked or contrasted with science in the pre-Christian traditions of the West, but the medieval Christian church fathers such as Saint Augustine used *religio* to signify the true knowledge about the nature of the world and humankind. The church, with its hierarchical priesthood, became the custodian of this true knowledge embodied in religion, combining supernaturalism and science.

### **Attempts to Integrate Religion Into Science**

Contemporary efforts to represent science and religion as two ways of searching for true knowledge are essentially a



continuation and revitalization of the medieval notion of religion. We are inundated with statements such as “evolution is God’s way of organizing the natural world,” “evolution is God’s way of creating human self-awareness,” “scientific discoveries reveal God’s design,” and “science is God’s gift to humankind.” There are scientists who intentionally or unintentionally confuse the separation of supernaturalism and science by confusing their personal supernaturalism and their objects of inquiry and, in turn, lend scientific legitimacy to religion.

The American scientist Dr. Richard Sneed, in an interview on CNN (1999), advocated human cloning with comments such as the following: God created humans in God’s image; God would not have given the intelligence to clone unless God wanted cloning; and cloning was a way of getting close to God. Peter Gosselin (2000) reported that Francis Collins, who runs the Human Genome Research Institute, is a “rare combination of premier scientist and devout Christian. [Collins] professes belief in a God that is beyond the reach of science. He says the pursuit of the genetic code is not, as some worry, an attempt by humans to play God, but only humans’ way of admiring God’s handiwork. ‘God is not threatened by all this’ he said in a television interview. ‘I think God thinks it’s wonderful that we puny creatures are going about the business of trying to understand how our instruction book works, because it’s a very elegant instruction book indeed.’”

God can be and is used to justify and legitimize any custom or activity, including science. God can also serve as a vehicle to prevent free inquiry and critical thinking in areas that are prohibited in the name of God, whose prohibition is verified only by the custodians of God and those who accept the custodial claims made in the name of God. Over a hundred years ago, the theologian/biblical scholar/anthropologist William Robertson Smith unsuccessfully defended himself as a scientist who had the moral duty to explore the cultural foundations of Christianity. He was tried for heresy by the Free Church of Scotland and defrocked. His defense was that if God did not want scientific research on discovering the origins of customs, God would not have endowed humans with rationality; he argued that the non-use of rationality in the furtherance of science was fundamentally a non-Christian attitude. Smith’s inquisitors did not accept his defense because in their view the Bible was the revealed truth about the nature of the world and humans, and humans could not fathom the mind of God.

The intellectual history of the past five hundred years has been one of religion attempting to preempt and/or incorporate scientific discoveries as religious truths. Church-affiliated or sectarian universities were built to produce and disseminate religious truths as they were supported by science. If and when scientific discoveries could not be formulated and presented as religious truths, there were inquisitorial persecutions of scientists who were identified as heretics or as atheists. The teaching of “natural theology” and its opposition to the Darwinian model of

life forms prevailed for a long time in academia. We now have departments of religion or religious studies in academia that continue the same intellectual tradition. What occurs today is a much more sophisticated and nuanced attempt to discredit the foundations of science through spurious platitudes such as “religion and science must respect each other,” “religion and science must cooperate to seek the basis of reality,” “religion and science have a common ground,” and “religion and science must seek together to better the conditions of human life.” These statements contain expressions that have universal appeal: “respect for each other,” “cooperation,” and “looking for a common ground for discourse and the search for the betterment of human condi-

**God can serve as a vehicle to prevent  
free inquiry and critical thinking in areas that  
are prohibited in the name of God, whose  
prohibition is verified only by the custodians  
of God and those who accept the  
custodial claims made in the name of God.**

tions” are laudable goals of all human beings. But by linking supernaturalism and science epistemologically, a distorted view of science is created, which could lead to the rejection of the scientific method because it discredits God’s design or plan.

The scholars of the Enlightenment who did so much to affirm the scientific method and liberate scientific research from supernaturalism failed to recognize that religion was a medieval Christian invention that was developed to oppose what the Church claimed to be pagan, magical, and demonic supernaturalism. Many scholastic treatises on God and the world were viewed by Enlightenment thinkers as facilitating the scientific understanding of the world—for example, formulations concerning a rational God and the rationality of the world, with humans endowed with reason to discover the rationality of the world. Enlightenment thinkers for the most part supported the ethnocentric assumption that religion was superior and more advanced than primitive supernaturalism and that the West had progressed and advanced along the evolutionary ladder because of the applications of rationality to discover the laws of nature and create rational institutions. The Enlightenment, which did so much to revive the Greek ideals of science, was caught in the Christian theological assertions about the nature of religion and supernaturalism. When the exponents of the Enlightenment attacked primitive irrationality as standing in the way of progress, the focus was on non-Western peoples and cultures who, in the view of these scholars, embodied supernaturalism.

The anthropological discourse on humankind was (and is) equally caught in the Christian theological assertions about the nature of religion and supernaturalism. Nineteenth-century sociologists and anthropologists postulated that magic, witchcraft, and divination constituted beliefs and practices that preceded religion and monotheism, and that monotheism and religion manifested themselves only in the higher stages of

# Science and Religion: Are They Compatible?



and hear thought-provoking talks critiquing (or, in some cases, defending):

- ✓ Near-Death Experiences
- ✓ The Medical Effects of Prayer at a Distance
- ✓ Intelligent Design: Creation/Evolution and Darwinism
- ✓ New Cosmologies and Religion
- ✓ Spiritualism and Science
- ✓ The Existence of Souls

We'll also feature meetings of local groups; a concurrent session on Science, Religion, and African Americans; and a session on Science and Islam. We'll have the pleasure of entertainment and education at the hands of nationally known physicist and showman **David G. Willey**, and—

Imagine getting to hear all these superb speakers in one meeting:

- Jim Alcock
- Michael Behe
- Patricia Churchland
- Antony Flew
- Adolf Grünbaum
- Karl Jansen
- Raymond Moody
- Steven Pinker
- Gary Posner
- Eugenie Scott
- Wole Soyinka
- Matt Young
- Hector Avalos
- Susan Blackmore
- Jerome W. Elbert
- Owen Gingerich
- Ray Hyman
- Paul Kurtz
- Joe Nickell
- Massimo Pigliucci
- Gary E. Schwartz
- Quentin Smith
- Vic Stenger

\*The registration fee will be only \$79 for students who are currently enrolled in classes (copy of current student identification required).

Make plans now to be in Atlanta, at the Atlanta Airport Marriott (just \$89 a room per night, single or double, with free airport shuttle service, free parking, and first class service), on Friday through Sunday, November 9–11.

## Be Part of the First CENTER FOR INQUIRY INTERNATIONAL CONFERENCE!

**You're invited** to what may just be the finest conference you've ever had a chance to attend—the Center for Inquiry's first International Conference. For only \$149\* (we're holding the line on costs), you can come to Atlanta

**Center  
for  
Inquiry**

**CSICOP**  
THE COMMITTEE FOR THE SCIENTIFIC INVESTIGATION  
OF CLAIMS OF THE PARANORMAL

To register, complete the form below and send with your payment to **The Center for Inquiry, ATTN: November Conference, P. O. Box 741, Amherst NY 14226-0741**, or call credit card charges (Visa, MasterCard or American Express) to 1-800-458-1366. Please note: You must reserve your sleeping room(s) directly with the hotel. Call 404-766-7900 and ask for the Center for Inquiry conference rate. Note: Room rate is only guaranteed until **October 8, 2001**.

### REGISTRATION FORM

**YES!** Register \_\_\_\_\_ person(s) for the Center for Inquiry Conference, "Science and Religion: Are They Compatible?"

NAME \_\_\_\_\_ DAYTIME PHONE \_\_\_\_\_ E-MAIL \_\_\_\_\_

ADDRESS \_\_\_\_\_ CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

Number	Item	Price Each	Total Price
	<b>Adult Conference Registration</b> (per person—does not include meals)	\$149	
	<b>Student Conference Registration</b> (per person—does not include meals) <i>enclose photocopy of current student ID for each student registration requested</i>	\$79	
	<b>Friday Luncheon</b> <i>World-class speaker to be announced</i>	\$25	
	<b>Saturday Luncheon</b> <i>World-class speaker to be announced</i>	\$25	
	<b>Saturday Banquet</b> <i>With David G. Willey "mad scientist" extravaganza and international Awards Ceremony</i>	\$35	

TOTAL: \$ \_\_\_\_\_

**PAYMENT:** I enclose  check/M.O. payable to Center for Inquiry or Charge to my  MasterCard  Visa

Card Number: \_\_\_\_\_ Expiration: \_\_\_\_\_ Signature: \_\_\_\_\_

(required for charges)

human mental development. There was also hope that religion would be replaced by science as (and when) the human mind progressed to attain positivistic understanding of natural phenomena. Twentieth-century anthropologists and sociologists devoted considerable time to defining religion, with definitions ranging from religion as supernaturalism to religion as sacred or sanctified values of society, and as the quest for ultimate meaning and reality. Postmodernists have reflected upon whether the definition of religion as supernaturalism is an ethnocentric Western assumption, suggesting that religion should be understood as a system of ordering the world and human life.

### Defining Terms and Clarifying Arguments

Perhaps it would clarify discussion if we discarded the use of the term *religion* and substituted the term *supernaturalism*. As I noted earlier, supernaturalism is a cultural universal. Historically humans have created beliefs and practices associated with supernatural beings and supernatural powers, and these beliefs and practices have been used to construct sacred self and group identities and to formulate models or narratives of coherence and meaning to cope with feelings of helplessness, encounters with suffering and injustice, realities of uncertainty, and fear and anxiety associated with sickness and death. Humans have created innumerable forms of the supernatural world with an infinite range of attributes, and this process of creating and maintaining the supernatural world will continue. Science does not attempt to replace or duplicate this creative process, but it attempts to study the relevance and significance of this process in human life.

It is necessary to understand that the concept of religion that developed in the medieval period combines supernaturalism and science to formulate statements about the world and humankind. In this sense, religion does not complement science but pre-empts and co-opts scientific discourse in support of supernaturalism. The most overt expression of how religion uses science in affirming supernaturalism is found in the evangelical or fundamental Christian perspective known as "scientific creationism" or "creationist science." "Creation scientists" do not see the combination of creation myths and science as an oxymoron but as a way of using the vocabulary of science to foster biblical discourse as scientific.

A recent example of how supernaturalism and science are combined is found in a lawsuit filed in the Minnesota Court of Appeals by a fundamentalist Christian teacher, Lod LaVake. As reported by Joseph Tyrangiel (2000), LaVake's attorney has claimed that "For the first time, we have a teacher who is not asking to teach creationism. He simply wants to teach science the way he thinks—and the way a lot of people think—it should be taught, in a more balanced way." The implication is that Mr. LaVake should be permitted to teach science the way it supports his belief and the belief of many other fundamentalist Christians.

Tyrangiel correctly notes, "Indeed, creationists have become

a lot more shrewd. For years they'd propose antievolution laws and lesson plans brimming with religious language, and for years their cases were struck down on constitutional grounds. Like LaVake, they began co-opting the logic of Darwinists and speaking in a softer voice."

Religion does not complement science but pre-empts and

**It is necessary to understand that the concept of religion that developed in the medieval period combines supernaturalism and science to formulate statements about the world and humankind. In this sense, religion does not complement science but pre-empts and co-opts scientific discourse in support of supernaturalism.**

co-opts scientific discourse in support of supernaturalism. We must recognize the importance of supernaturalism in human life and foster its study in terms of why and how humans create and maintain it. The use of the term *religion* to discuss the role of supernaturalism confuses and distorts our understanding of the latter. To the public, the use of *religion* would be more palatable and respectable than the use of the term *supernaturalism* because *supernaturalism* conjures up images of irrational practices such as witchcraft and magic as opposed to religion, which is viewed as a rational, scientific understanding of the world. When scientific research discredits the assumptions of religion, there is conflict between science and religion unless the scientific discoveries are incorporated into the religious framework.

As a first step toward resolving the "science and religion" controversy, and focusing on the real issues that reveal the nature of science and supernaturalism, I suggest that we rename the "departments of religion" in academia and call them "departments of supernaturalism." It is more appropriate to have a discourse on "comparative supernaturalism" than on "comparative religion" because religion, as I noted earlier, is an emic, indigenous category that acquired significance in the medieval period of the Western tradition in an attempt to combine supernaturalism and science within the framework of religion.

### References

- Barbour, I.G. 1997. *Religion and Science*. New York: Harper Collins.
- Easterbrook, G. 1999. Grappling with science and religion. *Los Angeles Times*, March 14.
- Estling, R. 2000. Templeton and the AAAS. *SKEPTICAL INQUIRER* 4(24), July/August.
- Frazier, K. 1999. A special issue on science and religion. *SKEPTICAL INQUIRER* 23(4), July/August.
- Gould, S.J. 1999a. Dorothy, it's really Oz. *Time*, August 23.
- \_\_\_\_\_. 1999b. *Rocks of Ages: Science and Religion in the Fullness of Life*. New York: W.W. Norton and Company.
- Gosselin, P.G. 2000. Public project's chief: Quiet but no pushover. *Los Angeles Times*, June 27.
- Smith, W.C. [1962] 1991. *The Meaning and End of Religion*. Minneapolis: Fortress Press.
- Sneed, R. 1999. Interview. Cable News Network, July 11.
- Stammer, L.B. 2000. Physicist awarded \$948,000 Templeton Prize. *Los Angeles Times*, March 23.
- Tyrangiel, J. 2000. The science of dissent. *Time*, July 10. □



# Design Yes, Intelligent No

## *A Critique of Intelligent Design Theory and Neocreationism*

---

*The claims by Behe, Dembski, and other "intelligent design" creationists that science should be opened to supernatural explanations and that these should be allowed in academic as well as public school curricula are unfounded and based on a misunderstanding of both design in nature and of what the neo-Darwinian theory of evolution is all about.*

MASSIMO PIGLIUCCI

A new brand of creationism has appeared on the scene in the last few years. The so-called neocreationists largely do not believe in a young Earth or in a too literal interpretation of the Bible. While still mostly propelled by a religious agenda and financed by mainly Christian sources such as the Templeton Foundation and the Discovery Institute, the intellectual challenge posed by neocreationism is sophisticated enough to require detailed consideration (see Edis 2001; Roche 2001).

Among the chief exponents of Intelligent Design (ID) theory, as this new brand of creationism is called, is William Dembski, a mathematical philosopher and author of *The Design Inference* (1998a). In that book he attempts to show

that there must be an intelligent designer behind natural phenomena such as evolution and the very origin of the universe (see Pigliucci 2000 for a detailed critique). Dembski's (1998b) argument is that modern science ever since Francis Bacon has illicitly dropped two of Aristotle's famous four types of causes from consideration altogether, thereby unnecessarily restricting its own explanatory power. Science is thus incomplete, and intelligent design theory will rectify this sorry state of affairs, if only close-minded evolutionists would allow Dembski and company to do the job.

### Aristotle's Four Causes in Science

Aristotle identified *material* causes, what something is made of; *formal* causes, the structure of the thing or phenomenon; *efficient* causes, the immediate activity producing a phenomenon or object; and *final* causes, the purpose of whatever object we are investigating. For example, let's say we want to investigate the "causes" of the Brooklyn Bridge. Its material cause would be encompassed by a description of the physical materials that went into its construction. The formal cause is the fact that it is a bridge across a stretch of water, and not either a random assembly of pieces or another kind of orderly structure (such as a skyscraper). The efficient causes were the blueprints drawn by engineers and the labor of men and machines that actually assembled the physical materials and put them into place. The final cause of the Brooklyn Bridge was the necessity for people to walk and ride between two land-masses without getting wet.

Dembski maintains that Bacon and his followers did away with both formal and final causes (the so-called teleonomic causes, because they answer the question of *why* something is) in order to free science from philosophical speculation and ground it firmly into empirically verifiable statements. That may be so, but things certainly changed with the work of Charles Darwin (1859). Darwin was addressing a complex scientific question in an unprecedented fashion: he recognized that living organisms are clearly designed in order to survive and reproduce in the world they inhabit; yet, as a scientist, he worked within the framework of naturalistic explanations of such design. Darwin found the answer in his well-known theory of natural selection. Natural selection, combined with the basic process of mutation, makes design possible in nature without recourse to a supernat-

ural explanation because selection is definitely nonrandom, and therefore has "creative" (albeit nonconscious) power. Creationists usually do not understand this point and think that selection can only eliminate the less fit; but Darwin's powerful insight was that selection is also a cumulative process—analogueous to a ratchet—which can build things over time, as long as the intermediate steps are also advantageous.

Darwin made it possible to put all four Aristotelian causes back into science. For example, if we were to ask what are the causes of a tiger's teeth within a Darwinian framework, we would answer in the following manner. The material cause is provided by the biological materials that make up the teeth; the formal cause is the genetic and developmental machinery that distinguishes a tiger's teeth from any other kind of biological structure; the efficient cause is natural selection promoting some genetic variants of the tiger's ancestor over their competitors; and the final cause is provided by the fact that having teeth structured in a certain way makes it easier for a tiger to procure its prey and therefore to survive and reproduce—the only "goals" of every living being.

**Natural selection, combined with the basic process of mutation, makes design possible in nature without recourse to a supernatural explanation because selection is definitely nonrandom, and therefore has "creative" (albeit nonconscious) power.**



Therefore, design is very much a part of modern science, at least whenever there is a need to explain an apparently designed structure (such as a living organism). All four Aristotelian causes are fully reinstated within the realm of scientific investigation, and science is not maimed by the disregard of some of the causes acting in the world. What then is left of the argument of Dembski and of other proponents of ID? They, like William Paley (1831) well before them, make the mistake of confusing natural design and intelligent design by rejecting the possibility of the former and concluding that any design must by definition be intelligent.

**Aristotle identified final causes with formal causes as far as living organisms are concerned. He rejected chance and randomness (as do modern biologists) but did not invoke an intelligent designer in its place, contra Dembski.**

One is left with the lingering feeling that Dembski is being disingenuous about ancient philosophy. It is quite clear, for example, that Aristotle himself never meant his teleonomic causes to imply intelligent design in nature (Cohen 2000). His mentor, Plato (in *Timaeus*), had already concluded that the designer of the universe could not be an omnipotent god, but at most what he called a Demiurge, a lesser god who evidently messes around with the universe with mixed results. Aristotle believed that the scope of god was even more limited, essentially to the role of prime mover of the universe, with no additional direct interaction with his creation (i.e., he was one of the first deists). In *Physics*, where he discusses the four causes, Aristotle treats nature itself as a craftsman, but clearly devoid of forethought and intelligence. A tiger develops into a tiger because it is in its nature to do so, and this nature is due to some physical essence given to it by its father (we would call it DNA) which starts the process out. Aristotle makes clear this rejection of god as a final cause (Cohen 2000) when he says that causes are not external to the organism (such as a designer would be) but *internal* to it (as modern developmental biology clearly shows). In other words, the final cause of a living being is not a plan, intention, or purpose, but simply intrinsic in the developmental changes of that organism. Which means that Aristotle identified final causes with formal causes as far as living organ-

---

*Massimo Pigliucci is associate professor of ecology and evolutionary biology at the University of Tennessee, Knoxville, TN 37996-1100, and author of Tales of the Rational: Skeptical Essays About Nature and Science. His essays can be found at <http://fp.bio.utk.edu/skeptic>.*

isms are concerned. He rejected chance and randomness (as do modern biologists) but did not invoke an intelligent designer in its place, contra Dembski. We had to wait until Darwin for a further advance on Aristotle's conception of the final cause of living organisms and for modern molecular biology to achieve an understanding of their formal cause.

### **Irreducible Complexity**

There are two additional arguments proposed by ID theorists to demonstrate intelligent design in the universe: the concept of "irreducible complexity" and the "complexity-specification" criterion. Irreducible complexity is a term introduced in this context by molecular biologist Michael Behe in his book *Darwin's Black Box* (1996). The idea is that the difference between a natural phenomenon and an intelligent designer is that a designed object is planned in advance, with forethought. While an intelligent agent is not constrained by a step-by-step evolutionary process, an evolutionary process is the only way nature itself can proceed given that it has no planning capacity (this may be referred to as incremental complexity).

Irreducible complexity then arises whenever all the parts of a structure have to be present and functional simultaneously for it to work, indicating—according to Behe—that the structure was designed and could not possibly have been gradually built by natural selection.

Behe's example of an irreducibly complex object is a mousetrap. If you take away any of the minimal elements that make the trap work it will lose its function; on the other hand, there is no way to assemble a mousetrap gradually from a natural phenomenon, because it won't work until the last piece is assembled. Forethought, and therefore intelligent design, is necessary. Of course it is. After all, mousetraps as purchased in hardware stores are indeed human products; we know that they are intelligently designed. But what of biological structures? Behe claims that, while evolution can explain a lot of the visible diversity among living organisms, it is not enough when we come to the molecular level. The cell and several of its fundamental components and biochemical pathways are, according to him, irreducibly complex.

The problem with this statement is that it is contradicted by the available literature on comparative studies in microbiology and molecular biology, which Behe conveniently ignores (Miller 1996). For example, geneticists are continuously showing that biochemical pathways are partly redundant. Redundancy is a common feature of living organisms where different genes are involved in the same or in partially overlapping functions. While this may seem a waste, mathematical models show that evolution by natural selection has to produce molecular redundancy because when a new function is necessary it cannot be carried out by a gene that is already doing something else, without compromising the original



function. On the other hand, if the gene gets duplicated (by mutation), one copy is freed from immediate constraints and can slowly diverge in structure from the original, eventually taking over new functions. This process leads to the formation of gene "families," groups of genes clearly originated from a single ancestral DNA sequence, and that now are diversified and perform a variety of functions (e.g., the globins, which vary from proteins allowing muscle contraction to those involved in the exchange of oxygen and carbon dioxide in the blood). As a result of redundancy, mutations can knock down individual components of biochemical pathways without compromising the overall function—contrary to the expectations of irreducible complexity.

(Notice that creationists, never ones to lose a bit, have also tried to claim that redundancy is yet another evidence of intelligent design, because an engineer would produce backup systems to minimize catastrophic failures should the primary components stop functioning. While very clever, this argument once again ignores the biology: the majority of duplicated genes end up as pseudogenes, literally pieces of molecular junk that are eventually lost forever to any biological utility [Max 1986].)

To be sure, there are several cases in which biologists do not know enough about the fundamental constituents of the cell to be able to hypothesize or demonstrate their gradual evolution. But this is rather an argument from ignorance, not positive evidence of irreducible complexity. William Paley advanced exactly the same argument to claim that it is impossible to explain the appearance of the eye by natural means. Yet, today biologists know of several examples of intermediate forms of the eye, and there is evidence that this structure evolved several times independently during the history of life on Earth (Gehring and Ikeo 1999). The answer to the classical creationist question, "What good is half an eye?" is "Much better than no eye at all!"

However, Behe does have a point concerning irreducible complexity. It is true that some structures simply cannot be explained by slow and cumulative processes of natural selection. From his mousetrap to Paley's watch to the Brooklyn Bridge, irreducible complexity is indeed associated with intelligent design. The problem for ID theory is that there is no evidence so far of irreducible complexity in living organisms.

### The Complexity-Specification Criterion

William Dembski uses an approach similar to Behe to back up creationist claims, in that he also wants to demonstrate that intelligent design is necessary to explain the complexity of nature. His proposal, however, is both more general and more deeply flawed. In his book *The Design Inference* (Dembski 1998a) he claims that there are three essential types of phenomena in nature: "regular," random, and designed (which he assumes to be intelligent). A regular phenomenon would be a simple repetition explainable by the fundamental laws of

physics, for example the rotation of Earth around the Sun. Random phenomena are exemplified by the tossing of a coin. Design enters any time that two criteria are satisfied: complexity and specification (Dembski 1998b).

There are several problems with this neat scenario. First of all, leaving aside design for a moment, the remaining choices are not limited to regularity and randomness. Chaos and complexity theory have established the existence of self-organizing

**There are several cases in which biologists do not know enough about the fundamental constituents of the cell to be able to hypothesize or demonstrate their gradual evolution. But this is rather an argument from ignorance, not positive evidence of irreducible complexity.**

phenomena (Kauffman 1993; Shanks and Joplin 1999), situations in which order spontaneously appears as an emergent property of complex interactions among the parts of a system. And this class of phenomena, far from being only a figment of mathematical imagination as Behe maintains, are real. For example, certain meteorological phenomena such as tornados are neither regular nor random but are the result of self-organizing processes.

But let us go back to complexity-specification and take a closer look at these two fundamental criteria, allegedly capable of establishing intelligent agency in nature. Following one of Dembski's examples, if SETI (Search for Extraterrestrial Intelligence) researchers received a very short signal that may be interpreted as encoding the first three prime numbers, they would probably not rush to publish their findings. This is because even though such signal could be construed as due to some kind of intelligence, it is so short that its occurrence can just as easily be explained by chance. Given the choice, a sensible scientist would follow Ockham's razor and conclude that the signal does not constitute enough evidence for extraterrestrial intelligence. However, also according to Dembski, if the signal were long enough to encode all the prime numbers between 2 and 101, the SETI people would open the champagne and celebrate all night. Why? Because such signal would be both too complex to be explained by chance and would be specifiable, meaning that it is not just a random sequence of numbers, it is an intelligible message.

The specification criterion needs to be added because complexity by itself is a necessary but not sufficient condition for design (Roche 2001). To see this, imagine that the SETI staff receives a long but random sequence of signals. That sequence would be very complex, meaning that it would take a lot of information to actually archive or repeat the sequence (you have to know where all the 0s and 1s are), but it would not be specifiable because the sequence would be meaningless.

Dembski is absolutely correct that plenty of human activities, such as SETI, investigations into plagiarism, or encryption,

depend on the ability to detect intelligent agency. Where he is wrong is in assuming only one kind of design. For him design equals intelligence and, even though he admitted that such an intelligence may be an advanced extraterrestrial civilization, his preference is for a god, possibly of the Christian variety.

The problem is that natural selection, a natural process, also fulfills the complexity-specification criterion, thereby demonstrating that it is possible to have unintelligent design in nature. Living organisms are indeed complex. They are also specifiable, meaning that they are not random assemblages of organic compounds, but are clearly formed in a way that enhances their chances of surviving and reproducing in a changing and complex environment. What, then, distinguishes organisms from the Brooklyn Bridge? Both meet Dembski's complexity-specification criterion, but only the bridge is irreducibly complex. This has important implications for design.

In response to some of his critics, Dembski (2000) claimed that intelligent design does not mean optimal design. The criticism of suboptimal design has often been advanced by evolutionists who ask why God would do such a sloppy job with creation that even a mere human engineer can easily determine where the flaws are. For example, why is it that human beings have hemorrhoids, varicose veins, backaches, and foot aches? If you assume that we were "intelligently" designed, the answer must be that the designer was rather incompetent—something that would hardly please a creationist. Instead, evolutionary theory has a single answer to all these questions: humans evolved bipedalism (walking with an erect posture) only very recently, and natural selection has not yet fully adapted our body to the new condition (Olshansky et al. 2001). Our closest primate relatives, chimps, gorillas, and the like, are better adapted to their way of life, and therefore are less "imperfect" than ourselves!

Dembski is of course correct in saying that intelligent design does not mean optimal design. As much as the Brooklyn Bridge is a marvel of engineering, it is not perfect, meaning that it had to be constructed within the constraints and limitations of the available materials and technology, and it still is subject to natural laws and decay. The bridge's vulnerability to high winds and earthquakes, and its inadequacy to bear a volume of traffic for which it was not built can be seen as similar to the back pain caused by our recent evolutionary history. However, the imperfection of living organisms, already pointed out by Darwin, does do away with the

idea that they were created by an omnipotent and omnibenevolent creator, who surely would not be limited by laws of physics that He Himself made up from scratch.

## The Four Fundamental Types of Design and How to Recognize Them

Given these considerations, I would like to propose a system that includes both Behe's and Dembski's suggestions, while at the same time showing why they are both wrong in concluding that we have evidence for intelligent design in the universe. Figure 1 summarizes my proposal. Essentially, I think there are four possible kinds of design in nature which, together with Dembski's categories of "regular" and random phenomena, and the addition of chaotic and self-organizing phenomena, truly exhaust all possibilities known to us. Science recognizes regular, random, and self-organizing phenomena, as well as the first two types of design described in figure 1. The other two types of design are possible in principle, but I contend that there is neither empirical evidence nor logical reason to believe that they actually occur.

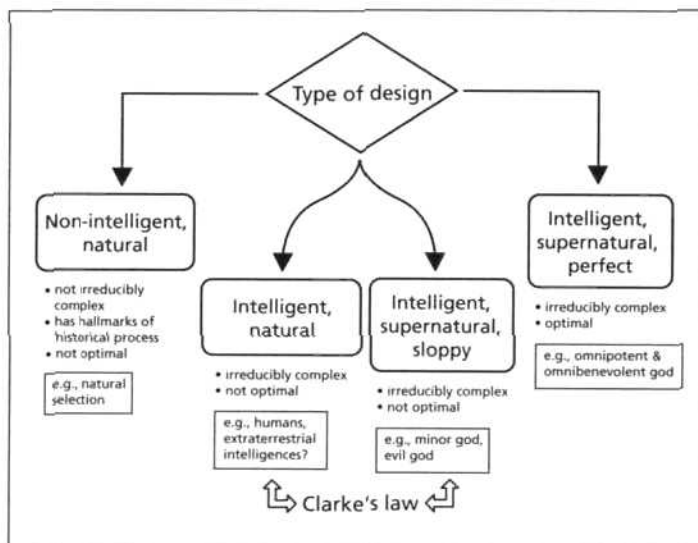


Figure 1: The four possible kinds of design in nature and how to distinguish them.

The first kind of design is *non-intelligent-natural*, and it is exemplified by natural selection within Earth's biosphere (and possibly elsewhere in the universe). The results of this design, such as all living organisms on Earth, are not irreducibly complex, meaning that they can be produced by incremental, continuous (though not necessarily gradual) changes over time. These objects can be clearly attributed to natural processes also because of two other reasons: they are never optimal (in an engineering sense) and they are clearly the result of historical processes.

For example, they are full of junk, nonutilized or underutilized parts, and they resemble similar objects occurring simultaneously or previously in time (see, for example, the fossil record). Notice that some scientists and philosophers of science feel uncomfortable in considering this "design" because they equate the term with intelligence. But I do not see any reason to embrace such limitation. If something is shaped over time—by whatever means—such that it fulfills a certain function, then it is designed and the question is simply of how such design happened to materialize. The teeth of a tiger are clearly designed to efficiently cut into the flesh of its prey and therefore to promote survival and reproduction of tigers bearing such teeth.

The second type of design is *intelligent-natural*. These artifacts are usually irreducibly complex, such as a watch designed by a human. They are also not optimal, meaning that they clearly compromise between solutions to different problems

(trade-offs) and they are subject to the constraints of physical laws, available materials, expertise of the designer, etc. Humans may not be the only ones to generate these objects, as the artifacts of any extraterrestrial civilization would fall into the same broad category.

The third kind of design, which is difficult, if not impossible, to distinguish from the second, is what I term *intelligent-supernatural-sloppy*. Objects created in this way are essentially indistinguishable from human or ET artifacts, except that they would be the result of what the Greeks called a Demiurge, a minor god with limited powers. Alternatively, they could be due to an evil omnipotent god that just amuses himself with suboptimal products. The reason *intelligent-supernatural-sloppy design is not distinguishable from some instances (but by all means not all) of intelligent-natural design* is Arthur C. Clarke's famous third law: from the point of view of a technologically less advanced civilization, the technology of a very advanced civilization is essentially indistinguishable from magic (such as the monolith in his *2001: A Space Odyssey*). I would be very interested if someone could suggest a way around Clarke's law.

Finally, we have *intelligent-supernatural-perfect* design, which is the result of the activity of an omnipotent and omnibenevolent god. These artifacts would be both irreducibly complex and optimal. They would not be constrained by either trade-offs or physical laws (after all, God created the laws themselves). While this is the kind of god many Christian fundamentalists believe in (though some do away with the omnibenevolent part), it's quite clear from the existence of human evil as well as of natural catastrophes and diseases, that such god does not exist. Dembski recognizes this difficulty and, as I pointed out above, admits that his intelligent design could even be due to a very advanced extraterrestrial civilization, and not to a supernatural entity at all (Dembski 2000).

