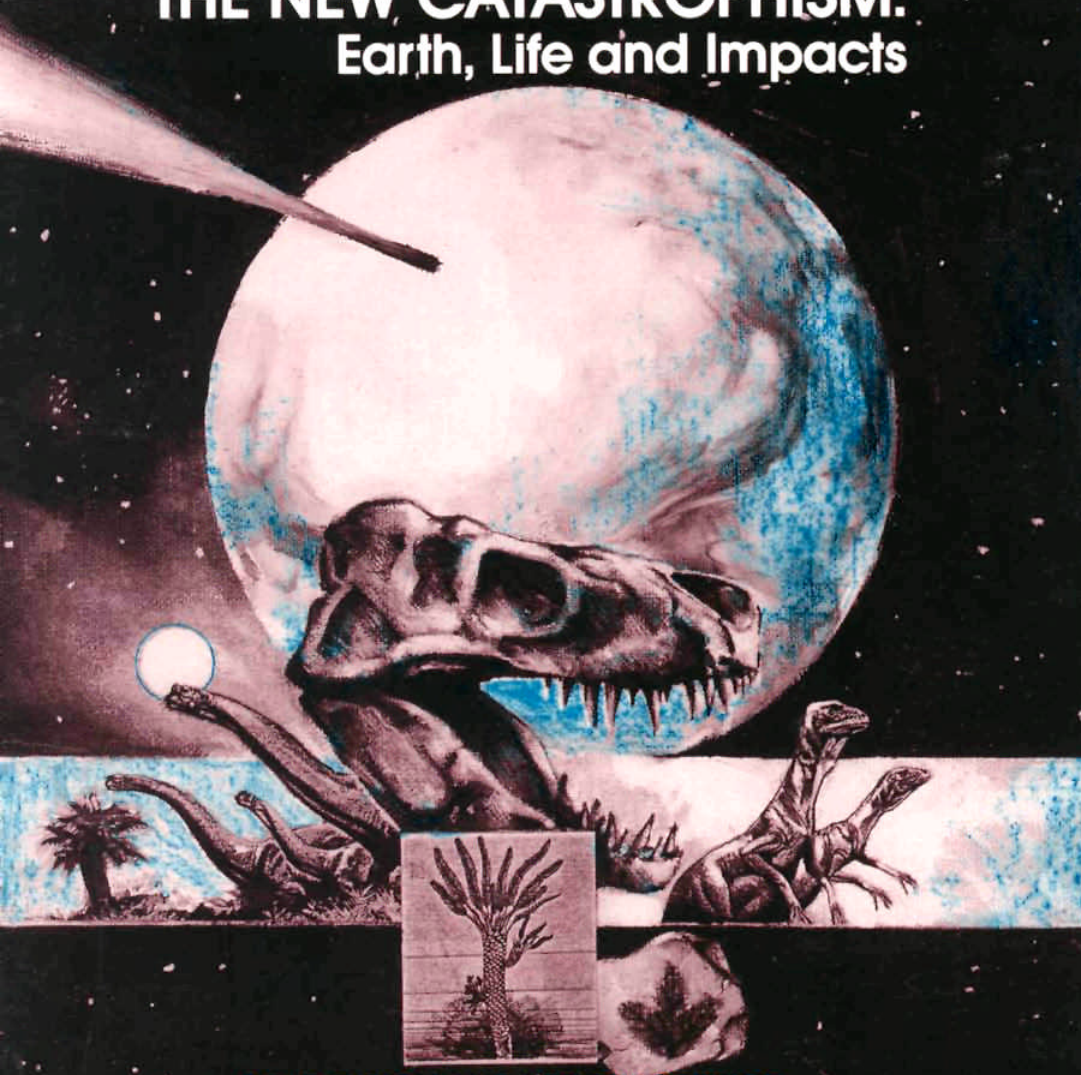
SKEPTICAL INQUIRER

Vol. 14, No. 2 / Winter 1990 $6.25

THE NEW CATASTROPHISM: Earth, Life and Impacts



COLD FUSION AND WISHFUL SCIENCE
FIELD GUIDE TO CRITICAL THINKING
EDITORS & EVOLUTION/MJ-12 HOAX
THE AIRSHIP HYSTERIA OF 1896-97

Published by the Committee for the Scientific Investigation of Claims of the Paranormal

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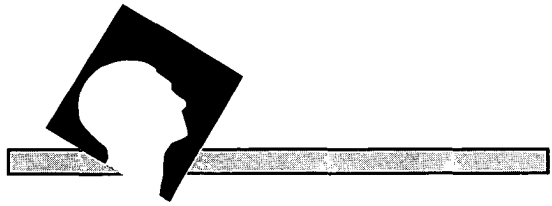
Vol. 14, 2, Winter 1990

Journal of the Committee for the Scientific Investigation of Claims of the Paranormal

SKEPTICAL INQUIRER

Redesign of SKEPTICAL INQUIRER by Peters & Company Graphic Designs, Albuquerque, New Mexico. Creative Director, Lynn Peters; Art Director, Cynthia Harmer; cover illustration, Eric Velhagen.