## Conclusions

In summary, it seems to me that the major arguments of Intelligent Design theorists are neither new nor compelling: 1) It is simply not true that science does not address all Aristotelian causes, whenever design needs to be explained; 2) While irreducible complexity is indeed a valid criterion to distinguish between intelligent and non-intelligent design, these are not the only two possibilities, and living organisms are not irreducibly complex (e.g., see Shanks and Joplin 1999); 3) The complexity-specification criterion is actually met by natural selection, and cannot therefore provide a way to distinguish intelligent from non-intelligent design; 4) If supernatural design exists at all (but where is the evidence or compelling logic?), this is certainly not of the kind that most religionists would likely subscribe to, and it is indistinguishable from the technology of a very advanced civilization.

Therefore, Behe's, Dembski's, and other creationists' (e.g., Johnson 1997) claims that science should be opened to supernatural explanations and that these should be allowed in academic as well as public school curricula are unfounded and based on a misunderstanding of both design in nature and of what the neo-Darwinian theory of evolution (Mayr and Provine 1980) is all about.

**Why is it that human beings have hemorrhoids, varicose veins, backaches, and foot aches? If you assume that we were "intelligently" designed, the answer must be that the designer was rather incompetent—something that would hardly please a creationist.**

## Acknowledgments

I would like to thank Melissa Brenneman, Will Provine, and Niall Shanks for insightful comments on earlier versions of this article, as well as Michael Behe, William Dembski, Ken Miller, and Barry Palevitz for indulging in correspondence and discussions with me over these matters.

## References

- Behe, M.J. 1996. *Darwin's Black Box: The Biochemical Challenge to Evolution*. New York, N.Y.: Free Press.
- Cohen, S.M. 2000. The four causes. Accessed on 5/16/00 at [www.faculty.washington.edu/smcohen](http://www.faculty.washington.edu/smcohen).
- Darwin, C. [1859] 1910. *The Origin of Species by Means of Natural Selection: Or, the Preservation of Favored Races in the Struggle for Life*. New York, N.Y.: A.L. Burt.
- Dembski, W.A. 1998a. *The Design Inference*. Cambridge, UK: Cambridge University Press.
- . 1998b. Reinstating design within science. *Rhetoric & Public Affairs* 1:503–518.
- . 2000. Intelligent design is not optimal design. Accessed on 2/3/00 at [www.meta-list.org](http://www.meta-list.org).
- Edis, T. 2001. Darwin in mind: Intelligent Design meets artificial intelligence. *SKEPTICAL INQUIRER* 25(2): 35–39.
- Gehring, W.J., and K. Ikeo. 1999. Pax 6, mastering eye morphogenesis and eye evolution. *Trends in Genetics* 15:371–377.
- Johnson, P. 1997. *Defeating Darwinism by Opening Minds*. Downers Grove, Illinois: InterVarsity Press.
- Kauffman, S.A. 1993. *The Origins of Order*. New York, N.Y.: Oxford University Press.
- Max, E.E. 1986. Plagiarized errors and molecular genetics: Another argument in the evolution-creation controversy. *Creation/Evolution* 9:34–46.
- Mayr, E., and W.B. Provine. 1980. *The Evolutionary Synthesis: Perspectives on the Unification of Biology*. Cambridge, Mass.: Harvard University Press.
- Miller, K.R. 1996. The biochemical challenge to evolution. Accessed on 10/30/99 at [biomed.brown.edu/faculty/M/Miller](http://biomed.brown.edu/faculty/M/Miller).
- Olshansky, S.J., A.C. Bruce, and R.N. Butler. 2001. If humans were built to last. *Scientific American* March, pp. 50–55.
- Paley, W. 1831. *Natural Theology: Or, Evidences of the Existence and Attributes of the Deity, Collected from the Appearances of Nature*. Boston, Mass: Gould, Kendall, and Lincoln.
- Pigliucci, M. 2000. Chance, necessity, and the new holy war against science. A review of W.A. Dembski's *The Design Inference*. *BioScience* 50(1): pp. 79–81. January.
- Roche, D. 2001. A bit confused: creationism and information theory. *SKEPTICAL INQUIRER* 25(2):40–42.
- Shanks, N., and K.H. Joplin. 1999. Redundant complexity: A critical analysis of intelligent design in biochemistry. *Philosophy of Science* 66:268–282. □



# A Way of Life for Agnostics?

---

*T.H. Huxley's intention to have science replace religion as the authoritative source of information about life and the cosmos has succeeded beyond his expectations. Unfortunately more has been discredited than he may have intended. To help fill the resulting ethical vacuum, the author proposes a worldview for agnostics based on science and with Earth as an object for reverence.*

JAMES LOVELOCK

The naming of things is important. Our deepest thoughts are unconscious, and we need metaphors and similes to translate them into something that we, as well as the rest of humankind, can understand. This is especially true of the broad subject, Gaia theory, which is the pseudonym for Earth System Science. Many scientists seem to dislike Gaia as a name; prominent among them is the eminent evolutionary biologist John Maynard Smith. He made clear when he said of Gaia, "What an awful name to call a theory," that it was the name, the metaphor, more than the science that caused his disapproval. He was, like most scientists, well aware of the power of metaphor. William Hamilton's metaphors of selfish and spiteful genes have served wonderfully, in



Richard Dawkins's hands, to make evolutionary science comprehensible, but let us never forget that the powerful metaphor of Gaia was the gift of a great novelist. I would remind those who criticize the name Gaia that they are doing battle with William Golding, who first coined it. We should not lightly turn aside from the name Gaia because of pedantic objection.

Biologists now accept Gaia as a theory that they can try to falsify so why do they continue to object to the name itself? Surely, it cannot be metaphor envy. I think that it is something deeper, a rejection by reductionist scientists of anything that smells of holism, anything that implies that the whole may be more than the sum of its parts. I see the battle between Gaia and the selfish gene as part of an outdated and pointless war between holists and reductionists. In a sensible world, we need them both.

The philosopher Mary Midgley reminded us that Gaia has influence well beyond science. She said, "The reason why the notion of this enclosing whole concerns us is that it corrects a large and disastrous blind spot in our contemporary world view. It reminds us that we are not separate, independent autonomous entities. Since the Enlightenment, the deepest moral efforts of our culture have gone to establishing our freedom as individuals. The campaign has produced great results but like all moral campaigns it is one sided and has serious costs when the wider context is forgotten."

One of these costs is our alienation from the physical world. She went on to say, "We have carefully excluded everything non-human from our value system and reduced that system to terms of individual self interest. We are mystified—as surely no other set of people would be—about how to recognize the claims of the larger whole that surrounds us—the material world of which we are a part. Our moral and physical vocabulary, carefully tailored to the social contract, leaves no language in which to recognize the environmental crisis."

Strangely, a statesman led me to think similar thoughts. That noble and brave man, Vaclav Havel, stirred me to see that science could evolve from its self-imposed reductionist imprisonment. His courage against adversity gave his words author-

ity. When Havel was awarded the Freedom Medal of the United States he took as the title of his acceptance speech, "We are not here for ourselves alone." He reminded us that science had replaced religion as the source of knowledge but that modern science offers no moral guidance. He went on to say that recent holistic science did offer something to fill this moral

**Gaia is a theory of science and is therefore always provisional and evolving, it is never dogmatic or certain and could even be wrong. Provisional it may be but being of the palpable Earth, it is something tangible to love and fear and think we understand.**

void. He cited the anthropic principle as explaining why we are here, and Gaia as something to which we could be accountable. If we could revere our planet with the same respect and love that we gave in the past to God, it would benefit us as well as Earth. Perhaps those who have faith might see this is God's will also.

I do not think that President Havel was proposing an alternative Earth-based religion. I take his suggestion as offering something quite different. I think he offered a way of life for agnostics. Gaia is a theory of science and is therefore always provisional and evolving, it is never dogmatic or certain and could even be wrong. Provisional it may be but being of the palpable Earth, it is something tangible to love and fear and think we understand. We can put our trust—even faith—in Gaia but this is different from the cold certainty of purposeless atheism or an unwavering belief in God's purpose.

Science is not excluded from Mary Midgley's vision of our alienation from the material world. We now know enough about living organisms and the Earth System to see that we cannot explain them by reductionist science alone. The deepest error of modern biology is the entrenched belief that organisms interact only with other organisms and merely adapt to their material environment. This is as wrong as believing that the people of a village interact with their neighbors but merely adapt to the material conditions of

their cottages. In real life, both organisms and people change their environment as well as adapting to it. What matters are the consequences: if the change is for the better then those who made it will prosper; if it is for the worse then the changers risk extinction. Reductionist science grew from the clockwork logic of Descartes. It can only partially explain

**We have inherited a planet of exquisite beauty.  
It is the gift of four billion years of evolution.  
We need to regain our ancient feeling for  
Earth as an organism and revere it again.**

anything alive. Living things also use the circular logic of systems, now more fashionably known as complexity theory, where cause and effect are indistinguishable and where there is the miracle of emergence.

President Havel's thoughts led me to think about the ethic that comes from Gaia theory; it would be one with two strong rules. The first rule states that stability and resilience in ecosystems and on Earth requires the presence of firm bounds or constraints. The second rule states that those who live well with their environment favor the selection of their progeny. Imagine sermons based on these rules. Consider first the guiding hand of constraint. I can see the nods of approval. People's own experience of the need for a firm hand in the evolution of their families and in society concurs with the evolutionary experience of Earth itself.

---

*James Lovelock is an independent scientist and inventor and is perhaps best known as the progenitor of the Gaia Theory. He is a Fellow of the Royal Society and an honorary Fellow of Green College, Oxford. His most recent book is *Homage to Gaia: The Life of an Independent Scientist*, to be published in September by Oxford University Press. Address: Coombe Mill, St. Giles on the Heath, Launceston, Cornwall PL15 9RY, U.K. E-mail: [Jesjl@cs.com](mailto:Jesjl@cs.com).*

The second rule, the need to take care of the environment, brings to mind a sermon on the abominable transgression of terraforming—the technological conversion of another planet into a habitat for humans. What is so bad about terraforming is its objective to make a second home for us while we are destroying our own planet by the greedy misapplication of science and technology. It is madness to think of converting with bulldozers and agribusiness the desert planet Mars into some pale semblance of Earth when we should be improving our way of living with Earth.

The second rule also warns of the consequences of unbridled humanism. Early in the history of civilization, we realized that overreaching self-worship turns self-esteem into narcissism. It has taken almost until now to recognize that the exclusive love for our tribe or nation turns patriotism into xenophobic nationalism. We are just glimpsing the possibility that the worship of humankind can also become a bleak philosophy, which excludes all other living things, our partners in life upon Earth.

We have inherited a planet of exquisite beauty. It is the gift of four billion years of evolution. We need to regain our ancient feeling for Earth as an organism and revere it again. Gaia has been the guardian of life for all of its existence; we reject her care at our peril. We can use technology to buy us time while we reform but we remain accountable for the damage we do. The longer we take the larger the bill. If you put trust in Gaia, it can be a commitment as strong and as joyful as that of a good marriage—one where the partners put their trust in one another. The fact that they are mortal makes that trust even more precious.

Let us as scientists look more closely at the ethical and philosophical aspects of Gaia. I have put before you the proposition that, in addition to being a theory in science, Gaia offers a worldview for agnostics. This would require an interactive trust, not blind faith, and a trust that accepts that, like us, Gaia has a finite life span and is provisional. □

**You can make a lasting impact on the future of skepticism...**

**when you provide for the *Skeptical Inquirer* in your will.**

CSICOP and the *Skeptical Inquirer* changed the terms of discussion in fields ranging from pseudoscience and the paranormal to science and educational policy. You can take an enduring step to preserve their vitality when you provide for the *Skeptical Inquirer* in your will.

Your bequest to CSICOP, Inc., will help to provide for the future of skepticism as it helps to keep the *Skeptical Inquirer* financially secure. Depending on your tax situation, a charitable bequest to CSICOP may have little impact on the net size of your estate—or may even result in a greater amount being available to your beneficiaries.

We would be happy to work with you and your attorney in the development of a will or estate plan that meets your wishes. A variety of arrangements are possible, including: gifts of a fixed amount or a percentage of your estate; living trusts or gift annuities, which provide you with a lifetime income; or a contingent bequest that provides for the *Skeptical Inquirer* only if your primary beneficiaries do not survive you.

For more information, contact Barry Karr, Executive Director of CSICOP, at (716) 636-1425. All inquiries are held in the strictest confidence.



# Science, Religion, and the Galileo Affair

---

*Galileo's trouble with the Church has become a popular archetype for the historical relationship between science and religion. But this classic story of conflict between science and religion is far more complex than most people realize.*

TIMOTHY MOY

Over the past few decades, historians of science have been re-examining the “Galileo Affair”—Galileo’s trial by the Roman Catholic Church in 1633. While scholars have (naturally) been unable to come to a consensus on why Galileo was tried by the Inquisition, almost all historians agree that it was *not* primarily because Galileo believed in Copernican heliocentrism.

The facts of the case are not in dispute. In 1616, Galileo went to Rome to defend his recent writings and public statements promoting heliocentrism after some of his critics had charged that Galileo was promoting a poorly substantiated belief that was contrary to Scripture. By this point, many—perhaps most—Church officials had already concluded that

Copernicus's system was the most accurate and useful way of predicting astronomical positions (which was particularly important to the Church because of its use in calendar reform), but the question of whether the system was an accurate depiction of reality remained open. First of all, no one had yet come up with a convincing proof that Earth really flew around the Sun at great speed, as Copernicus's proposal required. And second, there were some Biblical passages that seemed to suggest that Earth was stationary at the center of the universe. This was an unusually touchy subject at the time,

**When you read his writings, you get the distinct impression that Galileo believed that expertise in astronomy and mathematics gave him (and all scientists) a special authority to make theological pronouncements and inform Rome how to run the Church.**

since the Church was in the midst of crisis stemming from the Protestant Reformation and was particularly concerned about arguments over who had authority to interpret Scripture.

During his 1616 visit, Galileo received the support of some powerful liberal theologians, particularly Cardinals Roberto Bellarmine and Maffeo Barberini, who argued that, if Copernicus's system was someday proved true, then the Church would have to re-interpret those Biblical passages that seemed to contradict it. However, they also supported the compromise that Galileo eventually agreed to: Until such definitive proof was forthcoming, Galileo should discuss heliocentrism only hypothetically, and not promote it as a true description of the heavens.

### **A Problem of Evidence**

Flash forward to 1624. By this point, Galileo had become convinced that he had precisely the proof he was looking for. Even better, his old ally, Maffeo Barberini, had by then become Pope Urban VIII. In 1624, Galileo went back to Rome and had six separate audiences with the new Pope during which he assured the pontiff that he had worked out a definitive proof of Earth's motion. Urban, intrigued by the prospect of such a demonstration, yet concerned about how the Church would handle the theological consequences, gave Galileo the green light to write about heliocentrism, but still with the understanding that he would not describe it as truth (rather than simply a useful hypothesis) unless he could really prove it.

Convinced that he had the required proof in hand, and feeling that he had the Pope's personal blessing to make his case, Galileo published his *Dialogue on the Two Chief World Systems* in

---

*Timothy Moy is a professor of the history of science at the University of New Mexico. He can be reached at: History Department, 1104 Mesa Vista Hall, University of New Mexico, Albuquerque, NM 87131; e-mail at [tdmoy@unm.edu](mailto:tdmoy@unm.edu).*

1632. It is a wittily written treatise, crafted as a dialogue between three characters: Simplicio (the geocentric Aristotelian), Salviati (the heliocentric Copernican), and Sagredo (an intelligent and well-informed neutral observer to the debate). In the *Dialogue*, Salviati systematically destroys all of Simplicio's arguments, and concludes with Galileo's new, killer proof that Earth orbits the Sun. Sagredo ultimately concludes that the brilliant Salviati (a transparent stand-in for Galileo himself) is correct, Aristotle is wrong, and everyone retires for wine and snacks.

However, there was one problem: Galileo's new proof made no sense; it was a cockamamie argument about how the motion of the tides proves that Earth orbits the Sun, and it just doesn't work. When push came to shove (and it did), Galileo simply did not know how to prove that Earth truly moved. Galileo had therefore crossed the line set out sixteen years earlier—he had promoted an idea contrary to Scripture without providing convincing proof of its truthfulness. (In order to protect himself, Galileo had added

a preface that claimed that his treatment of heliocentrism was purely hypothetical, but even a casual reading of the *Dialogue* makes clear that this was hogwash; the book was a manifesto for heliocentrism, plain and simple.) Galileo's critics back in Rome instantly seized on the weaknesses of his arguments by charging that Galileo had committed serious offenses: disobeying a papal injunction and promoting teachings contrary to Scripture. (Important to note: Galileo was never charged with nor tried for heresy, as is commonly believed. Heresy was a far more serious offense and carried a much stiffer penalty, if you know what I mean.)

In 1633, Galileo was called back to Rome to answer these charges. His trial was a see-saw battle that turned on all manner of technical points in church law, theology, and mathematics, and nearly ended in the equivalent of a hung jury. In the ensuing plea bargain, Galileo admitted that he had gone a bit too far in promoting heliocentrism as truth without sufficient proof and promised not to do it again; all sides then prepared to conclude the face-saving compromise. Then, almost at the last moment (and for reasons that are still quite mysterious), the Inquisition overruled the plea bargain and handed down a verdict and sentence that was unexpectedly harsh: Galileo was found guilty of a "vehement suspicion of heresy" (which was not nearly as bad as heresy itself but still worse than disobedience and teachings contrary to Scripture) and forced to abjure and recant his belief in heliocentrism. Galileo signed a recantation in June of 1633. (I should also point out that Galileo was never imprisoned in a dungeon or tortured during the inquest, as is also sometimes believed. By all accounts, his surroundings were quite enviable.)

After the trial, Galileo returned to his villa outside Florence, where he technically spent the last decade of his life under a very comfortable house arrest and under injunction not to write anything further on physics. Just to show how strictly his sentence was carried out, during his remaining years Galileo often stayed

at the palaces of nobles and patrons in Tuscany, and openly disobeyed the gag rule by writing his *Discourse on Two New Sciences*, in which he essentially invented kinematics and materials science (though it's true that Galileo's criminal record meant that the book could not be published in Italy; it was published in the Netherlands in 1638). On a purely technical level, the *Discourse* was actually Galileo's greatest contribution to modern science. He died in 1642, the year of Isaac Newton's birth.

### Galileo's Punishment

So much for the facts. But why did the Church come down so hard on Galileo? Some scholars argue that Galileo simply had terrible luck, since he happened to be pushing his arguments at the worst possible political moment. In the early seventeenth century, the Catholic Church was desperately trying to fight off an insurrection within Christendom (the Protestant Reformation). Many within the Church hierarchy were not particularly fond of liberalizing Catholic doctrine while it was under assault, and Galileo may have ended up as a collateral casualty of a much larger war.

Other historians argue that an enormous amount of the fault was Galileo's. He was, without a doubt, a voracious social and political climber, and his political maneuvering in the Italian Renaissance court system over his career had garnered him many powerful enemies. With his (erroneous) proof of Copernicanism, Galileo apparently hoped to climb the pyramid to the most prestigious court of all: the Vatican itself (he wanted to become official mathematician/astronomer for the Pope). He took a gamble on his proof, lost, and suffered the consequences.

Still other scholars suggest that Galileo's downfall resulted from a personal falling out he had with the Pope. There is some documentation to support the conclusion that Urban VIII felt personally betrayed by Galileo's false proof, and was irritated to boot that Galileo had put the Pope's words from one of their private conversations into the mouth of Simplicio (the simpleton) at the end of the *Dialogue*.

Personally, I suspect that Galileo got into so much trouble for a variety of reasons. First, he thought heliocentrism was true and became an evangelist for the idea; sadly, there is good reason to believe that Copernican heliocentrism was already succeeding within Church hierarchy and would have become an accepted element of doctrine on its own if Galileo had not forced the issue. Second, he felt that the Church needed to reform its entire intellectual structure in order to modernize and protect itself

against Protestantism; in particular, Galileo believed that science had to replace theology as the Church's principal mode of understanding, and that accepting Copernicus was a good first step. Third, he felt that he could have the greatest impact in shaping new doctrine at precisely the moment when the Church was feeling weak and on the defensive. And finally, he felt that he, Galileo Galilei, had the authority and brilliance to transform Catholicism in this way. When you read his writings, you get the distinct impression that Galileo believed that expertise in astronomy and mathematics gave him (and all scientists) a special authority to make theological pronouncements and inform

Rome how to run the Church. Frankly, I find it no surprise that the Inquisition dropped the hammer on him.

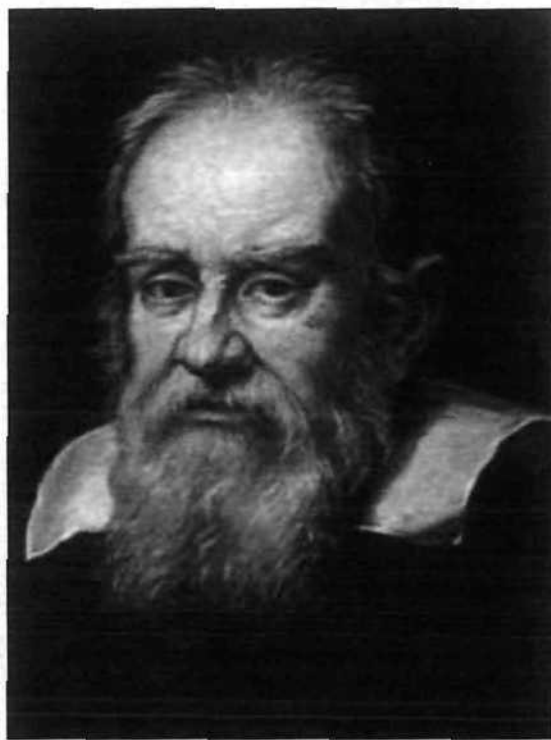
Unfortunately, Galileo's trouble with the Church later became a popular archetype for the historical relationship between science and religion. Nothing could be further from the truth. For most of the medieval and Renaissance periods, and even stretching into the eighteenth century Enlightenment, the primary supporter of research and teaching in the sciences was the Roman Catholic Church. In fact, one historian of science, John Heilbron, has recently published a book entitled *The Sun in the Church* that documents how the Church, in the aftermath of the Galileo affair, continued to promote research into evidence for heliocentrism, even to the point of turning entire cathedrals into giant pin-hole cameras to measure the

apparent diameter of the solar disk at various times of the year. By a mathematical quirk, Copernicus's system would actually produce slightly different variations in the Sun's apparent diameter than the old Ptolemaic-Aristotelian system; the experiments run by the Church in the 1650s and 1660s produced measurements that clearly supported Copernicus.

So, even this classic story of conflict between science and religion is far more complex than most people realize. For me, one of the greatest culprits in the tale is something that still plagues us: a confusion of boundaries between these two ways of understanding the world, and the false belief that expertise in one grants an authority to speak in the other.

### Further Reading

- Mario Biagioli, *Galileo, Courtier: The Practice of Science in the Culture of Absolutism* (Chicago: University of Chicago Press, 1993).
- Owen Gingerich, "The Galileo Affair," *Scientific American* 247, no. 2 (1982): 132-143.
- Giorgio de Santillana, *The Crime of Galileo* (Chicago: University of Chicago Press, 1955).



Portrait of Galileo by Justus Sustermans painted in 1636.



# The God of Falling Bodies

## *Galileo, Newton, Bentley, and Leibniz*

### *Chat on the Internet*

---

*Here's what might transpire if Galileo were a modern-day experimentalist engaged in an e-mail dialogue on science and religion with two famous scientific colleagues and a theologian.*

VICTOR J. STENGER

**I**n order to explore some of the thinking processes involved in the current dialogue between science and religion, I have imagined the following fable. The characters in my fable are modern-day versions of Galileo, Newton, and Leibniz. Also included is a lesser known historical figure, theologian Richard Bentley, with whom Newton corresponded. Galileo is pictured as a modern-day experimental physicist, performing increasingly precise experiments with falling bodies at the Leaning Tower of Pisa. I imagine him rapidly communicating his results by e-mail to Newton in Cambridge, who is contemporaneously developing his laws of motion and gravity. Of course, Galileo preceded the other characters by two generations, so this

interchange is obviously not historical. Furthermore, although both men were brilliant theorists and experimentalists, I am going to impose a modern division of labor and have Galileo be strictly an experimentalist and Newton a theorist. Galileo will have the best modern equipment at his disposal, and I will imagine each as if he thought like a scientist of today, not one of the sixteenth and seventeenth centuries.

Bentley is pictured discussing Galileo's experimental results and their theological implications with Newton and Galileo over the Internet. I show Newton doing his best to explain the data by means of natural laws and, like typical modern theoretical physicists (that is, those who do not attempt to write popular books), not fretting too much about theology. While the historical Newton branched off into theology and alchemy, this was later in life. In my scenario he is still a typical (for today) young researcher, impatient with philosophizing and eager to get on with his work with minimum distraction.

Bentley seeks the God of the Gaps, looking for places where Newton's theories seem to leave room for the Creator to impose his will. He exhibits the general misunderstanding and resulting distrust of scientific method that typifies the modern intellectual, who is intelligent but lacks scientific training and, worse, has little comprehension of scientific method. Galileo expresses religious skepticism more openly than he could in his day, but would have no trouble getting away with today. Finally, Leibniz joins the discussion near the end. He represents the new crop of science-theists who, unlike Bentley, know their science and mathematics but still think they see God's hand in physics and cosmology.

In his initial, crude experiments, Galileo measures the times,  $t$ , that it takes cannonballs of various weights to drop from balconies in the tower at different heights  $h$ . He makes a graph of  $h$  vs.  $t$  and shows that the data fit a parabolic curve,  $h = kt^2$ , with  $k$  a constant equal to 4.9 when  $h$  is measured in meters and  $t$  in seconds.

When Newton sees these results he e-mails Bentley and Galileo:

"Dear Friends: This is exactly what is predicted by my laws of motion and gravity. My second law of motion is  $F = ma$ , where  $F$  is the force on a body,  $m$  is its mass, and  $a$  is its acceleration. Putting it together with my law of gravity gives  $a = g$ , where  $g = 9.8$  meters per second squared is the acceleration due to gravity, independent of the mass  $m$ . Using the methods of calculus, which I invented despite the claims of that upstart Leibniz, I then get  $h = kt^2$  where  $k = g/2 = 4.9$ ."

Bentley finds Newton's explanation difficult to understand: "Isaac, as usual I do not have a clue what you are talking about :). It all seems rather magical to me. Why should this 'calculus' of yours, with all those strange symbols, have anything to do with reality?"

Newton responds, "Richard, I don't know why, but it seems to. I frame no hypotheses. I just calculate and compare my calculations with the data."

In the meantime, Galileo continues his experiments with objects other than cannonballs and dis-

covers something new. He drops a crumpled-up piece of paper, along with a rock. Releasing them at the same time from the same height, the paper hits the ground after the rock. A sheet of paper, and then a feather, take even longer.

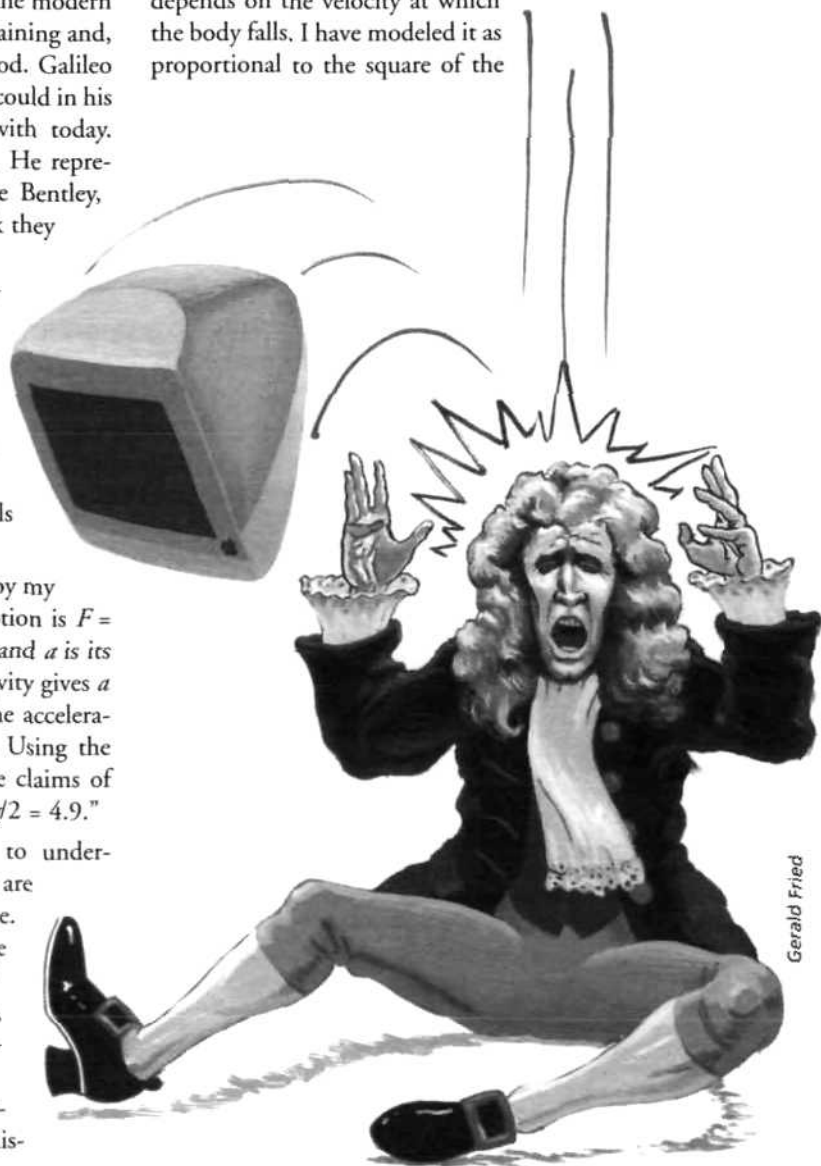
When Bentley sees this result he excitedly types:

"See, Isaac, your theory is incomplete. God is acting to hold up the paper and the feather. This explains how birds and angels fly! God wills it."

Galileo, who has been quiet so far except for supplying the data, butts in:

"I've never seen any angels, even with my telescope. But birds must fly by taking advantage of the upward force of the air, as de Vinci has suggested."

Newton does not take long to respond: "In the original experiments, Galileo was dropping heavy objects—cannonballs. So I neglected the effect of air resistance, which I guessed would be small in that case. In general, however, the air is expected to exert an upward force that subtracts from the downward force of gravity, and this will be important for lighter objects. This resistive force depends on the velocity at which the body falls. I have modeled it as proportional to the square of the



velocity and determined an air resistance coefficient from the data, which varies from object to object. Using some more calculus, I have obtained a fairly reasonable fit to Galileo's data, as you can see by the attached graphs."

Bentley is not too impressed: "That looks like a pretty ad hoc procedure to me. And so complicated! Only two people in the world can make such a calculation, Newton and Leibniz. Are we to rely on the authority of just the two of you? I prefer to rely on the authority of scriptures and the Church fathers. They provide a much simpler explanation that even the humblest peasant can understand, namely that God directs the motion of all things, from falling leaves to flying birds."

Galileo is a bit annoyed: "I think I can manage this calculus too. After all, I am a professor of mathematics! But, more important, where in the God theory can you obtain the detailed, quantitative results Isaac has here? He can make all kind of predictions about falling bodies and projectiles. Even the Biblical prophets could not do that."

"They were men of peace, not interested in bombs and cannonballs," Bentley reverently but irrelevantly replies.

Things only get worse when Galileo reports another strange anomaly. His falling bodies do not hit the ground at a point directly below the release point, as marked precisely by a plumb bob, but slightly off to the east. He is careful to show that this is not an effect of winds.

"Aha," Bentley cries, when the data appear on the Web. "Here is more evidence for God's action. The Creator is blowing the objects off to the east."

"Why would he do that?" Galileo questions.

"This is just one of those mysteries we were not meant to understand," Bentley answers.

Newton scratches his head but soon realizes what is happening. "My previous calculations assumed that Earth is not accelerating. In fact, the rotation about its axis constitutes an acceleration. When I properly add this term to my equations, I get exactly what Galileo observes."

"More ad hoc fixes and fudge factors," Bentley retorts scathingly. "And look at those equations now. How complicated can they get? What purpose are you serving with all these esoteric symbols? It looks to me like you are starting a new cult, and you know what the Church thinks of cults!"

"Christianity was once a cult," Galileo sourly answers.

Newton tries to cool things off. "Bentley, it is too bad you have not been able to follow my mathematics. (Damn these lousy schools.) If you could do the maths, you would see that my equations already contained the solutions to all the problems raised by Galileo's increasingly more precise measure-

ments. The  $F$  in  $F = ma$  represents the sum of the forces on a body. The term I added for air resistance in retrospect should have been included all along. Similarly, the  $a$  in  $F = ma$  must include the acceleration of Earth. Putting in the correct acceleration we again get what Galileo measures. What happens in the present case is that, because it is farther from the center of Earth, the body at its point of release has a greater eastward component of velocity than a point on the ground and so it drifts to the east relative to that point. And here is a falsifiable prediction! If Galileo does experiments with cannon balls shot straight up in the air, they will drift to the west."

Back in Italy, Galileo is presented with a huge grant from Cosimo de Medici, from which he purchases lasers and a highly accurate atomic clock. Repeating his experiments, he finds that, even after corrections for air resistance and Earth's rotation, the  $g$  in Newton's equations is not a constant but depends on the height of the tower balcony from which objects are dropped.

Once again, Bentley goads Newton: "This surely proves that your theory is, at best, an approximation and so cannot be related in any important way to 'ultimate reality.' Each time our friend Galileo makes a better experiment, you have to modify your equations to make them agree with his data. What are you going to do now about this non-constant value of  $g$ ?"

"Well, if you could follow the maths you would see that this, too, is in my equations. When I conceived the law of gravity I realized it applies to objects far from Earth, such as the Moon, as well as apples and leaves falling from trees. The Moon, in a sense, is falling toward Earth like an apple; but, because of its speed in orbit, it falls around Earth without ever hitting it. From estimates of the Moon's distance and the time it takes to go around Earth, one month, I was able to infer that the force of gravity, and thus the acceleration of a falling body, will decrease as the square of its distance to the center of Earth. In fact, my law of gravity reads  $F = GmM/r^2$  as the force between two bodies of masses  $m$  and  $M$  whose centers of gravity are separated by a distance  $r$ , where  $G$  is a constant determined from the data.

"The resulting acceleration on a body of mass  $m$  toward Earth is then  $g = GM/r^2$  where  $M$  is the mass of Earth and  $r$  is the distance to the center. The variation with  $r$  is normally unmeasurable near Earth's surface, since the difference between  $r$  and the radius of Earth  $R$  is small. So we are justified in neglecting it for most practical purposes. However, Galileo was able to detect the variation with his lasers and atomic clock."

"If I can't read your equations, neither can the great majority of the human race," Bentley responds. "How are you ever going to convince them?"

Newton sighs. "Okay, let me try to explain the significance of what I have done in words, which are unfortunately more imprecise than the maths. I have provided techniques that enable a sufficiently trained person to make quantitative calculations of precise measurements that agree with all the data. These equations also enable that person to make predictions about the motions of bodies that can be later tested by

---

*Victor J. Stenger is emeritus professor of physics and astronomy at the University of Hawaii and Visiting Fellow in Philosophy at the University of Colorado. His latest book is Timeless Reality: Symmetry, Simplicity, and Multiple Universes (Prometheus Books, 2000). His previous books include Not By Design, Physics and Psychics, and The Unconscious Quantum. He can be reached at [vstenger@mindspring.com](mailto:vstenger@mindspring.com). His home page is at [www.spot.colorado.edu/~vstenger/](http://www.spot.colorado.edu/~vstenger/).*



experiments. I hope Galileo and others will carry out these tests of my theories. My good friend Edmund Halley has just informed me that my equations predict that the recent comet will return again in seventy-five years. Unfortunately we will not be here to see if this prediction comes true. Even if some of these predictions fail, this could simply mean that I have once again made too many simplifying assumptions in my calculation, as I did when originally neglecting air friction or Earth's rotation. The comet prediction should be an accurate one, however, since neither Halley nor I can think of any factors that may mess it up.

"Bentley, you have continually derided the fact that I did not anticipate some of Galileo's measurements before they were made. But rather than taking this as a point against the validity of my theories, you should regard it as a point for!"

Bentley blinks. "Come again?"

"The fact that even I, the inventor of the theories, did not realize all their implications indicates, rather strongly I think, that they indeed have something to do with reality. In fact, you might say that I was not the inventor of the theories but rather their discoverer. They were out there in nature waiting for someone brilliant like me to come along to find them. Let me contrast my theories with yours, dear Bentley, that God has done it all. You claim your theory is simpler, and so more preferable, more likely to be correct than my complicated calculus equations.

"But is it simpler? I have been able to classify a wide range of phenomena, on Earth and in the heavens, with a few assumptions that are very simple in their own right. The complications you worry about are only in the manipulations, which admittedly require some inborn talent comparable to playing a musical instrument well."

Galileo then jumps in with a thought: "Perhaps, someday, humans will possess machines that will do these calculations for them. Then all they will have to do is put in the initial positions and velocities, and predict the future motion of all bodies. If Lucretius is correct—that everything is made up of atoms—then everything will be predictable."

Suddenly, Bentley breaks out into a broad grin and excitedly types: "Even if you are correct, and everything that happens in the universe can ultimately be predicted by some huge machine, the hand of the Creator was still involved. You have just written down some esoteric equations, but you have not told me where those equations come from. I think it is all pretty obvious. They came from God!"

"Why did they have to come from anything?" Galileo interjects.

"Everything comes from something."

"And God, where did he come from?"

"Well, God is the exception. As Aristotle said, the first cause uncaused."

"Why can't that exception be the universe itself?"

Bentley does not answer, since he has become troubled by another thought: "I don't think I like this idea after all. What happens to free will?"

"I will leave it to you theologians to figure that one out," Galileo responds.

Newton has not said much for a while and now speaks up: "Actually, now that you have distracted me from my research and dragged me into a theological discussion, I must admit that my theory does not account for everything. Remember I said that my law of gravity does not give the value of  $G$ . I have to get that from the data. Also, recall that the Moon is like a falling object. My equations will tell you that the Moon's orbit around Earth is elliptical, but they do not give the orientation of the axes of the ellipse."

"Ah, better yet!" Bentley exclaims. "We are back exactly to the God of the Bible. He creates the universe with its matter and light. He commands this matter and light to obey certain natural laws, which you scientists are now beginning to discover. But the Creator sees to it that the laws do not preordain all that happens. Humans then have the free will to act, from which we get evil despite God's innate goodness. All this freedom, however, can lead to things getting out of hand. So, God acts whenever necessary to keep the universe and mankind moving on track toward the ultimate realization of his divine plan."

Just then an e-mail comes in from Leibniz in Germany:

"I just happened to get wind of this discussion while surfing the Web. I have looked at Newton's equations on his Web page and can confirm that they fit Galileo's data. In fact, I did invent calculus independently and used my own methods which I think are superior, especially in terms of notation."

Newton: "Balderdash!"

"In any case," Leibniz continues, "I have to go along with Bentley that God's purpose is evident in all that is being uncovered here. Let's take Newton's constant  $G$  in his theory of gravity. He admits that his theory does not give its value, that it must be determined by experiment. I am sure that Bentley will agree that it must be set by God."

Bentley responds, "Indubitably."

"But I have more," Leibniz types. "I think I can prove that God has set this value of  $G$  very precisely for the divine purpose of making human life possible. Newton's equations, which I truly do admire despite their lamentable notation, have allowed me to calculate, with my own better methods, the effect that different values of  $G$  would have on the orbit of Earth. Earth might have been farther from the Sun and too cold for life, or closer to the Sun and too hot."

Newton replies, "Yes, yes. This is just the  $r^3/T^2 = a \text{ constant}$  law discovered observationally by Kepler which I have already proven from my theory. Note that if  $G$  were different we could have the same orbital radius  $r$  as now with just a different orbital period  $T$ ."

"I agree," says Leibniz. "But with all the values of  $r$  and  $G$  to choose from, how unlikely it is that a random selection would have given just the right values we need for our existence? Suppose we had a world in which a year was not 365 days. I shudder to think of what this would do to the seasons. I would wager that human life would again be impossible. As far as I can see, only the exact value of  $G$ , and the specific values of  $r$  and  $T$  we have, would allow for human life. God has obviously chosen these numbers carefully and created this as the best of all possible worlds."

"Or, the worst," Galileo replies. "It could all be just one, big accident." □

# The Relationship Between Paranormal Beliefs and Religious Beliefs

---

*A random sample survey fails to find substantial correspondence between paranormal belief and religious belief. In addition to some methodological differences between this study and one reported earlier by Erich Goode that could account for some of their difference in results, there may be good conceptual reasons to expect that these two belief domains are not closely related.*

GLENN G. SPARKS

Past research indicates that the easy assumption that religious belief and paranormal belief are closely associated may be unwarranted. For example, Williams, Taylor, and Hintze (1989) found little relationship between traditional religious beliefs and belief in the paranormal. More recently, Tobacyk and Wilkinson (1990) found that religious belief was actually inversely related with magical thinking. In the January/February 2000 *SKEPTICAL INQUIRER*, Erich Goode (2000) suggested that his new exploratory study on the relationship between religious traditionalism and paranormal beliefs challenged the traditional finding that beliefs in these two domains were uncorrelated or even inversely correlated. He presented data from

a convenience sample of 484 students that revealed some statistically significant relationships between individual paranormal belief items and other items taken as indicators for traditional religious beliefs. Although Goode did not report the precise extent of the statistical overlap between the religious and paranormal beliefs, his data suggested that some significant overlap was certainly present.

In the May/June 2000 SKEPTICAL INQUIRER, several readers, myself included, reacted to Goode's study by pointing out a number of things that would seem to dictate caution in evaluating his conclusion that these two belief domains overlap more than most researchers suspect. While I stand by each of

the points that I made in my letter, my intent in this article is not to revisit that exchange. Instead, I want to try in some small measure to take up the challenge that Goode outlines in the last sentences of his response letter in that issue. He wrote, "Still, I look forward to the findings of other researchers who wish to investigate same relationship. Perhaps Attanasio, Aberson, Stewart, Sparks, or Argall [the letter writers] are willing to step forward and take up the challenge."

As regular readers of SKEPTICAL INQUIRER might recall, I have been conducting a program of research that investigates the relationship between exposure to media messages and belief in the paranormal (see Sparks in the July/August 1998

	Agree	Undecided	Disagree
Daily horoscopes that appear in the newspapers DO NOT provide accurate information about a person's life.	81.5%	9.5%	9.0%**
Some people are able to levitate or lift objects just by thinking.	18.5%	14.0%	67.5%
I do NOT believe that there is any such thing as haunted houses.	37.5%	21.0%	41.5%**
I believe that sometimes I can tell what another person is thinking through ESP or extrasensory perception.	32.5%	7.0%	60.0%
No one can really tell about other people's lives just from looking at the lines on the palms of their hands.	68.5%	14.5%	16.5%**
Some people have the power of astral-projection, that is, they can willingly leave their body for short periods of time to travel to another part of the universe and then return.	7.5%	16.0%	76.0%
I do NOT believe that anyone really has psychic powers.	41.0%	15.0%	44.0%**
I believe that some people have a special gift to heal other people simply by touching them.	22.5%	16%	61.5%
Some people claim that they have had dreams about future events that actually come true, but I believe that these cases are simply coincidence.	43.0%	15.0%	42.0%**
I believe that some people have actually seen flying saucers that come from outer space.	34.0%	23.0%	42.5%
No one can bend metal just by thinking about it.	72.5%	13.0%	14.0%**
Astrology, or the use of horoscopes, has been proven to be valid for finding out the best ways in which people should act in their daily lives.	7.0%	18.5%	73.5%
I don't think ESP or extrasensory perception is possible.	39.0%	19.5%	41.0%**
I believe that some people have actually seen ghosts.	45.5%	16.5%	37.0%
I DO NOT believe that astral-projection is possible.	64.0%	17.5%	17.0%**
Some people can really tell the future about another person's life just by reading the palm of their hand.	8.0%	15.0%	75.5%
I DO NOT believe that there has ever been a case where another human being has been captured by a space alien.	58.0%	22.5%	18.5%**
Some people have a special gift that enables them to see things in the future that have not yet happened.	44.0%	16.0%	39.0%
Anyone who claims that he/she can heal other people just by touching them is either lying or badly mistaken.	57.5%	16.5%	25.0%**
There are some people who have a special ability to help the police solve crimes because they can psychically receive information just by touching objects that belong to the crime victims.	35.5%	19.0%	45.0%

\*\*Disagreement with these items indicates belief in the paranormal. The 95% confidence interval for a sample of 200 respondents is  $\pm 6.9\%$ .

Table 1. Percentages of respondents indicating agreement, disagreement, or uncertainty about paranormal beliefs.



SKEPTICAL INQUIRER). As part of that research program, I conducted a random sample survey of 200 respondents in a Midwestern city (Sparks and Miller 2001). In that survey, taken over the telephone, we asked adult respondents to indicate their

TV viewing habits as well as the extent to which they believed in ten different paranormal phenomena (astrology, psychokinesis, ghosts, ESP, palmistry, astral-projection, healing, general psychic power, psychic prophecy, and UFOs/space aliens).

		Disagree	Agree	
Horoscopes DO NOT contain accurate information.	Low Religious Belief	9%	91%	
	High Religious Belief	10%	90%	
Some people can levitate.	Low Religious Belief	84%	16%	
	High Religious Belief	73%	27%	
I do NOT believe in haunted houses.	Low Religious Belief	47%	53%	
	High Religious Belief	53%	47%	
I believe that sometimes I have ESP.	Low Religious Belief	62%	38%	
	High Religious Belief	62%	38%	
No one can read another's life from their palms.	Low Religious Belief	20%	80%	
	High Religious Belief	19%	81%	
Some people have the power of astral-projection.	Low Religious Belief	92%	8%	
	High Religious Belief	90%	10%	
I do NOT believe that anyone really has psychic powers.	Low Religious Belief	47%	53%	
	High Religious Belief	52%	48%	
I believe that some people have a special gift to heal.	Low Religious Belief	88%	12%	(p < .001)
	High Religious Belief	59%	41%	
People having prophetic dreams is just coincidence.	Low Religious Belief	31%	69%	(p < .004)
	High Religious Belief	57%	43%	
I believe that some people have actually seen flying saucers.	Low Religious Belief	67%	33%	
	High Religious Belief	58%	42%	
No one can bend metal just by thinking about it.	Low Religious Belief	6%	94%	(p < .03)
	High Religious Belief	20%	80%	
Astrology is valid for finding out best ways to act daily.	Low Religious Belief	93%	7%	
	High Religious Belief	95%	5%	
I don't think ESP or extrasensory perception is possible.	Low Religious Belief	48%	52%	
	High Religious Belief	49%	51%	
I believe that some people have actually seen ghosts.	Low Religious Belief	50%	50%	
	High Religious Belief	50%	50%	
I DO NOT believe that astral-projection is possible.	Low Religious Belief	21%	79%	
	High Religious Belief	25%	75%	
Some people can tell the future by reading palms.	Low Religious Belief	96%	4%	
	High Religious Belief	89%	11%	
I DO NOT believe humans have been captured by aliens.	Low Religious Belief	29%	71%	
	High Religious Belief	24%	76%	
Some people can see the future.	Low Religious Belief	60%	40%	(p < .10)
	High Religious Belief	44%	56%	
People who claim to heal are lying or mistaken.	Low Religious Belief	20%	80%	(p < .03)
	High Religious Belief	39%	61%	
Some people can solve crimes with psychic ability.	Low Religious Belief	60%	40%	
	High Religious Belief	57%	43%	

Significance tests refer to the chi-square test which tests for the probability (2-sided) that differences in the cell distributions of the table deviate from what would be expected by chance alone. The "undecided" category was eliminated due to the fact that frequent low cell counts in this category violated the assumptions of the chi-square computation. The complete wording for the belief items appears in Table 1. Wording is summarized for this table.

\*\*\*\*\*

Table 2. Percentages of respondents indicating agreement and disagreement with paranormal beliefs as a function of religious belief intensity.

Because of my interest in the relationship between paranormal beliefs and traditional religious beliefs, the survey also included a few items pertaining to religious belief. Until now, I have not published any of the data from the questions about religious beliefs, but I thought that the challenge offered by Goode provided an excellent opportunity.

### The Survey

In 1997, Will Miller and I directed a class of advanced undergraduate students, who conducted 200 telephone interviews by selecting phone numbers randomly from the pages of the phone directory in a medium-sized city in the Midwest. The final sample consisted of 102 females and 92 males (with six respondents of undetermined sex). Respondents had to be at least eighteen years old in order to participate in the interview. The median age of the sample was thirty-four. In addition to questions about exposure to different media, respondents indicated whether they agreed, disagreed, or were uncertain about twenty different paranormal belief statements. These items, along with the percentages of respondents who expressed agreement, disagreement, or uncertainty about the beliefs are displayed in table 1.

In addition to the other items on the survey, we asked respondents about their religious beliefs and practice with two specific questions. First, we asked them to indicate the intensity of their religious beliefs on a scale from one (not at all religious) to ten (extremely religious). Second, to get a more behavioral indication of religious commitment, we asked respondents to indicate if they typically attended a religious service on a weekly basis. Responses were coded simply "yes" or "no." In regression equations that we reported in the original paper (see Sparks and Miller 2001), viewing of paranormal TV programs was significantly related to paranormal beliefs even after controlling for age, sex, income, education, attendance at a weekly religious service, and intensity of religious belief. These last two variables that dealt with religious belief were not significant predictors of belief in the paranormal.

It is important to note that the main focus of our survey was not to measure religious beliefs among the respondents. The questions we asked were very general ones. Nevertheless, it seems to be a reasonable assumption that respondents who reported that they were intensely religious or attended a religious service at least once per week would also be more likely to endorse traditional religious belief items. Consequently, while it is readily apparent that the data gathered here are not the most desirable kind of data to bring to bear on the question, the data certainly seem pertinent for making some small contribution.

To examine the pattern of the relationships between the two religious belief items and the paranormal belief items for this report, I constructed a series of contingency tables for each paranormal belief item. Table 2 reports the results of the analysis for the measure of religious intensity. To obtain a comparison between those respondents who varied in their response to the "intensity of religious belief" question, those

who answered on the bottom half of the scale (1–5) were compared to those who answered at the top end of the scale (8–10). This division is not perfectly symmetrical with

## The overall pattern of these findings suggests that the religious and non-religious respondents believe and disbelieve in the paranormal in roughly the same proportions.

respect to the rating scale since the sample was skewed in the direction of low religious intensity. More people indicated intense religious belief than did not. Nevertheless, for the purposes of the tables, this scheme permitted a comparison between very intense religious believers ( $n = 99$ ) and those who were considerably less intense ( $n = 58$ ).

As table 2 shows, for sixteen of the twenty paranormal belief items, there was no significant difference ( $p < .05$ ) between those who indicated intense religious beliefs and those who indicated low intensity religious beliefs. The only items endorsed significantly more by intensely religious people were items pertaining to healing, prophetic dreaming, and bending metal just by thinking. It seems perfectly plausible that intensely religious people would be more likely to believe in healing and prophetic dreaming because numerous examples of both phenomena are recorded in the Bible. As for bending metal by thinking, even though religious respondents indicated more belief than the less religious respondents, they still indicated disbelief in the phenomenon by an 80 percent to 20 percent margin. Overall, the results of the contingency table analyses are striking only insofar as intensely religious respondents appear to believe and disbelieve in the paranormal in roughly the same proportions as respondents who indicated low levels of religious intensity.

I also constructed similar tables according to whether respondents indicated that they typically attended a weekly religious service ("no" = 106; "yes" = 91). Table 3 displays the results of these analyses. The only significant differences between those who attended a weekly religious service and those who did not were on the item about belief in ghosts and the item about the validity of astrology. On both items, those who attended a weekly religious service were *less inclined* to believe in the paranormal than those who did not attend such a service. The overall pattern of these findings suggests, once again, that the religious and non-religious respondents believe and disbelieve in the paranormal in roughly the same proportions.

---

*Glenn G. Sparks is a professor in the Department of Communication at Purdue University, West Lafayette, IN 47906. He conducts research on media effects and has published several studies on the impact of media messages on paranormal beliefs.*

## Discussion

It might be argued that the reason for the strong similarities between the subgroups in the analyses presented in tables 2 and 3 has to do with the very general nature of the indicators of religious belief. In Goode's article, paranormal beliefs were related to very specific religious belief items. As Goode was careful to point out, he was interested in a particular type of

**Many traditional religions call upon the would-be believer to exercise "faith" in believing in things that are utterly beyond scientific scrutiny. For example, the central belief of Christians that Jesus Christ died for one's sins is essentially unfalsifiable as a scientific proposition.**

belief associated with religious fundamentalism (but see my letter in the May/June 2000 issue on this point). The data presented here are more relevant to the hypothesis that religious belief *in general* is strongly associated with belief in the paranormal. Certainly, this general version of the hypothesis would appear to be unsupported by the findings of the survey. In future studies, I plan to investigate the relationship between more specific religious beliefs and belief in the paranormal.

There are several reasons why one might not expect there to be close convergence between religious beliefs and paranormal beliefs. First, many traditional paranormal beliefs (e.g., ESP, alien abductions, astral-projection, palm-reading, astrology)

are not specifically endorsed or treated in any detail in the writings associated with the different "revealed truths" revered by the adherents of different religious traditions. As a consequence, some religious believers may view such paranormal phenomena to be outside of the conceptual framework of their belief system and, thus, be just as inclined to reject them as any skeptic who embraces an atheistic or agnostic stance.

Therefore, religious believers of this ilk may find common ground with skeptics in rejecting many paranormal claims, despite the fact that their rejection is based on a different kind of warrant.

Second, many traditional religions call upon the would-be believer to exercise "faith" in believing in things that are utterly beyond scientific scrutiny. For example, the central belief of Christians that Jesus Christ died for one's sins is essentially unfalsifiable as a scientific proposition (assuming that it

is agreed that someone named Jesus Christ lived and died). This quality of religious belief—subscribing to propositions that are ultimately untestable by recourse to scientific method—is something that appears to be celebrated and even treasured within the context of different religious belief systems. That is, the very explicit teaching of many religions is that one is called to demonstrate faith in these sorts of propositions even though they are formulated in ways that render them untestable using the scientific method. In contrast to these sorts of untestable religious propositions, many of the traditional paranormal beliefs have rather clear empirical referents. Claims of ESP, astrology, spoon-bending, water-divining,

remote-viewing, etc., are all amenable to empirical test. They are falsifiable claims. Indeed, many scientists have conducted well-designed tests of these and other claims and have failed to find any supporting evidence. It may be that some religious believers who are accustomed to holding beliefs by "faith" are quite comfortable rejecting many of the sensational paranormal claims that appear to crumble so easily by recourse to data. This analysis would once again lead to the expectation that religious belief should not be a particularly powerful predictor of belief in many paranormal claims.

Before concluding my initial response to Goode's challenge, I call attention to the General Social Survey from the National Opinion Research Center that is maintained online for researchers to explore and use for various purposes. Upon exploring this data set, I used the archive of over 35,000 respondents





between 1972 and 1996.<sup>1</sup> According to the results of one analysis that I conducted with this data, belief in the Bible as the actual word of God was completely uncorrelated with the tendency to report experiences with ESP ( $r = .01$ ), being in touch

with someone who had died ( $r = -.03$ ), or remote viewing ( $r = .00$ ). The tendency to report a paranormal *experience* is not the same as expressing *belief* in the paranormal, but those who report experiences would almost certainly report strong belief in

		Disagree	Agree	
Horoscopes DO NOT contain accurate information.	Don't Attend	9%	91%	
	Attend	11%	89%	
Some people can levitate.	Don't Attend	78%	22%	
	Attend	78%	22%	
I do NOT believe in haunted houses.	Don't Attend	56%	44%	
	Attend	48%	52%	
I believe that sometimes I have ESP.	Don't Attend	65%	35%	
	Attend	65%	35%	
No one can read another's life from their palms.	Don't Attend	19%	81%	
	Attend	20%	80%	
Some people have the power of astral-projection.	Don't Attend	92%	8%	
	Attend	91%	9%	
I do NOT believe that anyone really has psychic powers.	Don't Attend	53%	47%	
	Attend	51%	49%	
I believe that some people have a special gift to heal.	Don't Attend	77%	23%	
	Attend	67%	33%	
People having prophetic dreams is just coincidence.	Don't Attend	48%	52%	
	Attend	51%	49%	
I believe that some people have actually seen flying saucers.	Don't Attend	52%	48%	
	Attend	62%	38%	
No one can bend metal just by thinking about it.	Don't Attend	16%	84%	
	Attend	15%	85%	
Astrology is valid for finding out best ways to act daily.	Don't Attend	88%	12%	( $p < .05$ )
	Attend	96%	4%	
I don't think ESP or extrasensory perception is possible.	Don't Attend	52%	48%	
	Attend	49%	51%	
I believe that some people have actually seen ghosts.	Don't Attend	39%	61%	( $p < .04$ )
	Attend	54%	46%	
I DO NOT believe that astral-projection is possible.	Don't Attend	21%	79%	
	Attend	22%	78%	
Some people can tell the future by reading palms.	Don't Attend	92%	8%	
	Attend	90%	10%	
I DO NOT believe humans have been captured by aliens.	Don't Attend	28%	72%	
	Attend	19%	82%	
Some people can see the future.	Don't Attend	50%	50%	
	Attend	44%	56%	
People who claim to heal are lying or mistaken.	Don't Attend	29%	71%	
	Attend	32%	68%	
Some people can solve crimes with psychic ability.	Don't Attend	50%	50%	
	Attend	63%	37%	

Significance tests refer to the chi-square test which tests for the probability (2-sided) that differences in the cell distributions of the table deviate from what would be expected by chance alone. The "undecided" category was eliminated due to the fact that frequent low cell counts in this category violated the assumptions of the chi-square computation. The complete wording for the belief items appears in Table 1. Wording is summarized for this table.

\*\*\*\*\*

Table 3. Percentages of respondents indicating agreement and disagreement with paranormal beliefs as a function of weekly attendance at a religious service.

the existence of that which they had supposedly encountered directly. Thus, I regard these results as ones that cause additional problems for the thesis that religious belief and belief in the paranormal are associated to any close degree.

In the final analysis, I suspect that researchers will discover that religious beliefs and paranormal beliefs represent conceptual domains that are considerably more complicated than our current understanding acknowledges. Consistent with this idea, recent results from the work of Johnston, deGroot, and Spanos (1995) suggest that the structure of paranormal belief is multidimensional and that many of the dimensions do not include beliefs associated with religion. I am grateful for Goode's challenge to other researchers to examine the relationship between these two domains more rigorously than we have done in the past. The data I have presented here constitute only a very modest beginning toward meeting the challenge. I hope more research and analysis on this topic will be forthcoming, from my own studies as well as those of other researchers.

## References

- Goode, E. 2000. Two paranormalisms or two and half?: An empirical exploration. *SKEPTICAL INQUIRER* 24(1): 29-35.
- Johnston, J., H.P. de Groot, and N.P. Spanos. 1995. The structure of paranormal belief: A factor-analytic investigation. *Imagination, Cognition & Personality* 14(2): 165-174.
- Sparks, G.G. 1998. Paranormal depictions in the media: How do they affect what people believe? *SKEPTICAL INQUIRER* 22(4): 35-39.
- Sparks, G.G., and W. Miller. 2001. Investigating the relationship between exposure to television programs that depict paranormal phenomena and beliefs in the paranormal. *Communication Monographs* 68(1): 98-113.
- Tobacyk, J.J., and L.V. Wilkinson. 1990. Magical thinking and paranormal beliefs. *Journal of Social Behavior & Personality* 5(4): 255-264.
- Williams, R.N., C.B. Taylor, and W.J. Hintze. 1989. The influence of religious orientation on belief in science, religion, and the paranormal. *Journal of Psychology & Theology* 17(4): 352-259.

## Note

1. I am indebted to Cheri Sparks for suggesting this data set and running analyses relevant to this paper. The data analysis was carried out with the Survey Documentation and Analysis package (SDA) from the University of California, Berkeley. For further information, see the following Web site: <http://csa.berkeley.edu:7502/>. □

## A Comment on 'The Relationship Between Paranormal Beliefs and Religious Beliefs' Response to Glenn Sparks

*We invited Erich Goode to submit a brief comment in response to Glenn Sparks's article. Here it is.—EDITOR*

I would like to thank Glenn Sparks for his interesting contribution to the ongoing dialogue on the relationship between paranormalism and religious beliefs. I feel that the overlap between these two realms (or the lack thereof) should receive a great deal more attention than it has, and Sparks has taken a step to remedy that deficiency. His analysis is sound and valid, and, in general, I agree with his conclusions. But Sparks's test of the relationship is very nearly completely irrelevant to my hypothesis. As he himself indicates, he did not test the proposition I explored, but a very different one. I focused specifically on *religious beliefs that have a paranormal component*—creationism, angels, and the devil as physically real, heaven and hell as actual, material places, etc. I did *not* examine overall religiosity or attendance at religious services. And as any social researcher knows, two variables that correlate with one another do not necessarily correlate consistently with a third variable.

I agree with Sparks that both paranormalism and religious belief are "multidimensional" phenomena, a point I stressed in my original article.

My speculation is that the key to the multifaceted relationship between paranormalism and religious belief is that two separate dimensions are contending with or contradicting one another. The first is *traditionalism*, a dimension on which *religionists rank high and paranormalists rank low*. (Public opinion polls consistently demonstrate that paranormalists rank high in "liberalism" and religionists rank high in "conservatism.") Herein lies the explanation for any negative relationship between our variables that might prevail. And the second is *belief in non-material causality*, a dimension on which both rank high. One or the other dimension could be relevant, depending on the context. Hence, the complex and seemingly contradictory relationship. In my humble opinion, my speculation is worth further exploration.

Detailed statistical tests were included in the original manuscript of my paper, but were omitted because of space limitations.

Erich Goode  
Department of Criminology and Criminal Justice  
College of Behavioral and Social Sciences  
University of Maryland  
College Park, MD 20742-8235

# Science and Religion in an Impersonal Universe

.....  
*Can you apply a skeptical empiricism to religious beliefs? The author answers yes, and religion comes up short. In place of theism he offers what Einstein called a cosmic religious feeling.*

MATT YOUNG

If something is in me which can be called religious then it is the unbounded admiration for the structure of the world so far as our science can reveal it.

—*Albert Einstein*

I used to have a colleague I shall call Robin. He is a bright guy and a good scientist, and I think highly of him. He is also a member of a small Baptist sect and a biblical literalist. Once, Robin owed me a favor, so I said, in essence, “Sit down. I would like to know why you hold your religious belief without evidence or, if you have evidence, what that evidence is.”

We talked for the better part of an hour. Robin told anecdotes, talked about reports of “miracles” from all over the



world, and spoke of his inner conviction, his inner feelings. I asked why he thought the religion of *his* parents was right and all others were (therefore) wrong. I asked if he would be a Koranic literalist if he had been born in Islamabad instead of Cleveland. He called this my “accident of birth” argument, but had no real answer to it.

Early on, I asked whether his belief was allegorical, that is, an approximation to the truth, or simply his way of getting at God and no better or worse than someone else’s. Was his belief a hypothesis that he would employ as long as it worked, or was it absolutely true?

No, he answered, it is absolutely true.

At the end of the hour, he said, as best I can recall, “Look, what you said earlier, about being a hypothesis. [Pause.] I guess it is sort of a hypothesis.” Saying so made him feel threatened. You could see it in his body language, hear it in his voice, see it in his eyes. So I quickly stopped the conversation.

The discussion with Robin kicked off what has become a four- or five-year investigation into religion and the basis for religious beliefs. Specifically, I set out to demonstrate, first, that *empiricism is the only way to establish reliable knowledge* about the physical world and, further, to show why it is appropriate to examine the claims of religion empirically. Accordingly, I applied a scientific approach to claims made by religious believers and apologists. Whether or not the universe has a purposeful creator, after all, is a matter of fact. It is therefore inappropriate for people who generally support their beliefs with evidence to believe without evidence in God. What, then, is the evidence?

My investigation brought me from science and philosophy of science to religion and philosophy, Biblical criticism, evolution and cosmology, mathematical physics, and the science of the brain. I do not have first-hand knowledge of many of these fields, so I have gone to the literature for my information. Except for a handful of books and articles on physics and one statistics paper, every one is accessible to the diligent layperson; that is, anyone could read the same material as I read and draw his or her own conclusion. I present mine here.

Contrary to postmodernist assertion, there is objective reality or, if you prefer, objective truth that exists independently of the observer and the belief system of the observer. I argue further that the only way to get at that truth—more precisely, the only way to approximate it, as a map approximates a continent—is through empirical observation. That observation

---

*Matt Young is adjunct professor at the Colorado School of Mines, retired physicist with the National Institute of Standards and Technology, Fellow of the Optical Society of America, and winner of the Department of Commerce Gold and Silver Medals for his work in optical communications. He is the author of Optics and Lasers and The Technical Writer’s Handbook. This article is adapted from his book No Sense of Obligation: Science and Religion in an Impersonal Universe, available as an e-book or in hardcopy from 1stBooks Library, [www.1stbooks.com/bookview/5559](http://www.1stbooks.com/bookview/5559), or from online or local bookstores. Copyright ©2001 by Matt Young. All rights reserved.*

must not be casual, however; observation must be supplemented with reason and care, or else you fall into related traps of believing what is agreeable to you and of relying on selectively chosen anecdotes or vague and unprovable hypotheses as supporting evidence.

The hypotheses of religion must be treated the same way as any other hypotheses: They must be examined critically and tested. That is, we must ask—we have an intellectual obligation to ask—are the hypotheses supported by the available evidence? In my book, *No Sense of Obligation*, I have tried to show that they are not. I will give an all too brief summary of my conclusions here.

## Hypotheses and Evidence

I have dismissed what I called “popular” beliefs such as the belief in signs or miracles on several grounds. First, most presumed miracles can be explained or accounted for without invoking divine intervention. Storms and other natural disasters are just those: natural disasters and not acts of God. We may therefore reject the arguments of those who give God credit for all that is good and ignore all that is bad; they are using evidence selectively in order to bolster a belief that they must intend to hold onto come hell or high water.

Similarly, we cannot accept the kind of wishful thinking that there must be a God because otherwise there would be no purpose to our existence, no fixed values, no universal code of morality. You cannot arbitrarily hypothesize, for example, a universal code of morality and then use the presumed existence of that code to “prove” that there must be a God. This hypothesis is not obviously true and requires evidence to support it. Basing one unsupported hypothesis on another, equally unsupported hypothesis is not progress.

Even though Bible codes are tantalizing because they appear statistically significant in a way that anecdotes do not, we cannot accept them as signs from God, particularly in light of the strong circumstantial case that the Bible was compiled from a multiplicity of sources (which are often at odds with one another). In addition, it now appears that the input data used to “uncover” the Bible codes may have been adjusted to achieve a desired result.

In the Western world, a great many people nevertheless think that the Bible is the literal word of God. The myriad errors and inconsistencies in the Hebrew Bible and in the Gospels ought to deliver a death blow to that belief. At most, the Bible is the word of God as interpreted and distorted by generations of oral tradition and then by later redaction. The Book of Jonah is so obviously a fiction that I am astonished any time I hear someone argue for its literal truth. The Gospels are not contemporaneous accounts of the life of Jesus, and they are unsupported by external evidence. Each successive account may be no more than an embellishment of the preceding account; only the first account is even roughly accurate, and there is no independent evidence for supernaturalism. As important as the Bible is, it is not the literal word of God.

Let us make a distinction between evil (that is, the deliberate infliction of harm on one human by another) and misfortune.

Both are a problem for those who believe in a benevolent God. Evil, oddly, is less of a problem: You can argue that evil is an unfortunate but necessary side effect of our having been granted free will, but it is hard to justify debilitating diseases by the same argument. The Bible gives no answers to the problems of evil and misfortune. Specifically, the most commonly cited theodicy, the Book of Job, offers little or no help. The comforters mostly blame the victim, assuming that he has done something wrong, even though readers of the book know that he is a righteous man. God himself never once claims to be just: only powerful. He seems to be saying, "Might makes right," a sentiment that our society has long abandoned as moral justification.

We can, however, find a potential source of evil in biology. When we see analogies to evil in the animal kingdom, we are properly reluctant to classify them as evil. In our minds, only humans can perpetrate evil. I conclude, therefore, that evil does not exist except insofar as we define it. It needs little or no explaining unless we hypothesize a benevolent God. Indeed, the God hypothesis hinders our understanding of evil rather than helping it.

### Philosophical Arguments and Evidence

I have therefore found wanting almost all the arguments of the laity and the clergy alike. How well do philosophers fare? Not well. Their proof texts are not as old as those of the scriptural literalists, but they seem as dated, and, except for a few philosophically minded scientists, philosophers of religion seem as unwilling to incorporate the discoveries of modern science into their worldviews as are the Biblical literalists.

The Ontological Argument of Saint Anselm asks you to imagine a "greatest possible being" and goes on to argue that such a being must be real because existence in reality is "greater" than existence in imagination. The argument makes no sense to me. It is based on the unsound premise that any valid logical argument must necessarily apply to the physical world. Neither does it define greatness, so you cannot evaluate its comparison between greatness in reality and greatness in imagination. Finally, it is a wild extrapolation from the finite to the infinite, and it is not testable.

The Argument from First Cause argues that every event has a cause. It assumes that the universe cannot be infinitely old, so there must have been a first cause, which Thomas Aquinas identified with his pre-existing notion of God. The Argument from First Cause fares slightly better than the Ontological Argument, but only because of the empirically supported claim that the universe has a finite age. If it has a finite age, then it probably had an ultimate cause. There is, however, no evidence that the ultimate cause was purposeful, so the Argument from First Cause ultimately fails as well.

The Argument from Contingency considers that all objects are contingent, that is, that objects exist only as a result of a series of past events that did not need to have happened. Some event or entity, however, created the universe, and that event or

entity could not have been contingent, since its existence is based on no past events. The Argument from Contingency presumes that objects or events are contingent, rather than deterministic. It further presumes that the entity that created the universe was purposeful. Neither presumption is obviously true, and the Argument from Contingency fails for much the same reason that the Argument from First Cause fails: It assumes

## The Bible gives no answers to the problems of evil and misfortune. Specifically, the most commonly cited theodicy, the Book of Job, offers little or no help. God himself never once claims to be just: only powerful.

without evidence that the creation was initiated by a being.

The Argument from Design sees both design and purpose in nature and presumes therefore that the entire universe was designed for a purpose. As a general argument, it is weak, but a couple of modern variations are more compelling. One such variation, which I call the Argument from Evolution, is firmly grounded in the fact that complexity increases almost inexorably as (geological) time progresses. The haphazard nature of evolution, especially the periodic mass extinctions, however, argues strongly against the claim that the universe was created with intelligent beings or anything else as its ultimate goal. A related argument, the Anthropic Principle, argues that the universe is so "hospitable" to life that it must have been designed with life in mind. The Anthropic Principle seems to me to be completely circular and impossible to take seriously.

Another design argument, which I call the Argument from Mathematical Physics, depends on whether you think there is order at the deepest levels of reality. Even so, there is no *a priori* reason to ascribe such order to a purposeful creator, and the Argument from Mathematical Physics fails: The universe need not have been created by a mathematician just because we can describe it by mathematics.

The Argument from Religious Experience presumes that, if people tell you that they have had certain experiences, then those people should be believed. I was frankly surprised that professional philosophers take this argument seriously. There is not one shred of evidence, credible or otherwise, that mystical or religious experiences are objectively real and not hallucinations or other well understood mental phenomena. That is, although the mystical experiences seem real, no one has ever devised a test that can be used to distinguish them from well known and well understood artifacts such as hallucinations and dreams. In addition, the religious experiences that people report are strikingly at variance with one another and highly dependent on the cultures of the reporters, which strongly suggests that they are mental phenomena.

## Belief, Knowledge, and Feelings

I conclude that the evidence in favor of a purposeful creator, let alone a benevolent God, is so weak as to be virtually nonexistent. Indeed, it is so weak that we are justified in arguing that the God hypothesis has been falsified. There is almost certainly no purposeful creator and certainly no benevolent God.

What then do I believe in?

*Believe* is a strong word. I do not *think* that the universe had a purposeful creator. I am *almost certain* that God does not intervene in our affairs, that there is no absolute code of morality, and so on. I probably believe these things as firmly as all but the most rigid literalists believe the very opposite. I differ from the literalists, however, in my admission that I could be wrong and in my continuing search for the evidence, either way. In short, *I try to believe what I have to believe, not what I want to believe.*

I am nearly convinced that the universe is completely deterministic. Even if it is not, the wavefunction of a complicated quantum system such as a brain evolves with almost perfect predictability. Far more of our personalities may be determined by the physiology of our brains than is generally recognized. Indeed, my statement that the universe is deterministic compels me to hypothesize that all our actions and thoughts are determined once and for all by the laws of nature. In this sense we have no free will: Free will is an approximation that we make because we can do nothing else; it is a concept that we developed because we seem to be free and have a great many choices open to us. But I doubt that we are free in the strictest sense of the term.

Some people find this argument very threatening. It might imply that mind is an epiphenomenon, that is, the result of physiological processes in our brains and bodies, and nothing more. That there is no purpose to our existence. That one day there will be no more humans, no Earth, no universe as we know it. To me, however, these are plain physical facts with no moral or ethical content. The fact that we do not have immortal souls does not justify unethical behavior. We might like the world to be otherwise, but it is not.

## The Cosmic Religious Feeling

What then can I propose in place of theism? First, the knowledge that the universe is intelligible. As a scientist, I see or read about phenomena that must seem like miracles to laypersons and certainly seemed like miracles to the ancients. The ancients postulated a god or gods to explain the natural order. Today, however, we find the universe understandable in terms of physical laws and have no need to invoke supernatural powers. In place of theism, I propose what Einstein called a *cosmic religious feeling*, an "unbounded admiration for the structure of the world so far as our science can reveal it." The awe and humility Einstein felt in the presence of the "magnificent structure" of nature were a genuinely religious feeling, but it was firmly grounded in reality and required no supernatural God.

Second, without a literal belief in a god who dictates moral codes or guides us along our paths through the universe, I propose the idea that we are grownups, on our own and responsible for ourselves, not children for whom someone else is responsible.

Finally, I offer, to those who want it, a religious humanism that is human-centered, not God-centered. In this view, our lives have meaning, but it is meaning that we and our communities give them, not meaning that is derived from a supernatural source. We have to act as if we had free will, because we can do nothing else. But we and our communities have to develop our own ethics. There are no moral imperatives and no universal code of morality, no automatic rewards for good deeds, no automatic punishment for bad deeds, no God looking over our shoulders. All we can do is strive to improve ourselves and our world, and we are completely on our own. Far from despairing, however, I consider hopeful the facts that medicine and sanitation have improved our health and longevity; science and technology have given us shorter working weeks, more abundant food and resources, and more leisure; and our political systems have given us more freedom and dignity. The power to improve the system further and to extend our good fortune to the rest of the world is in us and our own rational thinking, not in God. To put it in theological terms, we must seek our salvation in this world, because there is no other. □





# Arthur C. Clarke's 'Credo'

*People have debated the problems of existence for thousands of years—and that is precisely why we should be skeptical of the answers. One of the great lessons of modern science is that millennia are only moments. It is not likely that ultimate questions will be settled in such short periods of time.*

ARTHUR C. CLARKE

For thousands of years the subtlest minds of the human species have been focused on the great questions of life and death, of time and space—and of man's place in the universe. The answers have been encapsulated in the holy books of countless religions and whole libraries of philosophy, folklore, and myth.

Can our age contribute anything both new and true to these ancient debates? I believe so. We have been lucky enough to live at a time when knowledge that once seemed forever beyond reach can be found in elementary school-books. Our generation has seen the far side of the Moon, and close-ups of all the major bodies circling the Sun. We have opened the Pandora's box of the atomic nucleus. And

perhaps most marvelous of all, we have uncovered the secret of life itself, in the endless twining and untwining of the DNA spiral. This is perhaps the greatest discovery in the whole history of science, yet even now it is barely thirty years old.

There are those who claim not to be impressed by such achievements, arguing that science deals with unimportant questions that can be solved, while religion is concerned with important ones that can't. The logical positivists would maintain that this is nonsense; if a problem can't be solved, at least in principle, it doesn't really exist. In other words, there's no such animal as metaphysics.

Without knowing it, I became a logical positivist at about the age of ten. Every Sunday, I was supposed to make the two-mile walk to the local Church of England—it was a long time before I discovered there was any other variety—to attend a service for the village youth. To encourage us to sit through the sermons, we were rewarded with stamps illustrating scenes from the Bible. When we had filled an album with these, we were entitled to an "outing"—i.e., a bus trip to some exotic and remote part of Somerset, perhaps as far as twenty miles away. I stuck with it for a few weeks, then decided—to quote Churchill's famous memorandum on the necessity of ending sentences with a proposition—"This is nonsense up with which I will not put."

Half a century of travel, reading, and contact with other faiths has endorsed that early insight.

Now I myself am not completely innocent, according to one of the last letters I received from the great biologist J.B.S. Haldane. Shortly before he died (going not gently but heroically into the good night with a witty poem entitled "Cancer Can Be Fun") he wrote: "I would like to see you awarded a prize for theology, as you are one of the very few living persons who has written anything original about God. You have in fact, written several mutually incompatible things. . . . If you had stuck to one theological hypothesis you might be a serious public danger."

I am only sorry that J.B.S. never had a chance to criticize my later (doubtless yet more incompatible) speculations, developed in the novels *The Fountains of Paradise* and *The Songs of Distant Earth*. He would, I am sure, have enjoyed this specimen from *Fountains*:

There can be no such subject as comparative religion as long as we study only the religions of man. . . . If we find that religion occurs exclusively among intelligent analogs of apes, dolphins, elephants, dogs, etc., but not among extraterrestrial computers, termites, fish, turtles, or social amoebae, we may have to draw some painful conclusions. . . . Perhaps both love and religion can arise only among mammals, and for much the same reasons. This is also suggested by a study of their pathologies; anyone who doubts the connection between religious fanaticism and perversion should take a long, hard look at the *Malleus Maleficarum* or Huxley's *The Devils of Loudun*.

But I am quite serious about the profound philosophical importance of the Search for Extra-Terrestrial Intelligence (SETI); this may be its supreme justification. The fact that we have not yet found the

slightest evidence for life—much less intelligence—beyond this Earth does not surprise or disappoint me in the least. Our technology must still be laughably primitive; we may well be like jungle savages listening for throbbing of tom-toms, while the ether around them carries more words per second than they could utter in a lifetime.

The greatest tragedy in mankind's entire history may be the hijacking of morality by religion. However valuable—even necessary—that may have been in enforcing good behavior on primitive peoples, their association is now counterproductive. Yet at the very moment when they should be decoupled, sanctimonious nitwits are calling for a return to morals based on superstition.

Having disposed of religion (at least until next Wednesday), let us consider something really important: God—aka Allah/Brahma/Jehovah, etc. ad infinitum. In *The Songs of Distant Earth*, I distinguished between two aspects of this hypothetical entity, calling them Alpha and Omega to defuse emotional reactions.

Alpha might be identified with the jealous God of the Old Testament, who watches over all creatures ("His eye is on the sparrow") and rewards good and evil in some vaguely described afterlife. Even today, belief in Alpha is fading fast; I suggested that early in the next millennium the rise of "statistical theology" would prove that there is no supernatural intervention in human affairs. Nor does the "problem of evil" exist; it is an inevitable consequence of the bell-shaped curve of normal distribution.

Unfortunately, most people do not understand even the basic elements of statistics and probability, which is why astrologers and advertising agencies flourish. If you want to start an interesting fight, say in a loud voice at your next cocktail party, "Fifty percent of Americans (or whatever) are mentally subnormal." Then watch all those annoyed by this mathematical tautology instantly pigeonhole themselves.

I also, rather mischievously, demolished Alpha by invoking the ghost of Kurt Gödel, whose notorious "incompleteness of knowledge" theorem quite obviously rules out the existence of an omniscient being. However, this is an area where logic gets you nowhere. Belief—or disbelief—in Alpha appears to be irrevocably programmed into most people at an early age.

A man I admire, who has held the highest medical position in the United States, recently declared. "There are no atheists at the bedside of a dying child." It is a compassionate statement, nobly expressed, with which every humane person must sympathize. But, with all respect, it is simply untrue.

Nor have I ever felt a need for Alpha on the several occasions when I thought I was about to die (in each case, at a depth of embarrassingly few fathoms). Certainly the notion of appealing for divine help never entered my mind; I was much too busy thinking, "How do I get out of this ridiculous situation?"

Omega—the Creator of Everything—is a much more interesting character than Alpha, and not so easily dismissed. Although irredeemable agnostics may smile at Edward Young's "The undevout astronomer is mad," no intelligent persons can contemplate the night sky without a sense of awe. The mind-boggling vista of exploding supernovae and hurtling galaxies does seem to require a certain amount of explaining: to answer the question "Why is the universe here?" with the retort "Where else would it be?" is somehow not very satisfying. Although—the logical positivists would be pleased—it may be all the answer that is needed, because the question itself may not make sense.

Let me offer an analogy, suggested by a conversation I once had with C.S. Lewis. We science fiction authors are always picking each

---

Arthur C. Clarke is the author of such best-selling books as 2001: A Space Odyssey, Childhood's End, and Rendezvous with Rama. This essay is taken from his book Greetings, Carbon-Based Biped! Collected Essays 1934–1998 (St. Martin's Press). Copyright © 1999 by Arthur C. Clarke. It appeared originally in Living Philosophies, Clifton Fadiman, ed. (Doubleday, 1991). Published by permission of the author and the Scovill, Chichak, and Galen Literary Agency.

other's brain, and Lewis asked me what the horizon would look like (ignoring atmospheric absorption) on a really enormous planet—one not thousands, but millions, of kilometers in radius.

Any inhabitants would be convinced that they were living on a perfectly flat plane and might fight holy wars over the rival doctrines (a) the world goes on forever and ever; (b) you'll fall off when you reach the edge. But to us, there is no problem. We have watched the globe of the Earth floating on our television screens and have no difficulty in understanding why both flatlander cults are wrong. If they ever got around to making spaceships, their religious disputations would be ended.

So it is very, very risky to maintain that, as the old B-grade movies loved to intone, "There is some knowledge not meant for Man." I am fond of quoting a monumental gaffe made by Auguste Comte, who told the astronomers in no uncertain terms just what they could ever expect to know about other worlds—"We may determine their forms, their distances, their bulk, their motions—but we can never know anything of their chemical or mineralogical structure; and, much less, that of organized beings living on their surface."

Within a century of Comte's death, thanks to the invention of the spectroscope, much of astronomy had become astrochemistry—a science he had roundly declared impossible. I wonder what he would have said about space exploration, had anyone been rash enough to suggest such an absurdity to him.

So it may be that questions which now seem almost beyond conjecture may one day be conclusively settled. The limits of space, the beginning and ending of time, the origin of matter and energy, may have no mysteries to our remote descendants. And many of the questions we ask of the universe may turn out to be completely meaningless—as certain theories on the frontiers of modern physics tantalizingly suggest.

I felt this very strongly when I was privileged to make a television program, modestly entitled "God, the Universe and Everything Else" with Newton's successor Dr. Stephen Hawking. If you have not read *A Brief History of Time*, please rectify the omission—and read the bits about "imaginary time." Thank you; that saves me a lot of hand waving, trying to explain how our own views of past and future may be as naive as the flatlanders' ideas about the geometry of their giant planet.

The extraordinary success of Dr. Hawking's book is one of the best pieces of news from the popular science—indeed, educational—front for many years. I have been appalled by the way in which the United States (and much of the world, East and West) appears to be sinking into cultural barbarism, harangued by the fundamentalist ayatollahs of the airwaves, its bookstores, and newsstands poisoned with mind-rotting rubbish about astrology, UFOs, reincarnation, ESP, spoon-bending, and especially "creationism." This last—which implies that the marvelous and inspiring story of evolution, so clearly recorded in the geological strata, is all a cosmic practical joke—helps me to understand the revulsion that a devout Muslim must feel toward *The Satanic Verses*. If there is indeed such a thing as blasphemy, it is here. . . .

The Pontifical Academy of Science—which I have been honored to address—has now firmly stated: "Masses of evidence render the application of the concept of evolution to man and the other primates beyond serious dispute."

I began this essay by saying that men have debated the problems of existence for thousands of years—and that is precisely why I am skeptical about most of the answers. One of the great lessons of modern science is that millennia are only moments. It is not likely that ultimate questions will be settled in such short periods of time, or that we will really know much about the universe while we are still crawling around in the playpen of the Solar System.

So let us recognize that there is much concerning which we must reserve judgment, and refuse to take seriously all dogmas and revelations whose acceptance demands faith. They have been proved wrong countless times in the past; they will be proved wrong again in the ages to come.

And worse than wrong. Who can forget Jacob Bronowski, in his superb television series, *The Ascent of Man*, standing among the ashes of his relatives at the Auschwitz crematorium and reminding us: "This is how men behave when they believe they have absolute knowledge." This is how they are still behaving—in Ireland, in Lebanon, in Iran—and at this very moment, alas, in my own Sri Lanka.

Yet, if absolute knowledge is unattainable, someday most of the great truths may be established—if not with absolute certainty, then beyond all reasonable doubt. Do not be impatient; there is plenty of time.

How much time, we are only now beginning to appreciate. In a famous essay, "Time Without End," Freeman Dyson speculated that a high-technology cosmic intelligence might even be able to make itself, quite literally, immortal.

So let me end with the final chapter, "The Long Twilight," from my *Profiles of the Future: An Inquiry into the Limits of the Possible*.

Whether Freeman Dyson's vision (some would say nightmare) of eternity is true or not, one thing seems certain. Our galaxy is now in the brief springtime of its life—a springtime made glorious by such brilliant blue-white stars as Vega and Sirius, and, on a more humble scale, our own Sun. Not until all these have flamed through their incandescent youth, in a few fleeting billions of years, will the real history of the universe begin.

It will be a history illuminated only by the reds and infrareds of dully glowing stars that would be almost invisible to our eyes; yet the somber hues of that all-but-eternal universe may be full of color and beauty to whatever strange beings have adapted to it. They will know that before them lie, not the millions of years in which we measure eras of geology, nor the billions of years which span the past lives of the stars, but years to be counted literally in trillions.

They will have time enough, in those endless aeons, to attempt all things, and to gather all knowledge. They will be like gods, because no gods imagined by our minds have ever possessed the powers they will command. But for all that, they may envy us, basking in the bright afterglow of Creation; for we knew the universe when it was young. □



Arthur C. Clarke



---

# A Designer Universe?

.....

*If we were to see the hand of a designer anywhere, it would be in the fundamental principles, the laws of nature. But, contrary to some assertions, they appear to be utterly impersonal and without any special role for life. Physics may nevertheless be in a better position to give a partly satisfying explanation of the world than religion can ever be.*

STEVEN WEINBERG

I have been asked to comment on whether the universe shows signs of having been designed.<sup>1</sup> I don't see how it's possible to talk about this without having at least some vague idea of what a designer would be like. Any possible universe could be explained as the work of some sort of designer. Even a universe that is completely chaotic, without any laws or regularities at all, could be supposed to have been designed by an idiot.

The question that seems to me to be worth answering, and perhaps not impossible to answer, is whether the universe shows signs of having been designed by a deity more or less like those of traditional monotheistic religions—not necessarily a figure from the ceiling of the Sistine Chapel, but at



with the work of Hugh Everett forty years ago, the tendency of physicists who think deeply about these things has been to reformulate quantum mechanics in an entirely objective way, with observers treated just like everything else. I don't know if this program has been completely successful yet, but I think it will be.

I have to admit that, even when physicists will have gone as far as they can go, when we have a final theory, we will not have a completely satisfying picture of the world, because we will still be left with the question "why?" Why this theory, rather than some other theory? For example, why is the world described by quantum mechanics? Quantum mechanics is the one part of our present physics that is likely to survive intact in any future theory, but there is nothing logically inevitable about quantum mechanics; I can imagine a universe governed by Newtonian mechanics instead. So there seems to be an irreducible mystery that science will not eliminate.

But religious theories of design have the same problem. Either you mean something definite by a God, a designer, or you don't. If you don't, then what are we talking about? If you do mean something definite by "God" or "design," if for instance you believe in a God who is jealous, or loving, or intelligent, or whimsical, then you still must confront the question "why?" A religion may assert that the universe is governed by that sort of God, rather than some other sort of God, and it may offer evidence for this belief, but it cannot explain why this should be so.

In this respect, it seems to me that physics is in a better position to give us a partly satisfying explanation of the world than religion can ever be, because although physicists won't be able to explain why the laws of nature are what they are and not something completely different, at least we may be able to explain why they are not slightly different. For instance, no one has been able to think of a logically consistent alternative to quantum mechanics that is only slightly different. Once you start trying to make small changes in quantum mechanics, you get into theories with negative probabilities or other logical absurdities. When you combine quantum mechanics with relativity you increase its logical fragility. You find that unless you arrange the theory in just the right way you get nonsense, like effects preceding causes, or infinite probabilities. Religious theories, on the other hand, seem to be infinitely flexible, with nothing to prevent the invention of deities of any conceivable sort.

---

*Steven Weinberg is professor of physics and holds the Josey Regental Chair of Science at the University of Texas at Austin. His research has spanned a broad range of topics in quantum field theory, elementary particle physics, and cosmology, and he has been honored with numerous awards, including the Nobel Prize in Physics and the National Medal of Science. His books include the prize-winning *The First Three Minutes*, *Gravitation and Cosmology*, *The Discovery of Subatomic Particles*, and most recently *Dreams of a Final Theory*. He is a CSICOP Fellow. This article was first published in *The New York Review of Books*, October 21, 1999, and has been reprinted in *The Best American Science Writing 2000*, ed. by J. Gleick (HarperCollins, New York, 2000) and in *The Best American Essays 2000*, ed. by A. Lightman (Houghton Mifflin, Boston, 2000). It will also appear in *Facing Up*, a collection of the author's essays, to be published in the fall of 2001 by Harvard University Press.*

Now, it doesn't settle the matter for me to say that we cannot see the hand of a designer in what we know about the fundamental principles of science. It might be that, although these principles do not refer explicitly to life, much less human life, they are nevertheless craftily designed to bring it about.

Some physicists have argued that certain constants of nature have values that seem to have been mysteriously fine-tuned to just the values that allow for the possibility of life, in a way that could only be explained by the intervention of a designer with some special concern for life. I am not impressed with these supposed instances of fine-tuning. For instance, one of the most frequently quoted examples of fine-tuning has to do with a property of the nucleus of the carbon atom. The matter left over from the first few minutes of the universe was almost entirely hydrogen and helium, with virtually none of the heavier elements like carbon, nitrogen, and oxygen that seem to be necessary for life. The heavy elements that we find on Earth were built up hundreds of millions of years later in a first generation of stars, and then spewed out into the interstellar gas out of which our solar system eventually formed.

The first step in the sequence of nuclear reactions that created the heavy elements in early stars is usually the formation of a carbon nucleus out of three helium nuclei. There is a negligible chance of producing a carbon nucleus in its normal state (the state of lowest energy) in collisions of three helium nuclei, but it would be possible to produce appreciable amounts of carbon in stars if the carbon nucleus could exist in a radioactive state with an energy roughly 7 million electron volts (MeV) above the energy of the normal state, matching the energy of three helium nuclei, but (for reasons I'll come to presently) not more than 7.7 MeV above the normal state.

This radioactive state of a carbon nucleus could be easily formed in stars from three helium nuclei. After that, there would be no problem in producing ordinary carbon; the carbon nucleus in its radioactive state would spontaneously emit light and turn into carbon in its normal nonradioactive state, the state found on Earth. The critical point in producing carbon is the existence of a radioactive state that can be produced in collisions of three helium nuclei.

In fact, the carbon nucleus is known experimentally to have just such a radioactive state, with an energy 7.65 MeV above the normal state. At first sight this may seem like a pretty close call; the energy of this radioactive state of carbon misses being too high to allow the formation of carbon (and hence of us) by only 0.05 MeV, which is less than one percent of 7.65 MeV. It may appear that the constants of nature on which the properties of all nuclei depend have been carefully fine-tuned to make life possible.

Looked at more closely, the fine-tuning of the constants of nature here does not seem so fine. We have to consider the reason why the formation of carbon in stars requires the existence of a radioactive state of carbon with an energy not more than 7.7 MeV above the energy of the normal state. The reason is that the carbon nuclei in this state are actually formed in a two-step process: first, two helium nuclei combine to form the unstable nucleus of a beryllium isotope, beryllium 8, which occasionally, before it falls apart, captures another helium nucleus, forming a carbon nucleus in its radioactive state, which then decays into normal carbon. The total energy of the beryllium 8 nucleus and a helium nucleus at rest is 7.4 MeV above the energy of the normal state of the carbon nucleus; so if the energy of the radioactive state of carbon were more than 7.7 MeV it could only be formed in a collision of a helium nucleus and a beryllium 8 nucleus



if the energy of motion of these two nuclei were at least 0.3 MeV—an energy which is extremely unlikely at the temperatures found in stars.

Thus the crucial thing that affects the production of carbon in stars is not the 7.65 MeV energy of the radioactive state of carbon above its normal state, but the 0.25 MeV energy of the radioactive state, an unstable composite of a beryllium 8 nucleus and a helium nucleus, above the energy of those nuclei at rest.<sup>2</sup> This energy misses being too high for the production of carbon by a fractional amount of 0.05 MeV/0.25 MeV, or 20 percent, which is not such a close call after all.

This conclusion about the lessons to be learned from carbon synthesis is somewhat controversial. In any case, there is one constant whose value does seem remarkably well adjusted in our favor. It is the energy density of empty space, also known as the cosmological constant. It could have any value, but from first principles one would guess that this constant should be very large, and could be positive or negative. If large and positive, the cosmological constant would act as a repulsive force that increases with distance, a force that would prevent matter from clumping together in the early universe, the process that was the first step in forming galaxies and stars and planets and people. If large and negative the cosmological constant would act as an attractive force increasing with distance, a force that would almost immediately reverse the expansion of the universe and cause it to recollapse, leaving no time for the evolution of life. In fact, astronomical observations show that the cosmological constant is quite small, very much smaller than would have been guessed from first principles.

It is still too early to tell whether there is some fundamental principle that can explain why the cosmological constant must be this small. But even if there is no such principle, recent developments in cosmology offer the possibility of an explanation of why the measured values of the cosmological constant and other physical constants are favorable for the appearance of intelligent life. According to the “chaotic inflation” theories of André Linde and others, the expanding cloud of billions of galaxies that we call the Big Bang may be just one fragment of a much larger universe in which Big Bangs go off all the time, each one with different values for the fundamental constants.

In any such picture, in which the universe contains many parts with different values for what we call the constants of nature, there would be no difficulty in understanding why these constants take values favorable to intelligent life. There would be a vast number of Big Bangs in which the constants of nature take values unfavorable for life, and many fewer where life is possible. You don't have to invoke a benevolent designer to explain why we are in one of the parts of the universe where life is possible: in all the other parts of the universe there is no one to raise the question.<sup>3</sup> If any theory of this general type turns out to be correct, then to conclude that the constants of nature have been fine-tuned by a benevolent designer would be like saying, “Isn't it wonderful that God put us here on Earth, where there's water and air and the surface gravity and temperature are so comfortable, rather than some horrid place, like Mercury or Pluto?” Where else in the solar system other than on Earth could we have evolved?

Reasoning like this is called “anthropic.” Sometimes it just amounts to an assertion that the laws of nature are what they are so that we can exist, without further explanation. This seems to me to

be little more than mystical mumbo jumbo. On the other hand, if there really is a large number of worlds in which some constants take different values, then the anthropic explanation of why in our world they take values favorable for life is just common sense, like explaining why we live on Earth rather than Mercury or Pluto. The actual value of the cosmological constant, recently measured by observations of the motion of distant supernovas, is about what you would expect from this sort of argument: it is just about small enough so that it does not interfere much with the formation of galaxies. But we don't yet know enough about physics to tell whether there are different

**I'd guess that if we were to see the hand of the designer anywhere, it would be in the fundamental principles, the final laws of nature, the book of rules that govern all natural phenomena. We don't know the final laws yet, but as far as we have been able to see, they are utterly impersonal and quite without any special role for life.**

parts of the universe in which what are usually called the constants of physics really do take different values. This is not a hopeless question; we will be able to answer it when we know more about the quantum theory of gravitation than we do now.

It would be evidence for a benevolent designer if life were better than could be expected on other grounds. To judge this, we should keep in mind that a certain capacity for pleasure would readily have evolved through natural selection, as an incentive to animals who need to eat and breed in order to pass on their genes. It may not be likely that natural selection on any one planet would produce animals who are fortunate enough to have the leisure and the ability to do science and think abstractly, but our sample of what is produced by evolution is very biased, by the fact that it is only in these fortunate cases that there is anyone thinking about cosmic design. Astronomers call this a selection effect.

The universe is very large, and perhaps infinite, so it should be no surprise that, among the enormous number of planets that may support only unintelligent life and the still vaster number that cannot support life at all, there is some tiny fraction on which there are living beings who are capable of thinking about the universe, as we are doing here. A journalist who has been assigned to interview lottery winners may come to feel that some special providence has been at work on their behalf, but he should keep in mind the much larger number of lottery players whom he is not interviewing because they haven't won anything. Thus, to judge whether our lives show evidence for a benevolent designer, we have not only to ask whether life is better than would be expected in any case from what we know about natural selection, but we need also to take into account the bias introduced by the fact that it is we who are thinking about the problem.

This is a question that you all will have to answer for yourselves. Being a physicist is no help with questions like this, so I have to speak

from my own experience. My life has been remarkably happy, perhaps in the upper 99.99 percentile of human happiness, but even so, I have seen a mother die painfully of cancer, a father's personality destroyed by Alzheimer's disease, and scores of second and third cousins murdered in the Holocaust. Signs of a benevolent designer are pretty well hidden.

The prevalence of evil and misery has always bothered those who believe in a benevolent and omnipotent God. Sometimes God is excused by pointing to the need for free will. Milton gives God this argument in *Paradise Lost*:

I formed them free, and free they must remain  
Till they enthral themselves: I else must change  
Their nature, and revoke the high decree  
Unchangeable, eternal, which ordained  
Their freedom; they themselves ordained their fall.

It seems a bit unfair to my relatives to be murdered in order to provide an opportunity for free will for Germans, but even putting that aside, how does free will account for cancer? Is it an opportunity of free will for tumors?

I don't need to argue here that the evil in the world proves that the universe is not designed, but only that there are no signs of benevolence that might have shown the hand of a designer. But in fact the perception that God cannot be benevolent is very old. Plays by Aeschylus and Euripides make a quite explicit statement that the gods are selfish and cruel, though they expect better behavior from humans. God in the Old Testament tells us to bash the heads of infidels and demands of us that we be willing to sacrifice our children's lives at his orders, and the God of traditional Christianity and Islam damns us for eternity if we do not worship him in the right manner. Is this a nice way to behave? I know, I know, we are not supposed to judge God according to human standards, but you see the problem here: If we are not yet convinced of his existence, and are looking for signs of his benevolence, then what other standards can we use?

The issues that I have been asked to address here will seem to many to be terribly old-fashioned. The "argument from design" made by the English theologian William Paley is not on most peoples' minds these days. The prestige of religion seems today to derive from what people take to be its moral influence, rather than from what they may think has been its success in accounting for what we see in nature. Conversely, I have to admit that, although I really don't believe in a cosmic designer, the reason that I am taking the trouble to argue about it is that I think that on balance the moral influence of religion has been awful.

This is much too big a question to be settled here. On one side, I could point out endless examples of the harm done by religious enthusiasm, through a long history of pogroms, crusades, and jihads. In our own century it was a Muslim zealot who killed Sadat, a Jewish zealot who killed Rabin, and a Hindu zealot who killed Gandhi. No one would say that Hitler was a Christian zealot, but it is hard to imagine Nazism taking the form it did without the foundation provided by centuries of Christian anti-Semitism. On the other side, many admirers of religion would set countless examples of the good done by religion. For instance, in his recent book *Imagined Worlds*, the distinguished physicist Freeman Dyson has emphasized the role of religious belief in the suppression of slavery. I'd like to comment briefly on this point, not to try to prove anything with one example but just to illustrate what I think about the moral influence of religion.

It is certainly true that the campaign against slavery and the slave trade was greatly strengthened by devout Christians, including the Evangelical layman William Wilberforce in England and the Unitarian minister William Ellery Channing in America. But Christianity, like other great world religions, lived comfortably with slavery for many centuries, and slavery was endorsed in the New Testament. So what was different for anti-slavery Christians like Wilberforce and Channing? There had been no discovery of new sacred scriptures, and neither Wilberforce nor Channing claimed to have received any supernatural revelations. Rather, the eighteenth century had seen a widespread increase in rationality and humanitarianism that led others—for instance, Adam Smith, Jeremy Bentham, and Richard Brinsley Sheridan—also to oppose slavery, on grounds having nothing to do with religion. Lord Mansfield, the author of the decision in *Somerset's Case*, which ended slavery in England (though not its colonies), was no more than conventionally religious, and his decision did not mention religious arguments. Although Wilberforce was the instigator of the campaign against the slave trade in the 1790s, this movement had essential support from many in Parliament like Fox and Pitt, who were not known for their piety. As far as I can tell, the moral tone of religion benefited more from the spirit of the times than the spirit of the times benefited from religion.

Where religion did make a difference, it was more in support of slavery than in opposition to it. Arguments from scripture were used in Parliament to defend the slave trade. Frederick Douglass told in his *Narrative* how his condition as a slave became worse when his master underwent a religious conversion that allowed him to justify slavery as the punishment of the children of Ham. Mark Twain described his mother as a genuinely good person, whose soft heart pitied even Satan, but who had no doubt about the legitimacy of slavery, because in years of living in antebellum Missouri she had never heard any sermon opposing slavery, but only countless sermons preaching that slavery was God's will. With or without religion, good people can behave well and bad people can do evil; but for good people to do evil—that takes religion.

In an e-mail message from the American Association for the Advancement of Science I learned that the aim of this conference is to have a constructive dialogue between science and religion. I am all in favor of a dialogue between science and religion, but not a constructive dialogue. One of the great achievements of science has been, if not to make it impossible for intelligent people to be religious, then at least to make it possible for them not to be religious. We should not retreat from this accomplishment.

## Notes

1. This article is based on a talk given in April 1999 at the Conference on Cosmic Design of the American Association for the Advancement of Science in Washington, D.C.

2. This was pointed out in a 1989 paper by M. Livio, D. Hollowell, A. Weiss, and J.W. Truran ("The anthropic significance of the existence of an excited state of  $^{12}\text{C}$ ," *Nature*, Vol. 340, No. 6231, July 27, 1989). They did the calculation quoted here of the 7.7 MeV maximum energy of the radioactive state of carbon, above which little carbon is formed in stars.

3. The same conclusion may be reached in a more subtle way when quantum mechanics is applied to the whole universe. Through a reinterpretation of earlier work by Stephen Hawking, Sidney Coleman has shown how quantum mechanical effects can lead to a split of the history of the universe (more precisely, in what is called the wave function of the universe) into a huge number of separate possibilities, each one corresponding to a different set of fundamental constants. See Sidney Coleman, "Black Holes as Red Herring: Topological fluctuations and the loss of quantum coherence," *Nuclear Physics*, Vol. B307 (1988), p. 867. □

# An Evolutionary-Genetic Wager

JOHN C. AVISE

"It is incomprehensible that God should exist, and it is incomprehensible that He should not exist." So wrote Blaise Pascal in 1660. Pascal was a scientist and philosopher best remembered for his theistic "wager." To atheists and agnostics, he posed the following argument: If God does not exist, a person loses nothing by believing in Him; but if God does exist, belief in him can bring eternal life. Thus, one should wager that God exists.

At least two questionable steps of logic underlie Pascal's wager. First, if God exists, Pascal assumed that only a belief in Him can bring eternal salvation. However, by what logical or ethical rationale would God require human affirmation or damn nonbelievers? Pascal's reasoning merely suggests that a smart theological bet should be placed on any god that promises more, because if correct, a person thereby wins a greater payoff. Second, Pascal's wager assumes that nothing is lost by mistaken belief in God. Given the empirical history of man's inhumanity to man, often in the name of a god, this assumption too is impugnable. As Pascal noted, "Men never do evil so completely and cheerfully as when they do it from religious conviction."

What the evolutionary-genetic sciences point to most clearly is the important influence of genes over many human affairs that were thought to be under the purview of supernatural deities. The genes exercise these powers not in a vacuum, but rather in intimate collaboration with physical and social environmental conditions to which we are exposed during our development. The genetic gods and their protein angels interact elaborately with one another, and with environmental factors ranging from intracellular to macro-ecological. Many environmental conditions themselves, notably human cultures, reflect extended influences of the genes in this and prior human generations. The outcome is an individual person, unique from all others who have come before or ever will follow.

Yet, the genetic gods have evolved according to understandable, mechanistic biological processes such as mutation and DNA repair, recombination, Mendelian transmission, and Darwinian selection. Only natural selection comes close to omnipotence, but even here no intelligence, foresight, ultimate purpose,

or morality are involved. Natural selection is merely an amoral force, as inevitable and uncaring as gravity.

In the tradition of Pascal, perhaps a new wager can be posed. If mortal life is all that exists for individuals, we lose nothing by seeking to make that life as meaningful and rewarding as possible. But if eternal life exists, we have lost nothing by seeking a fulfilling existence here on Earth. Thus, one might wager on the richness of life here and now.

Like Pascal's original bet, this evolutionary-genetic wager involves some questionable assumptions. It assumes that nothing is to be lost by a mistaken belief in the absence of a god or of an eternal existence for the individual's soul. Many religions posit that only through complete faith can final redemption be attained. A far less severe philosophy holds that no deity would damn a soul for a lack of faith on matters unresolved to an open and reasonable, yet finite, human mind. Furthermore, some philosophers claim that, as a justification for ethical behavior, absolute faith is essential to society, regardless of its reality.

A second assumption of the evolutionary-genetic wager is that humans can choose to focus on the enhancement of meaning in immediate life, rather than in the hereafter. Findings from the biological and social sciences are ambivalent on this issue. Theism is a coping device from which many people derive great comfort and fulfillment.

Unfortunately, history documents that the pursuit of individual agendas, when coupled with the human tendency to invent personal justifications for moral authority, has promoted innumerable religious wars and persecutions. In any conciliation of faith and science, the deeper challenge is to incorporate science's objective understandings of nature into broader philosophical frameworks and responsible modes of action that may help us find satisfying lives.

*John C. Avise is a Distinguished Research Professor of Genetics at the University of Georgia and the author of several books, including Molecular Markers, Natural History and Evolution, Phylogeography, and Captivating Life. Reprinted by permission of the publishers from The Genetic Gods: Evolution and Belief in Human Affairs by John C. Avise, Cambridge, Mass.: Harvard University Press, Copyright ©1998 by the President and Fellows of Harvard College.* □



## Previous Articles on Science and Religion in SKEPTICAL INQUIRER

Here are some previous articles, reviews, and columns on science and religion published over the years in the *SKEPTICAL INQUIRER*. This is taken from the "Religion" subject heading of the new 25-year *SKEPTICAL INQUIRER Complete Online Index*. The numbers at the end of each entry are, in order: volume number (issue number) page numbers. Our first Science & Religion special issue was volume 23, number 4: 23(4).

- Age of Spiritual Machines, The*. By Ray Kurzweil.  
Rev. by Rudolph Muska 24(4)56
- Ancient Tales and Space-Age Myths of Creationist Evangelism. Tom McIver 10(3)258-276
- Celebrating Creation. Chet Raymo 23(4)21-23
- Evolution and Christianity. William G. Keehn 10(1)91
- Fringe Medicine. David Gerr 10(4)376-377
- From the Anthropic Principle to the Supernatural.  
David A. Shotwell 22(6)61-62
- Fundamental Dangers. Daniel Cohen 5(3)80
- Fundamentalists and Cults. Tony Pasquarello  
5(2)72-73
- Fundamentalists and Cults. Maryann Roth 5(2)73
- Fundamentalists and Cults. Taras Wolansky  
5(2)73-74
- Give Me That Old-Time Religion. Richard Noll.  
15(4)412-15
- God's Own Scientists: Creationists in a Secular World*  
by Christopher P. Toumey. Rev. by Robert A. Baker  
21(6)52-54
- Introduction: Conflicting or Complementary? Some  
Introductory Thoughts About Boundaries.  
Kendrick Frazier 23(4)18-20
- Irresponsible Speculation and Scientism? John E.  
Chappell, Jr. 24(6)60
- Let Our Children Go!* Ted Patrick. Rev. by Roy Wallis  
1(2)67-71
- Marriage of Sense and Soul, The*. By Ken Wilber.  
Rev. by Jeff Miner 24(1)53-54
- Martin Gardner Replies. Martin Gardner 10(1)91-92
- 'Miracle' Priest Suspended. Joe Nickell 21(5)15
- New Religious Consciousness, The*. C.Y. Glock and  
R.N. Bellah. Rev. by Rosa Willy 1(2)92
- Non-Overlapping Magisteria. Stephen Jay Gould  
23(4)55-61
- 'Prophet for Profit' Describes New Cult Leader  
O'Brien. Joe Nickell 24(6)8-9
- Ralph Estling Responds. 24(6)60-61
- Random Notes on the Psi Scene. Kendrick Frazier  
7(3)10-11
- Religion and Investigations. John F. Davis  
10(4)382-383
- Religion Writer's View of the New Age, A. Richard J.  
Brenneman 13(4)416-417
- Religious Belief Among Scientists Stable for Eighty  
Years. Thomas C. Genoni, Jr. 21(5)12
- Rocks of Ages: Science and Religion in the Fullness  
of Life*. By Stephen Jay Gould. Rev. by Mark W.  
Durm and Massimo Pigliucci 23(6)53-56
- 'Science and Religion Movement,' The. Eugenie C.  
Scott 23(4)29-31
- Science and the Versus of Religion. Barry A. Palevitz  
23(4)32-36
- Science Educators Rebut Creationist-friendly *Wall  
Street Journal* Column. Kendrick Frazier 24(6)8
- Sectarianism. Roy Wallis, ed. Rev. by Marcello Truzzi  
1(1)82
- Should Skeptical Inquiry Be Applied to Religion?  
Paul Kurtz 23(4)24-28
- SI and Religion. Jeffrey V. Governale 10(2)190
- SI and Religion. Russell Straw 10(2)190
- Skeptics and True Believers*. By Chet Raymo. Rev. by  
Wolf Roder 23(4)66-67
- Sleeping with Extra-Terrestrials: The Rise of  
Irrationalism and Perils of Piety*. By Wendy  
Kaminer. Rev. by Jim Sullivan 24(6)52
- Some Earlier Discussions of Science and Religion in  
SI. No Author 23(4)52
- Supernatural Power and Cultural Evolution.  
Anthony Layng 24(6)44-47
- Superstitions: Old and New. W.S. Bainbridge and R.  
Stark 4(4)18-31
- Templeton and the AAAS. Ralph Estling 24(4)59-60
- Three More Little Adventures on the Voodoo  
Science Front. Robert L. Park 24(6)7
- Two Mind-Sets. Steve Allen 23(4)47-49
- Whence Religious Belief? Steven Pinker 23(4)53-54,  
80
- William Sims Bainbridge and Rodney Stark Reply.  
W.S. Bainbridge and R. Stark 5(2)74-75
- You Can't Have It Both Ways: Irreconcilable  
Differences? Richard Dawkins 23(4)62-64

# Brain Biology and Belief

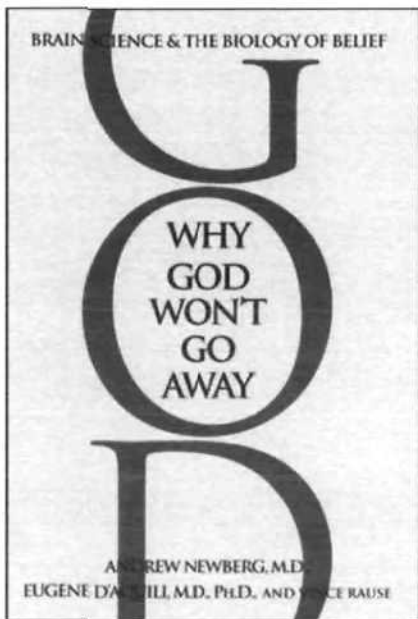
ANDREW THOMAS FYFE

*Why God Won't Go Away.* Andrew Newberg, M.D., and Eugene d'Aquili, M.D., Ph.D.  
Ballantine Books, New York, N.Y. 2001. ISBN 0-345-44033-1. 320 pp. Hardcover \$24.95.

In the early 1990s Gallup polls showed that over half of American adults have had "a moment of sudden religious awakening or insight." For these people one can imagine how this experience could quickly become the true pillar of their faith. Whatever Thomas Aquinas may have done to try to prove God's existence in his *Summa Theologica* 800 years ago is unimportant to the real, undeniable experience over half of Americans have felt in their lifetimes. A simple commoner can attain that "oneness" with the universe and that great surge of both fear and overwhelming joy by just closing his eyes and clearing his mind. Skeptics may show whatever logical and empirical evidence they wish for and against the spiritual realm, but eventually they must account for that feeling of infinite harmony attributed to meditation and prayer. Thanks to the latest in twenty-first century technology, that is exactly what Dr. Andrew Newberg and the late Eugene d'Aquili have attempted to do in their new book, *Why God Won't Go Away*.

The most compelling aspect of the book is experiments using a "SPECT camera" (the acronym stands for single photon emission computed tomography) to take, as the title of the book's first chapter puts it, "a photograph of God." Newberg and d'Aquili, working with eight Tibetan meditators and several Franciscan nuns, were able to use the SPECT to gain an "accurate freeze-

frame of blood flow patterns" at the transcendent peak of mystical experience. What was found in these scans was an expected increase in the activity of the prefrontal cortex, home to the



attention span; but also, and more interestingly, there was a decrease in activity of the "orientation association area" (OAA). The "primary job of the OAA is to orient the individual in physical space," and to accomplish this it must also generate a clear "distinction between the individual and everything else, to sort out the you from the infinite not-you that makes up the rest of the universe." Specifically, the left orienta-

tion area is responsible for creating the borders of the self, while "the right orientation area is associated with generating the . . . physical space in which that self can exist."

In fact, people with severe damage to this area of the brain have great difficulty maneuvering in physical space—often bumping into chairs or falling to the floor instead of successfully lying down on a bed. But what the SPECT scans show is not a shutdown of the OAA; instead during spiritual events it becomes deprived of the "incoming flow of sensory information" it needs to be able to find any boundaries between itself and existence. Put simply, the mind has "no choice but to perceive that the self is endless and intimately interwoven with everyone and everything."

Newberg and d'Aquili describe the different levels of spiritual events leading up to the culminating, and rare, "Absolute Unity Being" (AUB) state. They describe two paths of meditation that religions have used over time to attain this AUB. Newberg and d'Aquili connect the origin of religion and myth to the ability of the brain to reach this state. In turn, they also propose that the origin of this very "ability" lies in our ancient ancestors' dread of death and need for safety.

Those are the positives.

The most dismaying aspect of *Why*

---

*Andrew Thomas Fyfe is a skeptic serving in the U.S. Army at Ft. Bragg, N.C.*

*God Won't Go Away* is the authors' conclusions from their own research. They regularly interject personal speculation, and this greatly harms the work, at times teetering to the point of scientific irresponsibility. They try to draw connections between their research and the existence of "a primary reality that runs deeper than material . . . a state of pure being that encompasses the lesser realities," whatever that means. The irony lies in how Newberg and d'Aquili often point to the flaws in their own conclusions, but then fail to correct them. Just as often as they tell us that they believe "we saw evidence of a neurological process that has evolved to allow us humans to transcend material existence," they state (rather contradictorily) that their "neurological model . . . does not explain whether absolute being is nothing more than a brain state or, as mystics claim, the essence of what is most fundamentally real."

A reader is left with the question, If their research cannot determine if this transcendent and nonmaterial world exists, then why do they at other times draw the conclusion from their very research that it *does* exist? They even go

on to tell us that their work "could support the argument that religious experience is only imagined neurologically, that God is physically 'all in your mind,'" but then try to draw the opposite conclusion later in the book with no evidence why. Newberg and d'Aquili repeatedly state that they have proven that this meditative state is not a delusion, but I am inclined to believe this is their attempt to soften the book so not to drive away religious readers and their wallets. Otherwise, Newberg and d'Aquili's ability to hold these contradictory ideas would be a true testament to the brain's ability to overcome reality and rationality.

Overall, *Why God Won't Go Away* is an important work in our understanding of the religious experience. This is a field of study everyone should try and gain a basic understanding of, and this book, even with its occasional elements of pseudoscience, is a good start. I suggest everyone read this book for the landmark experiments and research it relates, but then I also recommend you draw your own conclusions from those experiments and not take the authors' opinions too seriously.

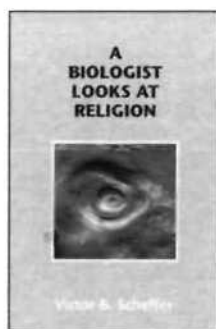
away from church and creed. He switched to what he calls "natural religion."

In this slim, thoughtful volume he ponders, as do so many other scientifically oriented people, why religion is "so vital to millions of thinking persons," even while its supernatural base is "so highly improbable."

Scheffer's approach is gentle and thoughtful. He acknowledges that scientists like him have no special credentials for writing about religion, but his extended essay is nevertheless infused with a wildlife biologist's appreciation and awe of nature. He considers life an electrochemical system, self-contained, self-sustaining, multiplying and evolving by natural selection. He sees similarities throughout the animal world, ranging from the largest whale to the pygmy shrew—a 90-million-times difference in scale, "yet both have similar tissues and organs and both (I presume) nurse their young with tenderness." Our human feeling of sympathy with others in pain has roots in the behavior of social wild animals; care-giving for an injured companion is common, for example, among bottlenose dolphins. And while he sees no evidence of purpose in life anywhere outside imagination, he nevertheless sees the human enterprise itself as full of purpose.

In brief chapters, Scheffer considers the origins of religion, its strength today, the strength of nonbelief, and belief in prayer and immortality. "Science and Religion" is treated in a concise six-page chapter. He gives the statistics showing that belief among scientists in a personal god has not significantly changed over the past eighty years (41.8 percent in 1916, 39.3 percent in 1996), although among "greater" scientists, members of the National Academy of Sciences (as polled in 1998), disbelief is greater—almost total. He briefly sketches the beliefs of five selected scientists including two believers, two nonbelievers, and one uncommitted.

In a balanced chapter on the bright and dark sides of religion, he sees both. "The bright side of organized religion



## A Gentle Scientist Ponders Religious Belief

KENDRICK FRAZIER

*A Biologist Looks at Religion.* Victor B. Scheffer. Bamboo Press, Seattle, 2001. (Distributed by the author, 1750 152nd Ave. NE, #214, Bellevue, WA 98007.) ISBN 0-9676634-0-7. 88 pp. Softcover, \$12.

More than three decades ago, zoologist Victor B. Scheffer wrote *The Year of The Whale*, which won the Burroughs Medal for the best book in the field of natural history in 1969 and helped spark the marine mammal conservation movement of the 1970s. *The Year of the Seal* followed (I

Kendrick Frazier is editor of the *SKEPTICAL INQUIRER*.

am proud to own both), and along the way there were ten other books, most dealing with outdoor values and biology.

Now in his ninety-fourth year, Scheffer turns his philosophical and literary attention to religion. In the closing years of his life, Scheffer says, he is trying to make sense of religion—particularly its Christian forms in America. Scheffer grew up a Presbyterian, but the pull of natural science drew him



displays love expressed through pity, kindness, charity, compassion, sympathy, care-giving, friendship, peacemaking, generosity, and goodwill." The dark side is intolerance. "The dark side of religion displays hate expressed through the calculated use of power to suppress freedom of thought and to impose by force the beliefs of one group on another."

In other brief chapters he considers the challenges to religion in an ailing society, the future of religion, and the greening of religion (a growing environmental ethic). He predicts hopefully that in the future the most greatly admired persons "will be those who believe in, and work for, the triumph of gentleness and reason." His heroes from his own time in this regard include Eleanor Roosevelt, Archibald MacLeish, Joseph Wood Krutch, E.B. White, and Rachel Carson. He calls for the teaching of moral values, "clearly dissociated

from religious doctrine," in elementary schools. He agrees with Carl Sagan's view that there is true spirituality in our reverence and awe for nature.

Scheffer concludes with a brief personal credo. "I am an agnostic. . . . I do believe that giving credit to a god-figure is far too easy: the cosmos deserves respect; it deserves truly thoughtful speculation as to its being." The social gifts of church can be valuable, but he finds its sacraments and contracts for salvation unneeded.

"One holds fast to Russell's dictum that a good world needs knowledge, kindness, and courage. One remembers the unceasing human need for love—the organizing power of the universe." One cultivates the habit of optimism. And one reserves the right to challenge all who, hiding in the cloak of religion, show disrespect for the worth and the dignity of human life."

individual using methods designed to separate truth from falsity. We would expect such a person to be prepared to accept any conclusion derived from those methods, and the assumptions made before starting the process to be independent of the conclusions drawn.

But from the very first page, it's clear this not what the author is about. Instead, Strobel begins from a perspective of evangelical Christianity. He "investigates" it by posing hard questions about Christianity and traditional theism to "experts," and seeing if some set of plausible answers to them exist. This is not an investigation in the sense that most of us understand it.

Clearly, Strobel asks the right questions. Chapter titles include "Since evil exists, a loving God cannot," "It's offensive to claim Jesus is the only way to God," "God isn't worthy of worship if he kills innocent children," and so forth. The "experts" he interviews, of course, are all evangelical Christians. Space prohibits a detailed discussion of the answers they provide. I think it safe to say, however, that while they are unsatisfying to skeptics, neither are they outside the realm of possibility.

But *not outside the realm of possibility* is very different from *true*, or even *likely*.

Throughout the book, Strobel wants readers to equate *not incompatible with reason or evidence* to *shown conclusively by reason or evidence*. Strobel, along with most evangelical Christians interested in these issues, uses words from the vocabulary of science very differently from how scientists use them. At the very least, both skeptics and believers owe it to the rest of the world to make that distinction clear.

Since the belief system Strobel espouses can explain everything, it is not incompatible with anything, and therefore the book is uninteresting on a purely logical level.

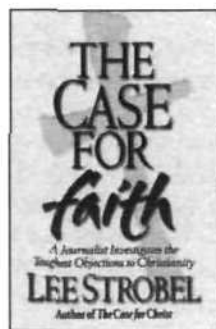
Why, then, is it important? Because of its intended audience and the way it chooses to reach them.

Throughout *The Case For Faith*, Strobel uses the rhetoric of journalism,

## Defending the Faith

BARRY FAGIN

*The Case for Faith: A Journalist Investigates the Toughest Objections to Christianity.* By Lee Strobel. Zondervan Publishing, New York, 1998. ISBN 0310209307. 304 pp. Paperback, \$12.99.



As a skeptic who works alongside evangelical Christians on a regular basis, I'm often asked to read material not normally of interest to SKEPTICAL INQUIRER readers. *The Case For Faith*, by Lee Strobel, is an exception. Books like this are important for skeptics to pay attention to,

*Barry Fagin is professor of computer science at the U.S. Air Force Academy. He is a member of the Rocky Mountain Skeptics, a Senior Fellow in Technology Policy at the Independence Institute, and writes occasional columns on science and critical thinking for Colorado newspapers. Fagin is a member of Temple Shalom in Colorado Springs.*

though perhaps not for the reasons their authors hope.

Subtitled "A Journalist Investigates the Toughest Objections to Christianity," the book is written by the former legal editor of the *Chicago Tribune*, by his own admission a former atheist and now devout Christian. The book is a painful read for skeptics, not so much because of its prose or because we might find its conclusions difficult to accept, but because of its dramatically different use of words and concepts from what we are accustomed to.

For example, when a skeptic reads that an *investigation* is to be performed by a *journalist*, the standard use of those terms suggests an impartial search by an

evidence, investigation, and analysis to make a case. Why? Conventional theology has long argued that faith is beyond reason, and therefore unaffected by it. Why must a different case be made now?

Why is it so important to the author and his publisher that reason be used to support their faith? Perhaps their decision reflects a growing recognition among fundamentalist Christians of the importance of science, reason, and rationality.

For believers, this book is reassurance that they need not set aside their rational faculties to practice their faith. Are there a significant number of Christians who feel that way? Strobel thinks so. The book also can help evangelicals respond to rationalist attacks. Do Christians encounter many such attacks today? Strobel thinks so. For non-Christian

skeptics, the book's primary purpose is to convert us to Christianity. Are we now a sufficiently important audience to write for? Once again, Strobel thinks so.

That the author believed his journalistic credentials to be of interest to prospective readers, that he chose the rhetoric of reason, logic, and investigative reporting to tell his story, and that he made a great deal of the academic credentials of his experts is evidence that fundamentalist Christians recognize how influential critical thinking and the scientific method are today. At a time when skeptics are often discouraged at the gullibility of the media and the poor level of science education of the average citizen, books like *The Case For Faith* serve to remind us that the other side sees things a little differently. For skeptics, that's truly good news.



## Is Biological Life More than Coded Molecules?

RICHARD EMERY

*The Triple Helix.* By Richard Lewontin. Harvard University Press, Cambridge/London, 2000. ISBN 0-674-00159-1. 136 pp. Hardback, \$22.95.

The war of books continues to rage in the north Atlantic over an old question: What exactly is biological life? Harvard and Oxford are fighting at the front.

Richard Lewontin, Harvard's eminent Agassiz Research Professor in Comparative Biology, is not pleased with those too preoccupied with the operations of genes. "No developmental biologist asks why human beings and chimpanzees look so different, except to say the obvious: that they have different genes." Lewontin thinks there's much more to life than that.

*Richard Emery teaches biology at Olympic College in Bremerton, Washington. He can be reached at remery@oc.ctc.edu.*

His new book, *The Triple Helix*, is a jab at molecular biology and genetics, and a conspicuous swipe at Richard Dawkins, the Oxford agitator for selfish genes and extended phenotypes. Dawkins, in his contrary books, asks instead why humans and chimpanzees look so much alike. The base reductionism he uses offends Lewontin. Besides, it was Dawkins, in his *Unweaving the Rainbow* (1998, reviewed in SKEPTICAL INQUIRER, March/April 1999), who previously kicked the academic pants of Harvard's biologist Stephen Jay Gould. Now it's Lewontin's turn to kick back for Gould's sake, and Harvard's, too.

Lewontin abstains from mentioning either his colleague or his adversary, but he is out to make a case against biolo-

gists who are "... devoted to explanations of the way in which a reductionist approach to the study of living organisms can lead us to formulate incomplete answers to questions about biology or to miss the essential features of biological processes or to ask the wrong questions in the first place."

More than naked reductionism, Lewontin believes, is needed to explain life and how it evolves—something more than codes written on DNA or their transcriptions onto microchips must emerge to offer us epistemological relief: "If we had the complete DNA sequence of an organism and unlimited computational power, we could not compute the organism because the organism does not compute itself from its genes."

Lewontin, in his concise attack, makes clear that the war between holism and reductionism in science is not over. He believes geneticists and their molecular explanations of life have "... pauperized, temporarily it is to be hoped, an entire field of study." Money and respect are the main reasons why Harvard and Oxford continue to lob their literary ordnance at each other. Lewontin sides with his wounded colleague, Gould, noted punctuator of evolution and authority on the Cambrian explosion (when the body plans of animals were established rather suddenly about half a billion years ago). Dawkins, with his body-snatching genes and mind-snatching memes, is bothering these Harvard laureates again.

Here, precisely, is where biology is coming to terms with itself. Both sides of this epic drama are concerned with the validity of *emergent properties*, like gravity, governed by physical laws. Molecular biologists can show with astonishing clarity how genes manifestly build, operate, repair, reproduce, and even kill living organisms. Indeed genetic dogma defines the new emergent property, and old-timers like Lewontin are not so impressed.

He sees a different sort of emergent property—a "dialectic." He uses interesting examples in both plant and animal

kingdoms to show that biological things do appear to happen apart from genes: environmental influences on corn yield, morphological changes in tropical vines, different eye sizes in fruit flies, skeletal traits in dinosaurs. All of these lead him to understand life as a recursively "dialectic" phenomenon in nature. The third

the genetic dictionary (the exact code), or the Central Dogma (that coded information on DNA must always flow through RNA to make a protein, and never in the opposite direction).

Early in *The Triple Helix*, Lewontin cautions us on the pitfalls of metaphor. We must use language to describe lan-

**"If we had the complete DNA sequence of an organism and unlimited computational power, we could not compute the organism because the organism does not compute itself from its genes."**

strand of "the triple helix" is taken to mean "... a dialectic between organisms and their environments, each forming the other." As such, Lewontin believes that holistically correct biologists should focus on "... a dialectic of method and problematic in science."

Lewontin complains about the tedium of mechanical reductionism where "[t]he problem of how to parse the world into appropriate bits and pieces is a consequence of the analytic tradition that modern science has inherited from the seventeenth century." This distinguished biologist feels a natural need to refute reductionism because life seems so much more complex.

If the chemists have all the answers, then what's a biologist to do?

A reader might also ask why Lewontin does not place his own hypothesis more squarely on the table. He offers no parameters for measuring the "dialectic." Instead, he drags out vague promises of what he calls the "Three C's": catastrophe theory (an ocean wave breaking), chaos theory (a hurricane forming), and complexity theory (undiscovered laws of complex systems). Lewontin can only hope, however, because none of these theories has yet revealed a single emergent property to match the power of a geneticist's Hardy-Weinberg equation (the statistical distribution of alleles), homeobox genes (an organism's developmental software),

language, unfortunately, and he is disdainful of that: "Just as the metaphor of development implies a rigid internal predetermination of the organism by its genes, so the language used to describe the biochemistry of the genes themselves implies an internal self-sufficiency ... and the metaphor of the Holy Grail seems entirely apt since it too was said to be self-renewing—although only on Good Friday" (his words).

In this context, Dawkins might ask: If you are disdainful of false metaphors, why do you so often refer to genes as "blueprints" of proteins? That, of course, is a false metaphor: blueprints look *something* like the objects they define, genes look *nothing* like the proteins they express.

Lewontin concludes: "Progress in biology depends not on revolutionary new conceptualizations, but on the creation of new methodologies that make questions answerable in practice in a world of finite resources." Dawkins should be feeling dispatched.

Many fine biologists, in their formative years, were told by arrogant chemists that if they could actually *do* science they would do it in chemistry. And now these molecular bullies are taking over, reducing biology to "bits and pieces," teaching biologists what they couldn't learn on their own. This may be why Lewontin feels the need to call their bluff. □

## The Young Skeptics Program

In an effort to promote science and skepticism among all generations, the Committee for the Scientific Investigation of Claims of the Paranormal (CSICOP), is pleased to announce the launch of the Young Skeptics Program. The Web-based program is geared towards students, parents and educators.

[CSICOP.org/youngskeptics](http://CSICOP.org/youngskeptics)

### The goals of the Young Skeptics Program are:

- To promote science and skepticism within all facets of society and among all generations.
- To provide multiple outlets for young people to learn and involve themselves in science, skepticism, and critical inquiry.
- To work with parents, teachers and students in an effort to promote learning, defend and advance science education, and encourage critical thinking in all areas of life.
- To help young people make sense of the world by developing the tools and gathering the information to navigate through the nonsense effectively.
- To nurture curiosity, wonder, and the imagination while sharing in the fascination of reality and the excitement our universe has to offer.
- To explore extraordinary claims and investigate unexplained phenomena, while enjoying ourselves in the process.
- To inspire future generations to proudly carry the torch of science and reason and keep the flame burning bright for years to come.

For more information please contact Program Director Amanda Chesworth at [a.human@mindspring.com](mailto:a.human@mindspring.com)



*Listing does not preclude future review.*

**The Borderlands of Science: Where Sense Meets Nonsense.** Michael Shermer. Oxford University Press, London, New York, 2001. ISBN 0-19-514326-4. 360 pp. Hardcover, \$25. A book about the fuzzy borderlands of science, exploring the boundary problem between orthodoxy and heresy in science in general, and between normal science and nonscience, revolutionary science, radical science, pseudoscience, protoscience, and nonsense in particular. Divided into three parts: Borderlands Theories ("theories of everything," cloning, racial differences), Borderlands People (Wallace, Darwin, Freud, Sagan), and Borderlands History. Shermer begins by offering a Boundary Detection Kit, ten useful questions to ask in determining the validity of a claim. Throughout, he casts a strong critical intelligence on all manner of interesting topics and issues along the fuzzy borderlands.

**Final Séance: The Strange Friendship Between Houdini and Conan Doyle.** Massimo Polidoro. Prometheus Books, 59 John Glenn Drive, Amherst, NY 14228-2197. 2001. ISBN 1-57392-896-8. 275 pp. Hardcover, \$25. The story of an unusual friendship between escape artist Harry Houdini and Sir Arthur Conan Doyle, the creator of Sherlock Holmes. Houdini was an ardent skeptic about spiritualism and often publicly exposed fraudulent mediums; Conan Doyle was a true believer who became convinced that the dead communicated with the living. One chapter deals with the *Scientific American* committee established in 1923, with Houdini as a member, to investigate specific claims of mediums; Conan Doyle considered it a "farce." Based on original correspondence, photographs, and his own extensive research, Polidoro reconstructs this unusual friendship between a believer and a skeptic.

**Little Green Men, Meowing Nuns, and Head-Hunting Panics: A Study of Mass Psychogenic Illness and Social Delusion.** Robert E. Bartholomew. McFarland & Co., Inc. Publishers, Box 611, Jefferson, NC 28640. 2001. ISBN 0-7864-0997-5. 292 pp. Softcover, \$29.95. Foreword by Erich Goode. A series of case studies of mass hysteria and delusions. Bartholomew begins with a concise history of mass hysteria and social delusions. Sections then deal with mass hysteria in closed settings (schools and work), mass hysteria in communities (mad gassers, the Pokémon TV show sickness, the medieval dancing sickness), collective delusions (penis vanishing panics; imaginary air raids on Canada: the phantom sniper of Esher, England; ghost rockets; the Roswell crashed-UFO myth; the Martian invasion panic), and major issues and future directions.

**Roswell: Inconvenient Facts and the Will to Believe.** Karl T. Pflock. Prometheus Books, 59 John Glenn Drive, Amherst, NY 14228-2197. 2001. ISBN 1-57392-894-1. 331 pp. Hardcover, \$25. In his foreword Jerry Pournelle calls this a "courageous and important" book, and in many respects it is. Pflock is a rare breed, a pro-UFOlogist who is an anti-Roswellian, the result of his own eight years of research into the Roswell story and his gradual conversion from wanting to bust open the truth about Roswell to discovering that he was not as objective as he had believed. Pflock is a former Defense Department and intelligence official, and this is a meticulously researched look at Roswell. Pflock concludes that Roswell was indeed stimulated by the debris from a constant-level balloon project in 1947 that had both civilian (New York University researchers led by professor Charles B. Moore) and secret military aspects. "On close and careful examination, the seemingly impressive case for a crashed

flying saucer at Roswell dissolves, and a quite different picture comes into focus" writes Pflock after thirteen chapters of analysis. "No saucer wreckage. No bodies. No missing nurses. Instead there is revealed the story of a highly classified, very sensitive U.S. Army Air Force research-and-development project, how it almost was compromised by a combination of complacency, chance, and hubris, and what military authorities did to forestall such a security breach."

**Skepticism and Humanism: The New Paradigm.** Paul Kurtz. Transaction Publishers, Rutgers-The State University, 35 Berrue Circle, Piscataway, NJ 08854-8042. 2001. ISBN 0-7658-0051-9. 306 pp. Hardcover, \$39.95. A spirited defense of the values of reason, skepticism, science, and humanism in an increasingly complex world where, to take just one point, science has become so specialized that few people can draw on its broader intellectual and cultural implications. Kurtz has devoted his life to using the methods of skeptical inquiry in all fields of human interest—including religion—while likewise being committed to the secular humanist paradigm. He also has been involved in creating alternative institutions to carry forth and sustain those ideas. Skeptics may find especially valuable Part One of this collection of papers, "Skeptics of the World Unite!" It deals with antiscience paradigms, skeptical inquiry, skepticism and the paranormal, the escape to oblivion, fears of the apocalypse, scientific tests of astrology, the "Mars Effect," a defense of scientific medicine, Can the sciences be unified? Should skeptical inquiry be applied to religion? And, Why do people believe or disbelieve? This is a companion volume to *Toward a New Enlightenment: The Philosophy of Paul Kurtz*, from the same publisher. □

## ARTICLES OF NOTE

**Bailar, John C.** "The Powerful Placebo and the Wizard of Oz." *The New England Journal of Medicine*, 344(21):1630-32, May 24, 2001. In an editorial regarding Hrobjartsson and Gotzsche's study of the placebo effect (below), Bailar—a doctor at the University of Chicago—claims the findings impressive, but the conclusions too sweeping. As he writes, "I would not want to prescribe or receive a placebo without some reason that was far more specific than weak evidence of some general 'placebo effect.'" He compares this effect to the

Wizard of Oz who "was powerful because others thought he was powerful—until they found that the curtain hid a very ordinary man." He wonders if the placebo is powerful because we have yet to look behind the curtain.

**Blumner, Robyn.** "New Form of Creationism Shouldn't Be in School Curriculum." *St. Petersburg Times*, May 20, 2001, [www.sptimes.com/news/052001/perspective/new\\_form\\_of\\_creationism.shtml](http://www.sptimes.com/news/052001/perspective/new_form_of_creationism.shtml). With the famous Scopes Trial seventy-five years behind us, the

debate surrounding creationism or evolution in our school curriculum is stronger than ever. Blumner suggests, "Creationism is back under a new, politically astute guise" from our "born-again president and Religious right Attorney General" to the credentialed Intelligent Design theorists. Religion has nothing to fear from evolution, for science is neither "anti-religious" nor "atheistic." Religious leaders should in fact fear a government that includes spiritual beliefs in school curricula, beliefs that "may or may not comport with doctrine," says Blumner.

Hrobjartsson, Asbjorn, and Peter C. Gotzsche. "Is the Placebo Powerless? An Analysis of Clinical Trials Comparing Placebo with No Treatment." *The New England Journal of Medicine*, 344(21): 1594-1602, May 24, 2001. To evaluate whether placebos help patients with diseases, the authors conducted a systematic review of clinical trials where patients were given either a placebo or no treatment. Little evidence was found to prove that placebos had powerful clinical effects. The authors conclude that outside a clinical setting, they see no justification for the use of placebos, but that "they had possible small benefits in studies with continuous subjective outcomes and for the treatment of pain."

Murphy, Cullen. "Innocent Bystander: Thy Will Be Done." *The Atlantic Monthly*, April 2001, pp. 18, 20. Herbert Benson, M.D., author of the 1975 book *The Relaxation Response*, "has mounted a new controversial scientific effort to determine . . . whether intercessory prayer 'works.'" Benson is the president of the Mind/Body Medical Institute and an associate professor at Harvard Medical School. His studies are being met with skepticism by both the Council for Secular Humanism and the Committee for the

Scientific Investigation of Claims of the Paranormal, who question "whether a scientific evaluation of the efficacy of prayer is even theoretically feasible." The results of this study will be published in early 2002.

Scott, Eugenie C. "Fatally Flawed Iconoclasm." *Science*, 292:2257-2258, June 22, 2001. Another well-informed critical review of Jonathan Wells's evolution-bashing *Icons of Evolution: Science or Myth?* "Wells presents a systematically misleading view of evolution," says anthropologist Scott. "Individual sentences in *Icons* are usually technically correct, but they are artfully strung together to take the reader off the path of real evolutionary biology and into a thicket of misunderstanding." Scott blasts Wells's "incomplete and incorrect" discussion about peppered moths and his failure to cite the abundance of human fossils over the last 5 million years. Scott concludes that the book "has high potential to mislead the nonscientific public, and scientists should be prepared to respond."

Silber, John. "Silliness Under Seattle Stars." *Boston Herald*, Wednesday, May 16, 2001, [www.bostonherald.com/news/columnists/silber05162001.htm](http://www.bostonherald.com/news/columnists/silber05162001.htm). Named after astronomer and optical scientist, Johannes

Kepler (1571-1630), Kepler College of Astrological Arts and Sciences is the only college in the Western Hemisphere that issues higher education accredited B.A. and M.A. degrees in astrology. Located in Washington State, the program consists of an eleven-week online course, and one week of on-campus training. Says Silber, the chancellor of Boston University, "It is inexcusable for the government to certify teachers of nonsense as competent or to authorize . . . the granting of degrees in nonsense."

Koenig, Robert. "Creationism Takes Root Where Europe and Asia Meet." *Science*, 292:1286-87, May 18, 2001. In a country where one of the strongest anti-evolution movements outside of North America (the BAV—roughly translated: "Science Research Foundation") resides, Aykut Kence and Isik Bökesoy, two Turkish scientists, have literally dedicated their lives to teaching evolution. Three years ago, Kence formed the Evolution Group, which educates the public on the "scientific basis of evolutionary theory." Kence says, "I won't let them silence me. If knowledgeable people keep quiet, it only helps those who spread nonsense."

—Jodi Chapman □

## SCIENCE BEST SELLERS

### Top Ten Best Sellers in New York

- 1** *The Elegant Universe: Superstrings, Hidden Dimensions, and the Quest for the Ultimate Theory*  
Brian Greene  
Vintage Books
- 2** *Telecosm: How Infinite Bandwidth Will Revolutionize Our World*  
George Gilder  
Free Press
- 3** *The Selfish Gene*  
Richard Dawkins  
Oxford University Press (Trade)
- 4** *Genome: The Autobiography of a Species in 23 Chapters*  
Matt Ridley  
Harpercollins
- 5** *Practical Algebra: A Self-Teaching Guide 2nd Edition*  
Peter H. Selby, et al.  
John Wiley & Sons
- 6** *Moon Lander: How We Developed the Apollo Lunar Module (Smithsonian History of Aviation and Spaceflight Series)*  
Thomas J. Kelly  
Smithsonian Institution Press
- 7** *The Triumph of Evolution and the Failure of Creationism*  
Niles Eldredge  
W.H. Freeman & Co.
- 8** *The Mythical Man-Month: Essays on Software Engineering*  
Frederick P. Brooks, Jr.  
Addison-Wesley Pub. Co.
- 9** *Robin Williams Design Workshop*  
Robin Williams, John Tollett  
Peachpit Press
- 10** *The Ape and the Sushi Master: Cultural Reflections of a Primatologist*  
F.B.M. De Waal, Frans De Waal  
Basic Books

By arrangement with Amazon.com, July 2001.

# FILL IN THE GAPS IN YOUR Skeptical Inquirer COLLECTION

• 15% discount on orders of \$100 or more •

• \$6.25 a copy, Vols. 1-18 (\$5.00 Vols. 19-22). To order, use reply card insert •

**JULY/AUGUST 2001** (vol. 25, no. 4): Confronting veterinary medical nonsense, *Imrie* / Junk science and the law, *Dodes* / Chevreul's report on the mysterious oscillations of the hand-held pendulum, *Spitz* and *Marcuard* / CSICOP 25th Anniversary section: A quarter-century of skeptical inquiry, *Paul Kurtz* / Thoughts on science and skepticism in the twenty-first century, *Kendrick Frazier* / Proper criticism, *Ray Hyman* / The lighter side of skepticism, *Pudim* / A skeptical look at Karl Popper, *Gardner*.

**MAY/JUNE 2001** (vol. 25, no. 3): The shrinking file drawer, *Stokes* / The Pokémon Panic of 1997, *Radford* / The Antinous Prophecies, *Pickover* / Common myths of children's behavior, *Fiorello* / Bertrand Russell and critical receptiveness, *Hare* / CSICOP 25th Anniversary section: From the editor's seat: 25 years of science and skepticism, *Kendrick Frazier* / Science vs. pseudoscience, nonsense, and nonsense, *James Alcock* / CSICOP timeline / Primal scream: A persistent New Age therapy, *Gardner*.

**MARCH/APRIL 2001** (vol. 25, no. 2): Darwin in mind, *Edis* / A bit confused, *Roche* / What can the paranormal teach us about consciousness?, *Blackmore* / Spontaneous human conflagration, *Nienhuys* / Italy's version of Harry Houdini, *Nisbet* / A psychological case of 'demon' and 'alien' visitation, *Reisner* / Distant healing and Elizabeth Targ, *Gardner*.

**JANUARY/FEBRUARY 2001** (vol. 25, no. 1): Special Section: Issues in Alternative Medicine: Medicine was, *Seidman* / Herbal medicines and dietary supplements, *Allen* / Psychoactive herbal medications, *Spinella* / Chiropractic, *Homola* / Damaged goods? Science and child sexual abuse, *Hagen* / Special Report: Science indicators 2000 / Facilitated communication, *Gardner*.

**NOVEMBER/DECEMBER 2000** (vol. 24, no. 6): The face behind the Face on Mars, *Posner* / The new paranormal paradigm, *Kurtz* / Francis Bacon and the true ends of skepticism, *Friedberg* / Worlds in collision: Where reality meets the paranormal, *Radford* / Why bad beliefs don't die, *Lester* / Supernatural power and cultural evolution, *Layng* / The brutality of Dr. Bettelheim, *Gardner*.

**SEPTEMBER/OCTOBER 2000** (vol. 24, no. 5): Voodoo science and the belief gene, *Park* / Rogierian Nursing Theory, *Raskin* / Sun sign columns, *Dean* and *Mather* / The psychic staring effect, *Marks* and *Colwell* / Management of positive and negative responses in a spiritualist medium consultation, *Greasley* / The laws of nature: A skeptic's guide, *Pazameta* / Special Report: On ear cones and candles, *Kaushall* and *Kaushall* / Little Red Riding Hood, *Gardner*.

**JULY/AUGUST 2000** (vol. 24, no. 4): Thought Field Therapy: Can we really tap our problems away?, *Gaudiano* and *Herbert* / Absolute skepticism equals dogmatism, *Bunge* / Did a close encounter of the third kind occur on a Japanese beach in 1803?, *Tanaka* / Rethinking the dancing mania, *Bartholomew* / Has science education become an enemy of scientific rationality?, *Ede* / Krakatene: Explosive pseudoscience from the Czech Academy of science, *Slanina* / David Bohm and Krishnamurti, *Gardner*.

**MAY/JUNE 2000** (vol. 24, no. 3): Special Report: The new bogus MJ-12 documents, *Klass* / Mass delusions and hysterias of the past millennium, *Bartholomew* and *Goode* / Doomsday fears at RHIC, *Gutierrez* / Save our science: The struggle for rationality at a French university, *Broch* / Paraneuroscience?, *Kirkland* / Bohm's guided wave theory, *Gardner*.

**MARCH/APRIL 2000** (vol. 24, no. 2): Risky business: Vividness, availability, and the media paradox, *Ruscio* / Physics and the paranormal, 't *Hooft* / Efficacy of prayer, *Tessman* and *Tessman* / Can we tell if someone is staring at us?, *Baker* / Assessing the quality of medical Web sites, *Levi* / The demon-haunted sentence, *Byrne* and *Normand* / Mad messiahs, *Gardner*.

**JANUARY/FEBRUARY 2000** (vol. 24, no. 1): Special Report: The ten outstanding skeptics of the twentieth century / Two paranormalisms or two and a half?, *Goode* / Anna Eva Fay, *Polidoro* / The pseudoscience of oxygen therapy, *Allen* / Confessions of a (former) graphologist, *Tripician* / The Second Coming of Jesus, *Gardner*.

**NOVEMBER/DECEMBER 1999** (vol. 23, no. 6): The Universe and Carl Sagan, *Davidson* / The millennium thought contagion, *Lynch* / Debunking the debunkers: A response to astrology, *Kelly* / The physics behind four amazing demonstrations, *Willey* / Another lunar effect put to rest, *Sweet* / Special Report: Blooming shroud claims, *Nickell* / The star of Bethlehem, *Gardner*.

**SEPTEMBER/OCTOBER 1999** (vol. 23, no. 5): Special Report: Flash! Fox news reports aliens may have built the pyramids, *Carrier* / Where do we come from?, *Pigliucci* / Profits and prophecy, *Wise* / Projective measures of personality and psychopathology: How well do they work?, *Lilienfeld* / What every skeptic ought to know about subliminal persuasion, *Epley*, *Savitsky*, and *Kachelski* / Carlos Castaneda and New Age anthropology, *Gardner*.

**JULY/AUGUST 1999** (vol. 23, no. 4): Special Issue: Science and Religion, Conflict or Conciliation? Celebrating creation, *Raymo* / Should skeptical inquiry be applied to religion?, *Kurtz* / The 'Science and Religion' movement, *Scott* / Science and the versus of religion, *Palevitz* / Science vs. religion, *Pazameta* / Anthropocentric design, *Stenger* / Scientific skepticism, CSICOP, and the local groups, *Novella* and *Bloomberg* / Two mind-sets, *Allen* / God is dead, after the weather and sports, *Reiss* / Whence religious belief?, *Pinker* / Non-overlapping magisteria, *Gould* / You can't have it both ways: Irreconcilable differences?, *Dawkins* / The concerns of science, *Mayr* / The religious views of Stephen Gould and Charles Darwin, *Gardner*.

**MAY/JUNE 1999** (vol. 23, no. 3): Special Section: Urban legends. The snuff film, *Stine* / Bitter harvest: The organ-snatching urban legends, *Radford* / Bigfoot's screen test, *Daegling* and *Schmitt* / Tracking Bigfoot on the Internet, *Zuefle* / Statement analysis, *Shearer* / NAGPRA, science, and the demon-haunted world, *Clark* / Urine therapy, *Gardner*.

**MARCH/APRIL 1999** (vol. 23, no. 2): Special Report: The ten-percent myth, *Radford* / Superstition and the regression effect, *Kruger*, *Savitsky*, and *Gilovich* / Psychology of the seance, *Wiseman* / Dowling and archaeology, *van Leusen* / Hidden messages in DNA?, *Larhammar* and *Chatzidimitriou* / The real Chief Seattle was not a spiritual ecologist, *Abruzzi* / Joint pain and weather, *Quick* / Acupuncture, zone therapy, and reflexology, *Gardner*.

**JANUARY/FEBRUARY 1999** (vol. 23, no. 1): Special Report: Armageddon and the prophets of doomsday. Fears of the apocalypse, *Kurtz* / The Bible and the prophets of doom, *Larue* / Science and pseudoscience in Russia, *Kapitza* / Testing dowsing: The failure of the Munich experiments, *Enright* / A fallibilist among the cynics, *Haack* / The internet: A world brain?, *Gardner*.

**NOVEMBER/DECEMBER 1998** (vol. 22, no. 6): Gaps in the fossil record: A case study, *Thomas* / The Martian Panic sixty years later, *Bartholomew* / The perils of post-hockery, *Ruscio* / May the force be with you, *Krauss* / The Mead-Freeman controversy: A fresh look: Much ado about nothing: The 'Fateful Hoaxing' of Margaret Mead, *Côté* / Margaret Mead, Derek Freeman, and the issue of evolution, *Shankman* / Second World Skeptics Congress: Science and reason, foibles and fallacies, and doomsdays / Science and the unknowable, *Gardner*.

**SEPTEMBER/OCTOBER 1998** (vol. 22, no. 5): Special Section: What are the chances?, Coincidences: Remarkable or random?, *Martin* / Numerology: Comes the revolution, *Dudley* / Calculated risks, *Cole* / How to study weird things, *Troxco* / Why would people not believe weird things?, *Anderson* / Starkle, starkle, little twink, *Hayes* / Of planets and cognitions: The use of deductive inference in the natural sciences and psychology, *Schlinger Jr.* / What's going on at Temple University?, *Gardner*.

**JULY/AUGUST 1998** (vol. 22, no. 4): Special Report: Mars Global Surveyor photographs 'Face on Mars', *Morrison* / Magnetic therapy: Plausible attraction, *Livingston* /

Biomagnetic pseudoscience and nonsense claims, *Sabadell* / Catching up with eighteenth century science in the evaluation of therapeutic touch, *Ball* and *Alexander* / Paranormal depictions in the media: How do they affect what people believe?, *Sparks* / Planting a seed of doubt, *Shneur* / Essai: The not-so-remarkable cancer remedy, *McCutcheon* / Near-Earth objects: Monsters of Doom?, *Gardner*.

**MAY/JUNE 1998** (vol. 22, no. 3): Special Section: The Aliens Files, Abduction by aliens or sleep paralysis?, *Blackmore* / Before Roswell: The meaning behind the crashed-UFO myth, *Bartholomew* / Case closed: Reflections on the 1997 Air Force Roswell report, *Gildenberg* and *Thomas* / Gray Barker: My friend, the myth-maker, *Sherwood* / A skeptic living in Roswell, *Churchill* / Zero-point energy and Harold Puthoff, *Gardner*.

**MARCH/APRIL 1998** (vol. 22, no. 2): Special Report: The price of bad memories, *Loftus* / Science, delusion, and the appetite for wonder, *Dawkins* / A mind at play: An interview with Martin Gardner, *Frazier* / Houdini and Conan Doyle: The story of a strange friendship, *Polidoro* / Spontaneous human combustion: Thoughts of a forensic biologist, *Bencke* / Did Adam and Eve have navel?, *Gardner*.

**JANUARY/FEBRUARY 1998** (vol. 22, no. 1): Testing new claims of dermo-optical perception, *Benski* and *CRSSA Scientists* / Magnetic water and fuel treatment, *Powell* / Dowsing the Rollrights, *Hancock* / Anomalous gold, *Brower* / Open minds and the argument from ignorance, *Adler* / 200% probability and beyond: The compelling nature of extraordinary claims in the absence of alternative explanations, *McDonald* / Psychic exploitation, *Wiseman* and *Greening* / Is cannibalism a myth?, *Gardner*.

**NOVEMBER/DECEMBER 1997** (vol. 21, no. 6): The Mars effect in retrospect, *Nienhuys* / Hidden messages and the Bible code, *Thomas* / Science, scientism, and antisense in the age of preposterism, *Haack* / The Elemental Man: An interview with Glenn T. Seaborg / *Men in Black* and Contact: Night and day, *Summer* / Intelligent design and Phillip Johnson, *Gardner*.

**SEPTEMBER/OCTOBER 1997** (vol. 21, no. 5): Special Issue: Alternative Medicine in a Scientific World, *Park*, *Beyerstein*, *Sampson*, *Green*, *Goodenough*, *McCutcheon* / The Numerology of Dr. Rashad Khalifa, *Gardner*.

**JULY/AUGUST 1997** (vol. 21, no. 4): Special Report: Heaven's Gate, *Kurtz*, *Gardner*, *Nickell* / What really happened at Roswell, *Korff* / Amazing free-energy claims of Dennis Lee, *Krieg* / Chiropractic: Science, antiscience, pseudoscience, *Keating* / Secrets of a Russian psychic, *Polidoro*.

**MAY/JUNE 1997** (vol. 21, no. 3): Is the sky falling?, *Morrison* / Collective delusions: A skeptic's guide, *Bartholomew* / Scientific reasoning and achievement in a high school English course, *Kral* / Skepticism and politics, *Fagin* / Courtney Brown's 'Cosmic Voyage' into preposterism, *Gardner*.

**MARCH/APRIL 1997** (vol. 21, no. 2): The darkened cosmos: A tribute to Carl Sagan / Hale-Bopp comet madness plus An astronomer's personal statement on UFOs, *Hale* / Biases of everyday judgment, *Gilovich* / The end of science?, *Schick* / The Book of Predictions: 15 years later, *Tuerkheimer* and *Wyse* / Farrakhan, Cabala, Baha'i, and 19, *Gardner*.

**JANUARY/FEBRUARY 1997** (vol. 21, no. 1): The X-Files meets the skeptics: Chris Carter takes questions / The significance of the millennium, *Loevinger* / Quantum quackery, *Stenger* / The mysterious placebo, *Dodes* / Bias and Error in children's books, *Wiseman* and *Jeffreys* / Jean Houston: Guru of human potential, *Gardner*.

**NOVEMBER/DECEMBER 1996** (vol. 20, no. 6): A strategy for saving science, *Lederman* / That's entertainment! TV's UFO coverage, *Klass* / Scientific consensus and expert testimony, *Moore* / The Dogon people revisited, *Ortiz de Montellano* / Cosmic menagerie, *Tyson* / Physicist Alan Sokal's hilarious hoax, *Gardner*.

**SEPTEMBER/OCTOBER 1996** (vol. 20, no. 5): Shades of meaning: Science fiction as a new metric, *Stewart* / The first World Skeptics Congress / Traditional medicine and pseudoscience in China, part 2, *Beyerstein* and *Sampson* / Conspiracy theories and paranoia, *Harrington* / Isaac Newton, *Gardner*.

**JULY/AUGUST 1996** (vol. 20, no. 4): Traditional medicine and pseudoscience in China, *Beyerstein* and *Sampson* / CSICOP at twenty, *Kurtz* / Maria's near-death experience, *Ebbert*, *Mulligan*, and *Beyerstein* / Alternative health education and pseudocredentiaing, *Raso* / Pentagon grant funds alternative health study, *Selby* and *Scheiber* / Thomas Edison, Paranormalist, *Gardner*.

For a complete listing of our back issues, call 800-634-1610, or see <http://www.csicop.org/si/back-issues.html>.





# Another Skeptical Inquiry

RALPH ESTLING

*This letter was forwarded to me by SKEPTICAL INQUIRER's editor:*

To the Editor (Letters):

Several months ago I canceled my subscription to the SKEPTICAL INQUIRER. I did so because of the plethora of opinionated articles insulting people who believe in a personal god finally irritated me more than the remaining articles informed me. A true skeptic, I propose, should realize that there is not now nor ever will there be any proof of whether or not God exists. They should at best leave it alone and at least not present their own "religion" as though it were commonly accepted. Regardless, my issues kept arriving and were mainly given away or trashed. Because of a temporary lack of other reading materials, however, I did read the majority of the July/August 2000 issue. I was actually enjoying the magazine and learning some useful information until I read Ralph Estling's "Forum" concerning "Templeton and the AAAS." As one of those he called "contented cows," I felt a metaphorical slap in the face and my enjoyment was suddenly negated. I looked immediately for Mr. Estling's credentials so as to understand why his opinions would be given space in the SKEPTICAL INQUIRER and alas could find none. Who is he?

I would like also to suggest that Mr. Estling betrayed himself in his article. He does indeed believe in a personal god, if not intellectually, certainly emotionally. His bitterness is evident. His god is mean-spirited, inflicting disease for the sole purpose of torturing mankind and waiting like a "butcher carefully grinding his ax" to kill (or eat?) his true believers. This same god was described by Jim Ring (see the last letter under "Critiquing Prayer Studies" p. 64 same issue). The God I believe in has

proved himself to me empirically and is merciful, just, and loving. I am going to pray for Mr. Estling. I wonder if he will sense either of our deities interceding in his life.

Sincerely yours,  
[Susan E. Macintyre]

Dear Ms. Macintyre,

A copy of your letter has been forwarded to me by SKEPTICAL INQUIRER.

I am sorry if my article, "Templeton and the AAAS," caused you, or anyone, distress as this was not my intent. My intent was to provoke thought, including my own. I am aware that thought can be painful, especially when it leads us in directions towards which we would rather not go. I am also aware that smugness, arrogance, and intellectually bullying, whether by believers or nonbelievers, is not the way to enlightenment and understanding.

I believe that most of us are free to believe whatever we like about the gods. Where we are not free is to insist that others take us and our beliefs seriously. But I also believe that those among us who pride themselves on their intellect, rationality, and academic accomplishments, such as professional scientists and certain philosophers, are not free to believe whatever they like, not if they are honest with themselves and wish others to regard them with respect for their integrity. Perhaps this is why you feel that articles in SKEPTICAL INQUIRER, and elsewhere, are insulting when they question the need for a personal god. Personal gods are, above all else, personal, and many of us are quick to associate attacks on these supernatural beings as attacks on

ourselves, which some of us appear to think are worse breaches of etiquette than attacks on our gods.

You are quite right that there can be no absolute proof on whether gods exist or whether there is any spiritual essence in or beyond the physical universe. But as I'm sure you know, negatives are impossible to disprove in logic. It would seem therefore that under these circumstances the burden of proof lies with the proposer of the hypothesis, with the person who holds the existence of supernatural beings, forces, and events are true and factual. Too many of us remain uncontaminated by events.

I have no religion of any kind, including atheism. It is my belief, subject to revision or total dismissal should this be warranted, that gods do not exist and that if they did, their primary concern would not be with my welfare, whether physical, moral, or spiritual. I do not know what credentials I or anyone else might offer in order to substantiate our beliefs, or lack of them, except an honest attempt to deal with these important matters. Of course these attempts can never be fully accurate and may indeed be totally in error. If one is honest with oneself this conclusion is unavoidable and should lead to a certain sense of humility, rather than intellectual or spiritual arrogance.

I am sorry that even before reading my article you chose to cancel your subscription to SKEPTICAL INQUIRER. A publication with such a title cannot honestly limit itself, draw careful boundaries around its inquiries into areas where no

---

*Our occasional essayist Ralph Estling writes from Ilminster, Somerset, England.*

one can be irritated or offended, nor where skepticism must of necessity be curtailed so as never to cause pain to some. More to the point, I believe we do ourselves a great disservice by not according those whose opinions and outlooks we do not share full opportunity to assail us with their views, for it is likely that we shall learn far more from our intellectual opponents than from those with whom we are in complete accord.

Let me assure you that I have no emotional belief in personal gods nor am I, like certain existentialists, angry with them for not existing. I am neither bitter nor entirely pleased with the nature of reality, and I am sure that reality will go

its merry, and not so merry, way in any case. What emotion I possess in these matters is limited to persons who loudly profess their rationality while refusing to live in accordance with its dictates.

I am glad that the God in whom you believe is merciful, just, and loving. I would be equally glad if some people professing belief in such a God would adhere to these qualities that they attribute to Him, for whether such a being exists or not, this would be a happier place if we all imitated Him in these ways.

I am sincere in my thanking you for your prayers on my behalf. Whether those prayers have a material effect on my wellbeing strikes me as less impor-

tant than your deep concern and kindness in regard to that wellbeing. I am seventy and in mediocre health. It is not beyond the realm of possibility that I might be meeting that God in the not-too-distant future. If I do, it will come as a surprise, but I've been surprised before. No doubt He would have a number of questions to put to me. I know that I would have a number of questions to put to Him. But one question I am sure He will not put is: Why didn't you believe in Me? For one thing, He will know. For another, He will regard it as irrelevant to the matter in hand.

Sincerely yours,  
Ralph Estling □



International Scientific Congress

## Science, Antiscience, and the Paranormal

October 3-7, 2001 • Moscow, Russia

- |  |   |
|--|---|
| <input type="checkbox"/> The Russian Academy of Sciences   | <input type="checkbox"/> The Russian Humanist Society                             |
| <input type="checkbox"/> The Committee for the Scientific Investigation of Claims of the Paranormal (CSICOP) | <input type="checkbox"/> The Philosophy Department of the Moscow State University |

### GENERAL AGENDA

1. The Social Value and Status of Science
2. Science and Antiscience:  
The New Lines of Confrontation
3. Paranormal Beliefs:  
The Threat to Science and Human Dignity
4. Science, Education, and Religion

#### WEDNESDAY, OCTOBER 3 - *Opening Plenary Session*

- Why Is Antiscience Dangerous?
- Science and the New Skepticism
- The Incompatibility of Science and Religion
- Science and Humanism: The Life-Affirmation Tandem
- The Appeal of the Paranormal and the Psychology of Belief
- The Expansion of Irrationalism in Russia
- The Sources of Pseudoscience in Biology and Medicine
- Parapsychology: Science, Antiscience, Pseudoscience, or Non-Science?
- Organized Pseudoscience as a Form of the Disintegration of Society
- The Age of Scientific Misinformation: The Sources of Mass-Media Bias
- Parapsychology under Russian-Market Conditions

#### THURSDAY, OCTOBER 4 - *Concurrent Sessions*

- The Social Value and Status of Contemporary Science
- Science and Antiscience: The New Lines of Confrontation
- Paranormal Beliefs: the Growing Threat to Reason and Human Dignity
- Roundtable
- Science, Education, and Religion

#### FRIDAY, OCTOBER 5 - *Closing Plenary Sessions*

- The Religious Situation in Russia Today
- Roswell, UFOs, and Space-Age Antiscience
- Astronomy and Astrology: The Unexpected Reversal in the Confrontation
- The New Atheist Movement in Russia
- Organized Humanism versus Charlatanism

**CONTACT: Fax (095) 939 2208, e-mail v.kuvakin@mtu-net.ru**

The conference will be held at the  
New Building of the Russian Academy of Sciences,  
117334 Moscow, Leninskii prospekt, 32a.

Special accommodation rates for conference attendees  
are available from the Hotel Orlyonok, Leninskii prospect.

## Clinical Parapsychology Thrives Under Mind-Body Research Guise

James Alcock's declaration of the demise of parapsychology in his May/June 2000 SI article on CSICOP's history ("Science vs. Pseudoscience . . .") seems to be grossly premature. He bemoans the "withering" of parapsychology; he even seems genuinely concerned that the ranks of "bright, creative, and respectable scholars" of parapsychology have been declining. He claims that "respectable" parapsychologists and the skeptics of CSICOP share a common commitment to the scientific method.

One can only scratch one's head over why Professor Alcock would admire so-called "scientific" parapsychologists who for decades have refused to accept that their "science" is a chimera and who consistently contort their own and others' findings in order to keep open a window of "hope" for evidence of a psychic dimension.

I, for one, share no such admiration for these mischief makers. Indeed, has Professor Alcock not noticed that parapsychology is now achieving perhaps its greatest level of success ever, not in the "formal" parapsychology labs, but rather in alternative medicine under the guise of clinical mind-body "research"?

The most glaring example of this unparalleled success is the \$2 million in research and grant monies given last year by NIH's National Center for Complementary and Alternative Medicine (NCCAM) to para-psychiatrist Elisabeth Targ for two multiyear research studies: one on "distant healing" for AIDS patients and the other for "distant healing" for cancer tumors. Targ, the daughter of "remote viewing's" Russell Targ, has done two prior studies showing strong positive results for "distant healing." When Targ completes her two NCCAM studies—with their no doubt "positive" results—those studies will stand as the gold standard for "distant healing" and "intercessory prayer" research, in other words as proof of the validity of medical psychokinesis.

Her official grant proposal to NCCAM contains numerous shabby citations from the parapsychological literature. These citations were accepted as proper science by the NIH grant reviewers. Therefore, as far as United States government health science is concerned, the parapsychological venture is alive, well, and extraordinarily credible. Indeed NCCAM has at least three parapsy-

chological supporters on its Scientific Advisory Board, including Marilyn Schlitz, the Research Director of the parapsychologically-oriented Institute for Noetic Sciences. Schlitz was a collaborator with Russell Targ on the original "remote viewing" research. Schlitz also has a NCCAM research grant to study direct "brain-to-brain" communication. Her co-researcher, Leanna Standish, is the Director of Research of Bastyr University, a naturopathic "university" that is a NCCAM research center.

CSICOP's response to this serious entry of parapsychology into medicine has been inadequate, to say the least. While SKEPTICAL INQUIRER has had several good articles about other aspects of alternative medicine, until Martin Gardner's March/April 2001 column on Elisabeth Targ, the parapsychological research breakthrough in alternative medicine had gone completely unnoticed by CSICOP and SI.

If ever there were "claims of the paranormal" that needed to be investigated, surely paranormal health research ought to be at the top of the list. If we wait until paranormal healing is covered by Medicare, Medicaid, and private health insurance, it will be too late. CSICOP should be assigning its top investigators right now to blow the lid off this debacle at the National Institutes of Health.

Then, perhaps, it will be time to celebrate.

E. Patrick Curry  
Consumer Health Advocate  
Pittsburgh, Pennsylvania

## Value of Negative Results

Douglas M. Stokes ("The Shrinking File Drawer," May/June 2001) has convinced me that the statistical meta-analysis used in parapsychological research is flawed, as he claims. However, I go beyond his conclusion that "the foundation [of statistical meta-analysis] may be less solid than it appears." It is impossible to decide just what statistics should be used to estimate the size of the file drawer.

For example, in the physical sciences a negative result can be just as worthy of publication as a positive one. Consider the experiment of Michelson and Morley, who set out to measure the velocity of Earth with respect to Newton's absolute space and got the most famous null result in the history of science. Should we really assume that all parapsychologists are so self-

deluding as to publish only positive results? In the physical sciences statistical meta-analysis is unnecessary.

Several decades after Einstein published his work on relativity, a collection of papers was published called *100 Authors Against Einstein* which sought to show by sheer number of contrary opinions that Einstein must be wrong. A reviewer said, "One paper, if it were correct, would suffice to refute Einstein."

In my opinion, statistical meta-analysis should be cast out of the toolbox of science.

James C. Wilcox  
Palos Verdes Estates, California

## Antinoüs Prophecies

I was amused by the Antinoüs Prophecies, coined by Clifford Pickover (SI, May/June 2001). They quite rightly put in light the fact that any prophecy can always be interpreted and more or less adapted to any specific case.

But Nostradamus's case is much more interesting and complex. In his troubled period, under constant threat, Nostradamus was indeed a true historian who described events of his time. The events happened of course before he wrote about them, but he disguised them in a sort of coded French. This has been demonstrated by French authors who happen to know Nostradamus well—and to read French, even coded French.

Knowing that the SKEPTICAL INQUIRER is addressed mainly towards an American public, it would be nevertheless wise—and humanist!—to give the reader broader ideas than those dominated by this "Americanotropy." I am often quite disappointed by this, even in the best American publications. As a member of the *Free Inquiry* panel of consultants, I am saddened by many Americans' ignorance of French literature.

### References

- Pecker, J.-C. 1984. *Des honnêtes en grimoire dans Ravenna. Le Débat-Gallimard*, mars.  
Prévost, Roger. 1999. *Nostradamus, le Mythe et la réalité: un historien au temps des astrologues*, Robert Laffont, Paris.

Prof. Jean-Claude Pecker  
Collège de France  
Paris, France

Clifford Pickover's "Antinoüs Prophecies" is very interesting and certainly valid in



demonstrating how readers can infuse fanciful meaning into more or less disconnected phrase sequences, once the suggestion has been made that such interpretations are possible.

But while it applies to twentieth-century "interpreters," it has very little relevance to the historical Nostradamus. Nostradamus did not work in a semi-aleatory, stream-of-consciousness mode of writing. His verse is written in very strict adherence to contemporary French poetry, in *vers commun*. His subject matter is not random. Most of his quatrains contain a single subject, which may often center on historical incidents of identifiable past or current events. When I say most, it is because details of court gossip or small-town histories have often been lost over the past five hundred and fifty years and connections are not always clear. The wretched English translations that are currently available are of no help.

What Nostradamus did to encourage a "prophetic" reading of his verses was to devise a very clever, complex apparatus of multivalence. He fractured grammar to create double or triple meanings; he developed enigmas to give his readers the satisfaction of interpreting them; he used a vocabulary of homonyms and antonyms to create multiple possible meanings. . . . But he did not write nonsense in the fashion of "Antinoüs." He was a most accomplished charlatan who carefully constructed verses that would appeal to his market, to whom the verses were much more open than to us.

How did Nostradamus get his verses? Mr. Pickover says that he obtained them from a "glass flask of steaming liquid." I don't find this anywhere. Nostradamus himself gives two situations, one a magical ceremony of Roman origin, the other, sitting on his roof watching stars. Actually, I think he wrote them seated at his desk or table, with a good map and a few reference books. . . .

Information about this aspect of Nostradamus may be found in rational studies of Nostradamus: my book, *Prophecies and Enigmas of Nostradamus* and the late Prof. Pierre Brind Amour's *Nostradamus Astropile and Les Premieres centuries ou propheties*.

Everett F. Bleier  
"Liberté E LeVert"  
Interlaken, New York

I'm sure the article on the Antinoüs Prophecies will produce a flood of responses from skeptics eager to try their hand at the

"game" of applying them to historical events. Here's my entry.

I think that Quatrain 8 can best be interpreted as a description of the evacuation of Dunkirk during WWII. "Lightning comes near the peninsula and one will swim" refers to Hitler's blitzkrieg, or "lightning war" pushing the British forces into the sea at Dunkirk. "There is ruin, Lester, but all is not lost." He is speaking to the British here, as "Lester" is a phonetic spelling of Leicester. All was not lost, because the British successfully evacuated most of their men.

"From the steel and silica brim/ Blood and water, but not at cost." Blood and water refers to the human resources, the soldiers themselves. They fled from their machines, but not at cost of their lives. They were rescued, while the steel and silica, or mechanical resources, were left behind.

That's how I "interpret" this quatrain, anyway, and I doubt that any better interpretation is possible. I could be wrong; human ingenuity has few bounds.

Steve Vanden-Eykel  
New Westminster, B.C.  
Canada

Clifford Pickover's article, "The Antinoüs Prophecies: A Nostradamoid Project," hits the mark. It would be interesting to apply his ink blot technique to psychic mediums, ESP, etc. To correct a minor error, Antinoüs was not so youthful at the age of 240!

Mark G. Kuzyk  
Department of Physics  
Washington State University  
Pullman, Washington

Clifford Pickover replies:

*Along with Shakespeare and the Bible, Nostradamus's poems have been in continuous print ever since their first publication centuries ago. The very first editions of his prophecies are lost, and today we must depend upon the accuracy and honesty of people who transcribed the original prophecies. Nostradamus wrote most of his rhymed quatrains in French, and he obscured the quatrains with metaphors and by changing proper names by swapping, adding, or removing letters. Many say that he wanted to be obscure so the Church wouldn't condemn him. Skeptics suggest that he also used vague symbols so that the quatrains would be interpreted to fit numerous situations. I give many more details on Nostradamus's life in my book Dreaming The Future.*

## Myths of Child Behavior

Catherine A. Fiorello's article "Common Myths of Children's Behavior" (May/June 2001) contains several questionable claims. A child who is failing at schoolwork is probably one who lacks motivation, ability, or both. If he does regard with horror the possibility of being held back a grade, that might supply an incentive to start working in order to do better. But if the problem is lack of ability, it will not be remedied by promoting him until he leaves with a credential that signifies nothing except that he has attended school for the required number of years. It is not really a kindness to promote his "self-esteem" by pretending that he is doing well; disillusionment will come later and is likely to be traumatic. (The same goes in the case of athletic ability or the lack of it.)

Concerning the effects of reward versus punishment, Fiorello appears to ignore the fact that children differ widely in temperament and personality. Even if many respond better to praise than threats, there is a hard core of intractables who do not, and we may suspect that research purporting to prove the contrary is driven by ideology rather than empiricism.

I will not dispute the claim that there is a condition, hyperactivity, for which treatment (including drug treatment) may be appropriate. But our society has been propagandized so effectively that almost any kind of undesirable behavior is labeled as a "disorder" requiring medical diagnosis and intervention. This provides prestige and financial rewards for the practitioners who run the system, but it has not been demonstrated that their activities benefit anyone else.

David A. Shotwell  
Alpine, Texas

Regarding candy causing children to be hyper, I feel that I have observed that in my three-year-old granddaughter. However, I am aware of some of the literature on the subject supporting the author's view.

Therefore, I have looked for another explanation. Though not based on scientific studies, I suggest that there is something other than sugar that is causing the problem. That is chocolate. Chocolate contains theobromin, a substance that is chemically similar to caffeine and has a similar effect on humans. It seems reasonable to me that chocolate, not sugar, is the culprit.

Regarding item five on punishment, it seems that we should take our clue from

basic biology. If we do something damaging to ourselves, such as place our hand in a fire, we get hurt and learn not to do that.

Also, if we do something beneficial, such as eat, we experience pleasure and we repeat that. Therefore, it would seem that reward for acceptable behavior and punishment for unacceptable behavior would be the most successful approach.

John E. Hendrix  
Fort Collins, Colorado

Catherine Fiorello replies:

*Both writers fall into the same fallacy—basing their objections on feelings or personal experience rather than empirical evidence. My statements on retention were based on a rather large body of empirical research indicating that it is not effective, not just a call to promote children to save their "self-esteem" as Mr. Shotwell implies. In a brief overview, I could not go into detail about the alternatives to retention that do show efficacy; suffice it to say here that I am not advocating social promotion without interventions.*

*Both Mr. Shotwell and Mr. Hendrix take exception to my statement that punishment is less effective than reward. Again, this is based on a body of research, not solely my opinion. Punishment can work in the short-term suppression of an unwanted behavior, but can also lead to avoidance of the person or situation leading to punishment and to adverse emotional reactions. Positive approaches (teaching what we want the person to do through modeling and direct instruction, praising the behavior we want, and eliciting natural reinforcers for the behavior we want) don't have these side effects and in addition teach the behavior we want to see rather than just suppressing what we don't want to see. When some sort of punishment is necessary, however, we do recommend the sort of natural feedback that Mr. Hendrix suggests.*

*Mr. Hendrix does point out another possible reason for the perceived link between sugar and behavior. The research with which I am familiar looked only at sugar itself (where parents would say the child was hyperactive but where double-blind observers would not), but it is certainly plausible that theobromine and/or caffeine might be responsible for some of the hyperactivity that is reported. A good suggestion for extending the research base!*

## Janov's Primal Therapy

I am sorry to see the usually excellent Martin Gardner attacking Arthur Janov's primal

therapy (May/June 2001). He refers to Janov divorcing "his first wife, Vivien France. . . ." Vivien was Janov's first wife; France is his second. Unfortunately this minor slip is symptomatic of grosser errors.

Since in therapy there can be bad practice based on good theory, it is important to distinguish between theory and practice. Regarding theory, Janov holds that events too traumatic to be felt to the full as they happen cause problems; the unmet negative emotions act themselves out in and through the person. Often the person will repress memories of the events—but not always: those rape victims who change their personality know very well that "he ruined my life" and can be restored by reliving the event over and over until the unmet latent feelings have been felt in full.

So the issue is not repressed memory (which Gardner has attacked before) but repressed *feeling*. It is hardly surprising that people who were nearly strangled by their umbilical cord at birth (for example) do not remember it, as people do not have spontaneous memories of any event from their babyhood. But awareness that one is close to a terrifying death is more traumatic even than rape. How do false memory adherents explain that memory and feeling are often evoked together in therapy? False memories might be induced, but false feelings?

Regarding practice, Janov does not conduct "the so-called 'primal scream' technique" (p. 17), which involves screaming in an attempt to access the memory/feeling. This is a very poor technique since it aims to access trauma from symptom when causation runs the other way. Janov calls his techniques simply "primal therapy." He guards those techniques closely, but it is clear from his recent *Why You Get Sick, How You Get Well* that they include drugs administered in a controlled fashion to aid access to the memories/emotions. The resulting therapy permanently lowers such objective indicators of inner stress as resting heart rate, blood pressure, and levels of natural depressants synthesized by the body. How would Gardner explain these observations? Incidentally there can be no legitimate objection by mental health professionals to Janov's use of drugs, since drugs are the principal tool of mainstream psychiatry. There, however, they are used merely to control symptoms and the patient must take them indefinitely. Janov uses them only temporarily as part of a permanent cure.

Gardner cites the death of Candace Newmaker in a mistaken and dangerous form of therapy that attempts to access

repressed feelings by recreating the trauma. This was not primal therapy either licensed or unlicensed by Janov. Indeed Gardner does not use the word "primal" to describe Candace's therapy. This appears to be an attempt to smear Janov's work by association. Gardner also simply refuses to believe that bruises can reappear on the body of someone reliving a traumatic event that caused bruising. In this case the event was a difficult birth; but the claim can be tested with therapy on rape victims. Is Gardner saying he is incapable of revising his opinions no matter what the evidence?

Dr. Janov has certainly made some over-grandiose and immodest statements about his work. But these cannot be used to discredit the whole enterprise.

Anthony J.M. Garrett, Ph.D.  
Cambridge, U.K.

Although I usually find myself in agreement with Martin Gardner, his attack on Arthur Janov and primal therapy was filled with errors ranging from the trivial to the egregious. As a card-carrying skeptic who has lectured to both New York and Philadelphia area skeptical organizations on the subject of psychology—and a veteran of primal therapy myself—I believe I am in a good position to respond.

Gardner's identification of primal therapy with New Age mysticism is wholly mistaken. The only connection between primal therapy and the New Age is that they both came along at the same time. The mere fact that Janov dismisses all other therapies as "obsolete and invalid" in one of his books automatically disqualifies him as a New Ager, since the latter freely incorporate every theory into their philosophy, rejecting only the scientific method as the test of truth. Janov's commitment to the scientific point of view should be clear to anyone who ever read him, and is exemplified by the fact that he submitted his latest work to Prometheus Books.

Gardner misrepresents what Mark Pendergrast wrote about Janov in *Victims of Memory*. Pendergrast quotes Janov as an authority, estimating from Janov's writings that only about one percent of adults were ever sexually molested as children. On the basis of my own observations while a patient in Janov's now-closed New York institute, I would concur with that figure, which is in sharp contrast with those given by such experts as Diana Russell, who claims that it is as high as 25 percent (boys

and girls combined). Janov's assumption that sexual abuse of children is relatively rare would put him in the same camp as most skeptics. One should keep in mind, however, that one percent of the adult population of the United States is more than two million people.

In contrast to other "recovered memory" therapists (who see parental sexual abuse in literally every case they treat) or orthodox Freudians (who think children really want to be abused), Janov always focused on the subtle hurts parents inflicted on their children. This does not represent any bias on his part, but rather the results from patients' sessions. As I saw, the big problems were neglect, excessive scolding, desertion, divorce, incessant guilt-tripping, overprotection, preference of one child to another, children being left at school at too early an age, and occasionally violence. The reason these rather commonplace events were traumatic was that the children were prohibited from expressing their anguish at the time; they held it in, and that added up to neurosis in adult life. Primal therapy gave them a safe place to let it out. . . .

When Janov claims that everything stems from birth trauma, I can hear his critics arguing. Wrong. Birth trauma by itself would cause few problems, unless it was extremely severe, because of what Janov calls the gating system, which locks early trauma up in the deepest parts of the brain. Birth trauma usually causes difficulties when it is compounded by later traumas. At the primal institute in New York, birth primals were rare, but they were dramatic when they did occur. Janov's tendency to focus on birth is mostly to compensate for its neglect by other therapies. Also, since births typically take place in hospitals, it should be easier to reform harmful natal practices than to change the way parents raise their children in the privacy of their own homes.

Is there any evidence that adult brains harbor birth memories? Plenty, although many in the skeptics movement might not accept it. There are already two scholarly journals devoted to the psychological effects of birth traumas, one in Europe and one in the United States. Gardner should have spent some time listening to former patients in primal therapy who resolved various problems after recovering their birth memories. . . .

We are only beginning to understand the workings of the mind, and as it happens, Arthur Janov is light-years ahead of the com-

petition. Prometheus Books is to be congratulated for having the courage to publish him.

Richard Morrock  
Bayside, New Jersey

Although Paul Kurtz is among the more erudite men of our times, he nonetheless deserves a light rap on the knuckles for his lame response to an incisive complaint regarding Kurtz's Prometheus Books publishing a tome of quackery titled *The Biology of Love* by primal screamer Dr. Arthur Janov.

The complaint urged Kurtz to withdraw the book post haste in view of outrageous claims such as Janov's report that a photograph of a screaming patient re-experiencing his birth showed fingerprints of the delivering obstetrician (who by the way apparently forgot to wear his latex gloves).

Kurtz responded, we're informed, that "we sometimes err," but then suggested that it would be suppression to drop Quackov's book of astounding science.

I shudder to think of what next may be published out of a fear of suppression. Perhaps a hard-science volume reporting the appearance of Baby Jesus' footprints on a church window?

Worse, what do I now tell my daughter, whom I advised just last week to browse through Prometheus offerings to discover learned answers to just such pseudoscience?

Karl Wickstrom  
Stuart, Florida

## Fox TV Moon-Landing Program

Your "News & Comment" article, "Fox Special Questions Moon Landing But Not Its Own Credulity," (May/June 2001) correctly points out all the flawed points made in Fox's moon landing hoax exposé. I'd also like to point out that light reflects from Earth onto the moon's surface, causing partial illumination of areas in shadows. As a high school science teacher, I had to field a barrage of questions from my students (and fellow teachers!) regarding this show, which I hadn't seen. While I used this as an opportunity to remind students about previous discussions we'd had regarding critical thinking, some were very adamant that the program showed that there is an appreciable chance that the Apollo landings may have been a hoax.

Programs like this do help muddy the waters, and even worse, they add to the growing feeling out there that there are two sides to every

issue, and that it all becomes an issue of opinion, without any objective, demonstrable facts.

George Farago  
Wayne, New Jersey

James V. Scott's News & Comment article concerning the Fox hoax was great. I do remember watching the whole original drama unfold. Walter Cronkite did the narration for CBS. He interviewed an elderly gentleman, asking the man what he thought about the moon landing. The elderly gentleman was incredulous, telling Mr. Cronkite, "I do not believe it, we are not up there."

I saw the Fox show. As Frank Zappa said:

"They ain't getting any smarter out there  
We have to come to terms with stupidity  
And learn to deal with it"

Your magazine is great, keep up the excellent work.

Rudy Ottaviani  
r.ottaviani@worldnet.att.net

## Evolution in Kansas

While I am heartened by the decision of the Kansas school board to return the teaching of evolution (News & Comment, May/June 2001), I am extremely puzzled that there were still three school board members that voted against the measure. It seems to me that some Kansas school board members have some evolving to do.

Paul Wainor  
Carol Stream, Illinois

## Dr. Zaius on Mars?

I have been looking at the latest pictures you have of the "Face" on Mars and I have come to a startling discovery. It is the face of Dr. Zaius of *Planet of the Apes*. So that's where all the "missing links" went! Oh my gosh!

Linda Marois  
bledivision269@erols.com

## What's Irrational?

It's not clear whether Paul Hilfinger (Letter to the Editor, May/June 2001, p. 72) claims that *my explanations* for paranormal beliefs are irrational or that *the reasons why* paranormal beliefs are so strongly and widely held,



which I discuss in my book, *Paranormal Beliefs*, reviewed (SI, January/February 2001, pp. 60–61) by Jeffrey Victor, are themselves “irrational.” I didn’t set out to do this in my book, but I suggest that every one of the reasons I mention can be operationalized and systematically tested with empirical evidence. Professor Hilfinger, irrationality anyone?

Erich Goode  
Silver Spring, Maryland

## Chiropractic Reform

As director of Victims of Chiropractic, with sixteen years of research in the field, I salute SI for printing retired chiropractor Sam Homola’s excellent article (January/February 2001). Homola and I are friends and quackbusting colleagues, and he has been one of my most valuable mentors. When I speak to any group, I always emphasize the difference between a *reformist* chiropractor and all the rest. Reformists have the character and courage to reject “traditional chiropractic pseudoscience and gobbledygook.” They acknowledge their limitations.

I especially enjoyed physicist Mohammad Ghaffari’s letter (May/June 2001) from Tucson, Arizona. Mr. Ghaffari got an introduction, as did I some years ago, into the preposterous world of Applied Kinesiology, a practice that ranks right along with astrology and homeopathy as worthy contributors to the dumbing-down of society.

Readers would do well to look again at chiropractic professor Joseph C. Keating’s July/August 1997 SKEPTICAL INQUIRER article “Chiropractic: Science and Antiscience and Pseudoscience Side by Side.” Prof. Keating talks about some areas that are of particular concern to chiropractic critics such as the penchant of chiropractors for marketing slogans like “Chiropractic Works!” He mentions the low college entrance requirements compared to other health care professions. He says that many of the chiropractic schools are “magnets for magical and mystical thinkers” and “Moreover, since the largest chiropractic colleges tend to have the strongest commitments to dogma, fuzzy thinkers are likely to fill the chiropractic ranks for decades to come.” This is more than a little disconcerting when we consider that most chiropractors want to be considered primary care physicians, on an equal level with medical doctors.

Don Paulin  
Victims of Chiropractic  
Huntington Beach, California

## Reaction to First ‘Science and Religion’ Issue Continues



*Even two years after its publication, the SKEPTICAL INQUIRER's first special issue on science and religion, July/August 1999, continues to stimulate reader reaction. This letter arrived July 8, 2001. It was preceded by a brief note from the authors. They said they had started it long ago, but "could not find the inspiration to complete it until we read your article, 'From the Editor's Seat: 25 Years of Science and Skepticism' [May/June 2001]. Your moving comments about the history of the SKEPTICAL INQUIRER, particularly about what you termed to be the journal's 'core unifying values' inspired us to submit this letter." I hope our publishing their letter in this, our second issue devoted specifically to issues of science and religion, will alleviate some of the concerns they express.—Kendrick Frazier, Editor*

In our opinion the special issue, “Science and Religion” was not only the most interesting issue of the SKEPTICAL INQUIRER ever published, it was one of the most remarkable issues of any journal ever published. How sad it is that this special issue was apparently only an aberration. In his article, “Should skeptical inquiry be applied to religion?” CSICOP founder Paul Kurtz concludes that neither CSICOP nor the SKEPTICAL INQUIRER should in any way, except tangentially, deal with religious issues. In the introductory essay entitled, “Conflicting or complementary? Some thoughts about boundaries” SKEPTICAL INQUIRER Editor Kendrick Frazier seems to agree and warns that 90 percent of the population of the U.S. is self-described as religious.

While our nation’s broadly religious social milieu may explain the excitement about Stephen Jay Gould’s capitulatory (and in our opinion ludicrous) theory of “non-overlapping magisteria” of science and religion, fear of repercussions must not stifle free inquiry. Richard Dawkins’s brief article, “You can’t have it both ways” deflates Gould’s theory and emphasizes that religion should not be granted special immunity from scientific investigation. Freedom to investigate ghosts but not holy ghosts is no freedom at all. During a recent lecture at our medical center entitled, “the Power of Prayer in Healing” at least a dozen scientifically testable claims were made. Must we turn a blind eye to the absurdity of these claims for fear of offending the proselytizers who tout them? The SKEPTICAL INQUIRER has done a wonderful job of debunking myths about Bigfoot and alien abductions. Most of our patients no longer believe these childish stories. In contrast, the majority of our patients still believe that prayer can cure cancer, that holy miracles can eradicate disease, that supernatural spirits visit their hospital rooms, and a host of other religious myths. Many of these claims are indeed scientifically testable. Most importantly, unlike Bigfoot stories, religious beliefs actually have profound effects on the health and lives of countless millions all over the world. Paul Kurtz and Kendrick Frazier will go down in history as heroes in the battle for intellectual freedom. It is our hope that their legacies will not be tarnished by an inconsistent stand on the conflict between science and religion, an issue of fundamental importance to all mankind.

Bruce L. Flamm  
Janice R. Goings  
Riverside, California

The letters column is a forum for views on matters raised in previous issues. Letters should be no more than 225 words. Due to the volume of letters not all can be published. Address letters to Letters to the Editor, SKEPTICAL INQUIRER, Send by mail to 944 Deer Dr. NE, Albuquerque, NM 87122; by fax to 505-828-2080; or by e-mail to letters@csicop.org (include name and address).



## United States

**ALABAMA.** **Alabama Skeptics**, Alabama. Emory Kimbrough. Tel.: 205-759-2624, 3550 Watermelon Road, Apt. 28A, Northport, AL 35476 US. **Skeptics-Freethought Forum of Alabama**. Richard G. Davis. Tel.: 256-751-4447; e-mail: RRbama66@hotmail.com.

**ARIZONA.** **Tucson Skeptics Inc.** Tucson, AZ. James McGaha. E-mail: JMCGAHA@PimaCC.Pima.EDU. 5100 N. Sabino Foothills Dr., Tucson, AZ 85715 US. **Phoenix Skeptics**, Phoenix, AZ. Michael Stackpole, P.O. Box 60333, Phoenix, AZ 85082 US.

**CALIFORNIA.** **Sacramento Organization for Rational Thinking (SORT)** Sacramento, CA. Ray Spangenberg, co-founder. Tel.: 916-978-0321; e-mail: kitray@quiknet.com. PO Box 2147, Carmichael, CA 95609-2147 US. www.quiknet.com/~kitray/index1.html. **Bay Area Skeptics (BAS)** San Francisco—Bay Area. Tully McCarroll, Chair. Tel.: 415 927-1548; e-mail: tullyann@pacbell.net. PO Box 2443 Castro Valley, CA 94546-0443 US. www.BASkepts.org. **Sacramento Skeptics Society**, Sacramento. Terry Sandbek, President. Tel.: 916-489-1774; e-mail: tsandbek@ispchannel.com. 4300 Auburn Blvd, Ste 206 Sacramento, CA 95841 US. http://my.ispchannel.com/~tsandbek/Skeptics/skeptics.htm. **San Diego Association for Rational Inquiry (SDARI)** San Diego, CA, county. Keith Taylor, President. Tel.: 619-220-1045; e-mail: krtaylorxyz@aol.com. 945 4th Ave. San Diego, CA 92101 US. http://members.tripod.com/sdари-web/home.html.

**COLORADO.** **Rocky Mountain Skeptics (RMS)** Colo., Wyo., Utah, Mont. Béla Scheiber, President. Tel.: 303-444-7537; e-mail: rmscentral@mindspring.com. PO Box 7277, Boulder, CO 80306 US. http://bcn.boulder.co.us/community/rms.

**CONNECTICUT.** **New England Skeptical Society (NESS)** New England. Steven Novella MD, President. Tel.: 203-281-6277; e-mail: board@thenss.com. PO Box 185526, Hamden, CT 06518-5526 US. www.thenss.com.

**D.C./MARYLAND.** **National Capital Area Skeptics NCAS**, Maryland, D.C., Virginia. D.W. "Chip" Denman. Tel.: 301-587-3827. 8006 Valley Street, Silver Spring, MD 20910 US. www.ncas.org.

**FLORIDA.** **Tampa Bay Skeptics (TBS)** Tampa Bay, Florida. Gary Posner, Executive Director. Tel.: 813-584-0603; e-mail: tbskep@aol.com. 5319 Archstone Dr. #102, Tampa, FL 33634 US. http://members.aol.com/tbskep.

**GEORGIA.** **Georgia Skeptics (GS)** Georgia.

Rebecca Long, President. Tel.: 770-493-6857; e-mail: arlong@hccr.org. 2277 Winding Woods Dr., Tucker, GA 30084 US.

**IOWA.** **Central Iowa Skeptics (CIS)** Central Iowa, Rob Beeston. Tel.: 515-285-0622; e-mail: webguy@dangerousideas.net. 5602 SW 2nd St. Des Moines, IA 50315 US. www.dangerousideas.net.

**ILLINOIS.** **Rational Examination Association of Lincoln Land (REALL)** Illinois. David Bloomberg, Chairman. Tel.: 217-726-5354; e-mail: chairman@reall.org. PO Box 20302, Springfield, IL 62708 US. www.reall.org.

**KENTUCKY.** **Kentucky Assn. of Science Educators and Skeptics (KASES)** Kentucky. Prof. Robert Baker, 3495 Castleton Way, North Lexington, KY 40502 US. Contact Fred Bach at e-mail: fwbach@visto.com.

**LOUISIANA.** **Baton Rouge Proponents of Rational Inquiry and Scientific Methods (BR-PRISM)** Louisiana. Marge Schroth. Tel.: 225-766-4747. 425 Carriage Way, Baton Rouge, LA 70808 US.

**MICHIGAN.** **Great Lakes Skeptics (GLS)** SE Michigan. Lorna J. Simmons, Contact person. Tel.: 734-525-5731; e-mail: Skeptic31@aol.com. 31710 Cowan Road, Apt. 103, Westland, MI 48185-2366 US. **Tri-Cities Skeptics**, Michigan. Gary Barker. Tel.: 517-799-4502; e-mail: barkerg@svol.org. 3596 Butternut St., Saginaw, MI 48604 US.

**MINNESOTA.** **St. Cloud Extraordinary Claim Psychic Teaching Investigating Community (SKEPTIC)** St. Cloud, Minnesota. Jerry Mertens. Tel.: 320-255-2138; e-mail: gmertens@stcloudstate.edu. Jerry Mertens, Psychology Department, 720 4th Ave. S, St. Cloud State University, St. Cloud, MN 56301 US. **Minnesota Skeptics**, Minnesota. Robert McCoy, 549 Turnpike Rd., Golden Valley, MN 55416 US.

**MISSOURI.** **Gateway Skeptics**, Missouri, Steve Best, 6943 Amherst Ave., University City, MO 63130 US. **Kansas City Committee for Skeptical Inquiry**, Missouri. Verle Muhrer, United Labor Bldg., 6301 Rockhill Road, Suite 412 Kansas City, MO 64131 US.

**NEW MEXICO.** **New Mexicans for Science and Reason (NMSR)** New Mexico. David E. Thomas, President. Tel.: 505-869-9250; e-mail: det@rt66.com. PO Box 1017, Peralta, NM 87042 US. www.nmsr.org.

**NEW YORK.** **New York Area Skeptics (NYASK)** metropolitan NY area. Ted W. Debiak, President. Tel.: 516-735-8739; e-mail: info@nyask.com. 57 South Windhorst Ave., Bethpage, NY 11714-4931 US. www.nyask.com. **Inquiring Skeptics of Upper New York (ISUNY)** Upper New York. Michael Sofka, 8

Providence St., Albany, NY 12203 US.

**NORTH CAROLINA.** **Triad Area Skeptics Club (TASC)** North Carolina. Eric Carlson, President. Tel.: 336-758-4994; e-mail: ecarlson@wfu.edu. Physics Department, Wake Forest University, Winston-Salem, NC 27109 US. www.wfu.edu/~ecarlson/tasc/index.html.

**OHIO.** **Central Ohioans for Rational Inquiry (CORI)** Central Ohio. Charlie Hazlett, President. Tel.: 614-878-2742; e-mail: charlie@hazlett.net. PO Box 282069, Columbus OH 43228 US. **South Shore Skeptics (SSS)** Cleveland and counties. Jim Kutz. Tel.: 440 942-5543; e-mail: jimkutz@earthlink.net. PO Box 5083, Cleveland, OH 44101 US. www.southshoreskeptics.org/.

**Association for Rational Thought (ART)** Cincinnati. Roy Auerbach, president. Tel.: 513-731-2774. e-mail: raa@cinci.rr.com. PO Box 12896, Cincinnati, OH 45212 US. www.cincinnati.skeptics.org.

**OREGON.** **Oregonians for Rationality (O4R)** Oregon. Dave Chapman, President. Tel.: 503 292-2146; e-mail: dchapman@iccom.com. 7555 Spring Valley Rd. NW, Salem, OR 97304 US. www.o4r.org.

**PENNSYLVANIA.** **Paranormal Investigating Committee of Pittsburgh (PICP)** Pittsburgh PA. Richard Busch, Chairman. Tel.: 412-366-1000; e-mail: mindful@telerama.com. 8209 Thompson Run Rd., Pittsburgh, PA 15237 US. **Philadelphia Association for Critical Thinking (PhACT)**, much of Pennsylvania. Eric Krieg, President. Tel.: 215-885-2089; e-mail: eric@phact.org. PO Box 1131, North Wales, PA 19454 US. www.phact.org/phact.

**TENNESSEE.** **Rationalists of East Tennessee**, East Tennessee. Carl Ledenbecker. Tel.: 865-982-8687; e-mail: Aletall@aol.com. 2123 Stonybrook Rd., Louisville, TN 37777 US.

**TEXAS.** **North Texas Skeptics NTS Dallas/Ft Worth area**, John Blanton, Secretary. Tel.: 972-306-3187; e-mail: skeptic@ntskeptics.org. PO Box 111794, Carrollton, TX 75011-1794 US. www.ntskeptics.org.

**VIRGINIA.** **Science & Reason**, Hampton Rds., Virginia. Lawrence Weinstein, Old Dominion Univ.-Physics Dept., Norfolk, VA 23529 US.

**WASHINGTON.** **Society for Sensible Explanations**, Western Washington. Tad Cook, Secretary. E-mail: tad@aa.net. PO Box 45792, Seattle, WA 98145-0792 US. www.seattlesketpicks.org.

The organizations listed above have aims similar to those of CSICOP but are independent and autonomous. Representatives of these organizations cannot speak on behalf of the CSICOP. Please send updates to Béla Scheiber, PO Box 4482, Boulder, CO 80306.

## SCIENTIFIC AND TECHNICAL CONSULTANTS

**George Agogino**, Dept. of Anthropology, Eastern New Mexico University

**Gary Bauslaugh**, educational consultant, Center for Curriculum, Transfer and Technology, Victoria, B.C., Canada

**Richard E. Berendzen**, astronomer, Washington, D.C.  
**Martin Bridgstock**, lecturer, School of Science, Griffith University, Brisbane, Australia

**Richard Busch**, magician/mentalist, Pittsburgh, Penn.  
**Shawn Carlson**, Society for Amateur Scientists, East Greenwich, CT

**Roger B. Culver**, professor of astronomy, Colorado State Univ.

**Felix Ares de Blas**, professor of computer science, University of Basque, San Sebastian, Spain

**Michael R. Dennett**, writer, investigator, Federal Way, Washington

**Sid Deutsch**, consultant, Sarasota, Fla.

**J. Dommanget**, astronomer, Royale Observatory, Brussels, Belgium

**Nahum J. Duker**, assistant professor of pathology, Temple University

**Barbara Eisenstadt**, psychologist, educator, clinician, East Greenbush, NY

**William Evans**, professor of communication, Georgia State University

**John F. Fischer**, forensic analyst, Orlando, Fla.  
**Robert E. Funk**, anthropologist, New York State Museum & Science Service

**Eileen Gambrell**, professor of social welfare, University of California at Berkeley

**Sylvio Garattini**, director, Mario Negri Pharmacology Institute, Milan, Italy

**Laurie Godfrey**, anthropologist, University of Massachusetts  
**Gerald Goldin**, mathematician, Rutgers University, New Jersey

**Donald Goldsmith**, astronomer; president, Interstellar Media

**Alan Hale**, astronomer, Southwest Institute for Space Research, Alamogordo, New Mexico

**Clyde F. Herreid**, professor of biology, SUNY, Buffalo

**Terence M. Hines**, professor of psychology, Pace University, Pleasantville, N.Y.

**Michael Hutchinson**, author; SKEPTICAL INQUIRER representative, Europe

**Philip A. Ianna**, assoc. professor of astronomy, Univ. of Virginia

**William Jarvis**, professor of health promotion and public health, Loma Linda University, School of Public Health

**I. W. Kelly**, professor of psychology, University of Saskatchewan

**Richard H. Lange**, M.D., Mohawk Valley Physician Health Plan, Schenectady, N.Y.

**Gerald A. Larue**, professor of biblical history and archaeology, University of So. California.

**William M. London**, consumer advocate, Fort Lee, New Jersey

**Rebecca Long**, nuclear engineer, president of Georgia Council Against Health Fraud, Atlanta, Ga.

**Thomas R. McDonough**, lecturer in engineering, Caltech, and SETI Coordinator of the Planetary Society

**James E. McGaha**, Major, USAF; pilot

**Joel A. Moskowitz**, director of medical psychiatry, Calabasas Mental Health Services, Los Angeles.

**Jan Willem Nienhuys**, mathematician, Univ. of Eindhoven, the Netherlands

**John W. Patterson**, professor of materials science and engineering, Iowa State University

**James Pomerantz**, Provost, and professor of cognitive and linguistic sciences, Brown Univ.

**Gary P. Posner**, M.D., Tampa, Fla.

**Daisie Radner**, professor of philosophy, SUNY, Buffalo

**Michael Radner**, professor of philosophy, McMaster University, Hamilton, Ontario, Canada

**Robert H. Romer**, professor of physics, Amherst College

**Milton A. Rothman**, physicist, Philadelphia, Penn.

**Karl Sabbagh**, journalist, Richmond, Surrey, England

**Robert J. Samp**, assistant professor of education and medicine, University of Wisconsin-Madison

**Steven D. Schafersman**, asst. professor of geology, Miami Univ., Ohio

**Béla Scheiber**,\* systems analyst, Boulder, Colo.

**Chris Scott**, statistician, London, England

**Stuart D. Scott, Jr.**, associate professor of anthropology, SUNY, Buffalo

**Erwin M. Segal**, professor of psychology, SUNY, Buffalo

**Carla Selby**, anthropologist/archaeologist

**Steven N. Shore**, associate professor and chair, Dept. of Physics and Astronomy, Indiana Univ. South Bend

**Waclaw Szybalski**, professor, McArdle Laboratory, University of Wisconsin-Madison

**Ernest H. Taves**, psychoanalyst, Cambridge, Mass.

**Sarah G. Thomason**, professor of linguistics, University of Pittsburgh

**Tim Trachet**, journalist and science writer, honorary chairman of SKEPP, Belgium.

\*Member, CSICOP Executive Council

°Associate Member, CSICOP Executive Council

# THE COMMITTEE FOR THE SCIENTIFIC INVESTIGATION OF CLAIMS OF THE PARANORMAL

AT THE CENTER FOR INQUIRY-INTERNATIONAL (ADJACENT TO THE STATE UNIVERSITY OF NEW YORK AT BUFFALO)

AN INTERNATIONAL ORGANIZATION

## Network of Affiliated Organizations International

**ARGENTINA. CAIRP.** Enrique Marquez, Director. E-mail: deschave@cvtci.com.ar Jose Marti 35 - "C" Buenos Aires (1406), Argentina. www.cairp.org.

**AUSTRALIA. Canberra Skeptics.** Canberra Australia. Peter Barrett, President. PO Box 555, Civic Square ACT 2608 Australia. **Australian Skeptics Inc.**, Australia. Barry Williams, Executive Officer. Tel: 61-2-9417-2071; e-mail: skeptics@kasm.com.au. PO Box 268, Roseville NSW 2069 Australia. www.skeptics.com.au.

**Australian Skeptics—Hunter Region** Newcastle/Hunter Valley. Dr. Colin Keay, President. Tel: 61-2-49689666; e-mail: bolide@hunterlink.net.au. PO Box 166, Waratah NSW 2298. **Australia Darwin Skeptics,** Northern Territory, Australia. Simon Potter, Secretary. Tel: 61-8-8932-7552; e-mail: dwnskeptic@ais.net.au. PO Box 809, Sanderson NT 0812 Australia.

**Gold Coast Skeptics,** Queensland, Australia. Lilian Derrick, Secretary. Tel: 61-7-5593-1882; e-mail: lmderrick@telstra.easymail.com.au. PO Box 8348, GCMC Bundall QLD 4217 Australia. **Queensland Skeptics Assoc. Inc.** (Qskeptics) Queensland. Bob Bruce, President. Tel: 61-7-3255-0499; e-mail: qskaptic@uq.net.au. PO Box 6454, Fairview Gardens QLD 4103 Australia.

**South Australia Skeptics (SAS)** South Australia. Mr. Laurie Eddie, Secretary. Tel: 61-8-8272-5881; e-mail: allang@txc.net.au. PO Box 377, Rundle Mall SA 5000 Australia. **Australian Skeptics in Tasmania Inc.,** Tasmania, Australia. Fred Thornett, Secretary. Tel: 61-3-6234-1458; e-mail: fredthornett@hotmail.com. PO Box 582, North Hobart, TAS 7000 Australia.

**Australian Skeptics—Victoria** Branch Victoria. Grant Stevenson, President. Tel: 61-3-9531-9905; e-mail: contact@skeptics.com.au. GPO Box 5166AA, Melbourne VIC 3001 Australia. www.skeptics.com.au. **WA Skeptics,** Western Australia. Dr. John Happs, President. Tel: 61-8-9448-8458; e-mail: wa.skeptics@australiainmail.com. PO Box 899, Morley, WA 6062 Australia.

**BELGIUM. Comité Belge Pour L'Investigation Scientifique des Phénomènes Réputés Paranormaux Comité Para,** Belgium. J. Dommangeat, President of the Committee. E-mail: omer.nys@oma.be. Observatoire Royal Belgique 3, ave. Circulaire B-1180, Brussels, Belgium. www.comitepara.be. **Studiekring voor Kritische Evaluatie van Pseudowetenschap en Paranormale beweringen (SKEPP)** Belgium. Prof. Dr. W. Betz. Tel: 32-2-477-43-11; e-mail: skepp@skepp.be Laarbeeklaan. 103 B-1090 Brussels, Belgium. www.skepp.be

**BRAZIL. OPÇAO RACIONAL,** Brazil. Luis Fernando Gutman. Tel: 55-21-548-2476; e-mail: fernandogutman@hotmail.com. Rua Santa Clara, 431 Bloco 5, Apt. 803, Copacabana-Rio de Janeiro 22041-010 Brazil. www.opcraoacional.com.br.

**BULGARIA. Bulgarian Skeptics,** Bulgaria. Dr. Vladimir Daskalov. E-mail: egoshev@einet.bg. Krakra 22 BG-1504 Sofia, Bulgaria.

**CANADA. Alberta Skeptics,** Alberta. Greg Hart, Chairman. Tel: 403-215-1440; e-mail: hartg@humaneffort.com. PO Box 5571, Station 'A', Calgary, Alberta T2H 1X9 Canada www.homestead.com/. **Alberta Skeptics, British Columbia Skeptics,** BC and Alberta. Lee Moller. Tel: 604-929-6299; e-mail: leemoller@home.com. 1188 Beaufort Road, N. Vancouver, BC V7G 1R7 Canada. **Ontario Skeptics,** Ontario, Canada. Eric McMillan, Chair. Tel: 416-425-2451; e-mail: eric@we-compute.com. P.O. Box 53003, 10 Royal Orchard Blvd., Thornhill, ON L3T 7R9 Canada.

www.astro.yorku.ca/~lmdrt/oskeptics.html. **Toronto Skeptical Inquirers (TSI)** Toronto. Henry Gordon, President. Tel: 905-771-1615; e-mail: henry\_gordon@hotmail.com. 343 Clark Ave., W., Suite 1009, Thornhill, ON L4J 7K5 Canada. **Ottawa Skeptics,** Ottawa, Ontario. Greg Singer. E-mail: skeptic@ottawa.com. PO Box 1237, Station B, Ottawa, Ontario K1P 5R3 Canada. www.admissions.carleton.ca/~addalby/cats/skeptic.html. **Sceptiques du Québec,** Quebec. Alan Bonnier. Tel: 514-990-8099. C.P. 202, Succ. Beauvieux Montreal, Quebec H2G 3C9 Canada. www.sceptiques.qc.ca.

**CHINA. China Association for Science and Technology,** China. Shen Zhenyu Research Center, P.O. Box 8113, Beijing China. **Hong Kong Skeptics,** Hong Kong. Brad Collins, P.O. Box 1010, Shatin Central Post Office, Shatin NT China.

**COSTA RICA. Iniciativa para la Promoción del Pensamiento Crítico (IPPEC)** San José. Victor Quiros V. Tel: 506 275 43 52; e-mail: victorcr@racsa.co.cr. A.P. 1513-1002 Paseo de los Estudiantes San José, Costa Rica. http://webs.demasiado.com/vicr.

**CZECHOSLOVAKIA. Sisyfos-Czech Skeptics Club.** Czech Republic. Ms. Ing. Olga Kracikova, Secretary. Tel: 420-2-24826691; e-mail: olgakracikova@email.cz. Hastalska 27 Praha 1 110 00 Czech Republic. www.fi.muni.cz/sisyfos/(in Czech).

**DENMARK. Skeptica: Association of Independent Danish Skeptics,** Denmark. Willy Wegner. Tel: 45-75-64-84-02; e-mail: skeptica@skeptica.dk. Vibevej 7 A DK 8700 Horsens, Denmark. www.skeptica.dk.

**ECUADOR. Pablo Cevallos Estarellas.** Apartado 09-01-5603 Guayaquil, Ecuador.

**ESTONIA. Horisont.** Indrek Rohtmets. EE 0102 Tallinn, Narva mnt. 5.

**FINLAND. SKEPSIS,** Finland. Jukka Hakkinen. PO Box 483, Helsinki 00101 Finland.

**FRANCE. AFIS, AFIS** France. 14 rue de l'Ecole Polytechnique F-75005 Paris, France. **Cercle Zététique,** France. Paul-Eric Blanrue. 12 rue; David Deitz. F-57000 Metz, France. **Comité Français pour l'Étude des Phénomènes Paranormaux,** France. Merlin Gerin, RGE/A2 F-38050 Grenoble Cedex, France. Michel Rouze. 147 rue de Rennes F-75006 Paris, France. **Laboratoire de Zététique (laboratory).** Professeur Henri Broch. Tel: 33-0492076312; e-mail: broch@unice.fr. Université de Nice-Sophia Antipolis Faculté des Sciences F-06108 Nice Cedex 2 France. www.unice.fr/zetetique/.

**GERMANY. Gesellschaft zur wissenschaftlichen Untersuchung von Parawissenschaften (GWUP)** Germany. Amadeo Sarma, Chairman. Tel: 49-6154-695023; E-mail: info@gwup.org. Arheilger Weg 11 D-64380 Rosdorf, Germany. www.gwup.org. **European Council of Skeptical Organizations (ECOS)** Europe. Dr. Martin Mahner. Tel: 49-6154-695023; e-mail: info@ecso.org. Arheilger Weg 11 64380 Rosdorf, Germany. www.ecso.org/.

**HUNGARY. Tényeket Tisztelt Társasága TTT Hungary.** Prof. Gyula Benze. Tel: 36-1-392-2728; e-mail: gbenze@rmki.kfki.hu. c/o Termézet Világa, PO Box 246 H-1444 Budapest 8 Hungary.

**INDIA. Maharashtra Andhashradha Nirmoolan Samiti (MANS)** states of Maharashtra & Goa. Dr. Narendra Dabholkar, Executive President. Tel: 91-2162-32333; e-mail: ndabholkar@hotmail.com. 155, Sadashiv Peth Satara 415001 India. www.antisuperstition.com. **Indian Rationalist Association,** India. Sanal Edamaruku. E-mail: edamaruku@yahoo.com. 779, Pocket 5, Mayur Vihar 1, New Delhi 110 091 India. Dravidar Kazhagam, southern India. K. Veeramani, Secretary General. Tel: 9144-5386555; e-mail: periyar@vsnl.com. Periyar Thidal, 50, E.F.K. Sampath Road Vepery, Chennai Tamil Nadu 600 007 India. www.Periyar.org. **Indian CSICOP,** India. B. Premanand, Convenor. Tel: 091-0422-872423; e-mail: dayamini@md4.vsnl.net.in. 11/7 Chettipalayam Road Podanur Tamilnadu 641 023 India.

**ITALY. Comitato Italiano per il Controllo delle Affermazioni sul Paranormale (CICAP)** Italy. Massimo Polidoro, Executive Director. Tel: 39-049-686870; e-mail: polidoro@cicap.org. P.O. Box 1117 35100 Padova, Italy. www.cicap.org.

**JAPAN. Japan Anti-Pseudoscience Activities Network (JAPAN)** Japan. Ryutarou Minakami, chairperson. E-mail: skeptic@mail.ne.jp. c/o Ohta Publishing Company, Epoc Bld, 1F, 22, Arakicho, Shinjuku-ku Tokyo 160-8571 Japan. **Japan Skeptics,** Japan. Dr. Jun Jugaku. E-mail: jugakujn@cc.nao.ac.jp. Japan Skeptics, Business Center for Academic Societies, Japan 5-16-9 Honkomagome, Bunkyo-ku Tokyo 113-8622 Japan.

**KAZAKHSTAN. Kazakhstan Commission for**

**the Investigation of the Anomalous Phenomena (KCIAP)** Kazakhstan. Dr. Sergey Efimov, Scientific Secretary. E-mail: efim@afi.south-capital.kz. Astrophysical Institute Kamenskoye Plato Aima-Ata. 480020 Republic of Kazakhstan. Committee for the Scientific Expertise of Claims of the Paranormal (CSECP).

**KOREA. Korea PseudoScience Awareness (KOPSA)** Korea. Dr. Gun-Il Kang, Director. Tel: 82-2-393-2734; e-mail: KOPSA@chollian.net. 187-11 Bukahyun-dong, Sudaemun-ku, Seoul 120-190 Korea www.kopsa.or.kr.

**MALTA. Society for Investigating the Credibility of Extraordinary Claims (SICCE)** Malta. Vanni Pule, Chairman. Tel: 356-381994; e-mail: pulevan@vol.net.mt. P.O. Box 31, Hamrun, Malta.

**MEXICO. Mexican Association for Skeptical Research (SOMIE)** Mexico. Mario Mendez-Acosta, Apartado Postal 19-546 D.F. 03900 Mexico.

**NETHERLANDS. Stichting Skepsis,** Netherlands. Rob Nanninga, Secretary. Tel: 31-50-3129893; e-mail: skepsis@wxs.nl. Westerkaade 20, 9718 AS Groningen, Netherlands. www.skepsis.nl.

**NEW ZEALAND. New Zealand Skeptics,** New Zealand, Vicki Hyde, Chair. Tel: 64-3-384-5136; e-mail: Vicki@spis.co.nz. PO Box 29-492, Christchurch, New Zealand. www.skeptics.org.nz.

**NIGERIA. Nigerian Skeptics Society,** Nigeria. Leo Igwe, Convenor. E-mail: dpc@skannet.com.ng. PO Box 25269, Mapo Ibadan Oyo State, Nigeria.

**NORWAY. SKEPSIS.** Norway St. Olavsgt. 27 N-0166 Oslo, Norway.

**PERU. Comité de Investigaciones de lo Paranormal lo Seudocientífico y lo Irracional CIPSI-PERU,** Lima, Peru. Manuel Abraham Paz-y-Mino. Tel: 51-14-810712; e-mail: cipsi-peru@yahoo.com. El Corregidor 318 Rimac, Lima 25 Peru. www.geocities.com/cipsiperu.

**POLAND. Polish Skeptics,** Poland Adam Pietrasiewicz. E-mail: redaktor@iname.com. www.biuletynsceptyczny.zp.l.

**PORTUGAL. Associação Céptica de Portugal (CEPO)** Portugal. Ludwig Krippahl. E-mail: cepo@interacesso.pt. Apartado 334 2676-901 Odivelas, Portugal. http://cepo.interacesso.pt.

**RUSSIA.** Dr. Valerii A. Kuvakin. Tel: 95-718-2178; e-mail: V.KUVAKIN@MTU-NET.RU. Vorob'evy Gory, Moscow State University, Phil. Dept. Moscow 119899 Russia. http://log.philos.msu.ru/rhs/index.htm.

**SLOVAK REPUBLIC (SACT).** Slovak Republic. Igor Kapisinsky Pavla Horova, 10 Bratislava 841 07 Slovak Republic.

**SOUTH AFRICA.** Marian Laserson. P.O. Box 46212, Orange Grove 2119 South Africa. **SOCRATES. South Africa. Cape Skeptics,** Cape Town. Dr. Leon Retief. Tel: 27-21-9131434; e-mail: leonr@iafrica.com. 5N Agapanthus Avenue, Welgedacht Bellville 7530 South Africa.

**SPAIN. El Investigador Esceptico,** Spain. Felix Ares de Blas Gámez/Ares/Martinez, P.O. Box 904, Donostia-San Sebastian 20080 Spain. **ARP-Sociedad para el Avance del Pensamiento Crítico ARP-SAPC** Spain. Sergio López, Borgoñoz. Tel: 34-933-010220; e-mail: arp@arp-sapc.org. Apartado de Correos, 310 E-08860 Castelldefels, Spain. www.arp-sapc.org.

**SWEDEN. Swedish Skeptics,** Sweden. Dan Larhammar, professor chairperson. Tel: 46-18-4714173; e-mail: vetfolk@physto.se. Medical Pharmacology BMC, Box 593, Uppsala 751 24 Sweden. www.physto.se/~vetfolk/index.html.

**TAIWAN. Taiwan Skeptics,** Taiwan. Tim Holmes, PO Box 195, Tanzu, Taiwan Perspective.

**UKRAINE.** Oleg Bakhtiarov 3-B Khmel'nitskogo St., Kiev 252001 Ukraine.

**UNITED KINGDOM. The Skeptic Magazine,** United Kingdom. Toby Howard. E-mail: toby@cs.man.ac.uk. P.O. Box 475 Manchester M60 2TH United Kingdom.

**VENEZUELA. La Asociación Racional y Esceptica de Venezuela (A.R.E.V.),** Guido David Nuñez Mujica, 10th Street, 13th av. corner, Mini centro comercial Oasis, Valera, Trujillo state, Venezuela. Web site: www.geocities.com/escpecticosvenezuela.



# Center for Inquiry International

"... to promote and defend reason, science, and freedom of inquiry in all areas of human endeavor."

## Ghostly Reflections in the Pleiades

NASA's Hubble Space Telescope has caught the eerie, wispy tendrils of a dark interstellar cloud being destroyed by the passage of one of the brightest stars in the Pleiades star cluster. Like a flashlight beam shining off the wall of a cave, the star is reflecting light off the surface of pitch black clouds of cold gas laced with dust. These are called reflection nebulae. This famous cluster is easily visible in the evening sky during the winter months as a small grouping of bright blue stars, named after the "Seven Sisters" of Greek mythology.

Credit: NASA and The Hubble Heritage Team (STScI/AURA)

**CENTER FOR INQUIRY—  
INTERNATIONAL**  
P.O. Box 703  
Amherst, NY 14226  
Tel.: (716) 636-1425

**CENTER FOR INQUIRY—MIDWEST**  
United Labor Building  
6301 Rockhill Rd., Suite 412,  
Kansas City, MO 64131  
Tel.: (816) 822-9840

**CENTER FOR INQUIRY—WEST**  
5519 Grosvenor Ave.,  
Los Angeles, CA 90066  
Tel.: (310) 306-2847

**CENTER FOR INQUIRY—MOSCOW**  
Professor Valerii A. Kuvakin  
119899 Russia,  
Moscow, Vorobevy Gory,  
Moscow State University,  
Philosophy Department

**CENTER FOR INQUIRY—EUROPE**  
Dr. Martin Mahner  
Arheilger Weg 11  
D-64380 Rossdorf, Germany  
Tel.: +49 6154 695023

## THE COMMITTEE FOR THE SCIENTIFIC INVESTIGATION OF CLAIMS OF THE PARANORMAL

The Committee is a nonprofit scientific and educational organization.  
The **SKEPTICAL INQUIRER** is its official journal.

The Committee for the Scientific Investigation of Claims of the Paranormal encourages the critical investigation of paranormal and fringe-science claims from a responsible, scientific point of view and disseminates factual information about the results of such inquiries to the scientific community, the media, and the public. It also promotes

science and scientific inquiry, critical thinking, science education, and the use of reason in examining important issues.

## Skeptical Inquirer