From the Editor



New Directions, Awesome Science, and Critical Inquiry

When we deal with pseudoscience and paranormal "science" in these pages, we are implicitly contrasting them to real science. Yet I have to agree with a complaint we have often heard: By concentrating almost exclusively on phenomena that are very probably *not* true or *not* real (or at least not quite what they are purported to be), we find ourselves constantly embracing a negative view of the subjects we tackle. There is a certain inevitability in this: When the evidence consistently fails to stand up to critical scrutiny, the claim itself must fail. And this happens time and time again with topics that are clearly pseudoscientific or paranormal.

No doubt people want a more positive view of the human endeavor. Is there nothing to any of this? we are constantly asked. Are there any mysteries you haven't been able to solve? Isn't there anything truly astonishing?

These are very human and very understandable questions. But in one sense I still find myself surprised to hear them. Because I have been fortunate to have been immersed in science throughout my career, I know that it is filled with wondrous unsolved mysteries, with revelations that astonish, with discoveries that truly do—or at least should, if we will only let them—move the mind and soul.

And despite the sea of information that really is available to anyone about such discoveries and adventures—in daily newspapers and in popular science magazines and books—it is clear that most of the public doesn't feel a part of this quest, doesn't share in any of that sense of intellectual adventure. Science is daily pushing back the frontiers of ignorance only to find still more mysteries lying ahead. There are always new layers of understanding to probe. It is an unending challenge, and, in my view, a continually exciting and stimulating one.

This is why we say that the supposed mysteries of the paranormal and fringe-science pale to insignificance in comparison with the latest discoveries and legitimate mysteries of real science. And it is why scientists and observers of science are always puzzled that so much of the public goes for the bogus rather than the genuine, since the latter is at least as exciting.

Where to find these wonders? Well, they are all around us. Good newsstands and libraries are filled with far more than even the best newspaper science sections can ever hope to present. Just as an example, here are the science or science-related period-

icals I read regularly: *Science, Nature, New Scientist, Science News* (these four are all weeklies—the first two essential scientific journals that also have important news and commentary sections, the last two lively and well-written science-news magazines), *Discover, Scientific American, American Scientist, Science Digest, Sky & Telescope, Planetary Report, Natural History, National Geographic, Smithsonian,* and *Air & Space.* And of course there are many other specialized publications. Any one of these can imbue readers with more of the sense of wonder and true scientific spirit than any of the pulp literature of the New Age and other subcultures. If you are deeply interested in mysteries and phenomena and you don't already read some of these publications, may I suggest you look them up?

All this is by way of noting some changes we are implementing in the SKEPTICAL INQUIRER. In our Fall issue we began by presenting several articles on misunderstandings about science and by giving you views of two extraordinary scientific lives (those of Richard Feynman and Luis Alvarez). In this issue we publish "The New Catastrophism" by space scientists David Morrison and Clark Chapman. They describe a truly extraordinary scientific revolution of the past decade—the new view about the importance of cosmic impacts and other catastrophic events and their effects on the evolution and history of the earth, including the life on it.

What could be more astonishing, for example, than the now leading view that our moon was formed by a collision of a Mars-sized object with the earth in a colossal event 4.6 billion years ago that launched into orbit material both from the earth's crust and mantle and from the colliding body? In writing an article on this for *Air & Space* a couple of years ago (December 1986/January 1987 issue), I talked to many of the scientists responsible for this new view of the moon's creation. The sociology of how it has become generally, if tentatively, accepted in just the past five years is fascinating indeed.

And what could be more awesome in its effect on all life on earth than the now well-known and fairly well accepted evidence of an enormous impact or series of impacts 65 million years ago whose global effects brought the Cretaceous period to an end and perhaps helped usher out the age of the dinosaurs?

Morrison and Chapman explicitly contrast the "New Catastrophism" with the catastrophic scenarios of Immanuel Velikovsky and the creationists. This illuminates the sometimes cloudy differences between real science and pseudoscience when they deal with similar dramatic topics.

In doing so the authors raise a question I myself had wondered about but never before had seen addressed: Did the bad name given catastrophism by Velikovsky and his followers—through their pseudoscientific approaches, their reliance on myths rather than evidence, and their focus only on the span of human history—delay by years or decades the attention of scientists to the growing evidence of other kinds of catastrophic impacts that have influenced earth history? If so, it is an important instance of pseudoscience hindering genuine science. I'd like to know what planetary scientists and historians of science think about this question.

Physicist Milton Rothman, who wrote "Myths About Science . . . and Belief in the Paranormal" in our Fall issue, this time turns his informed attention to the exciting controversy this past year over cold fusion. He considers whether this is another prominent case of "wishful science" and provides useful guidelines we can all use when the next instance of a

perhaps overenthusiastic scientific claim comes along.

Robert Bartholomew then takes a sociologist's look back at a widely publicized event of nearly a century ago—sightings of giant flying machines in the 1890s. He considers the airship wave as a case study in mass hysteria and provides rich (and explanatory) historical and technological context.

Anthropology professor James Lett presents a discussion of six guidelines for examining any claim. He uses these to teach critical thinking and, indirectly, the scientific method.

Biologist Michael Zimmerman gives the details of his survey of what newspaper managing editors know (or don't know) and believe about evolution—important in understanding how information and misinformation on such important issues get to the public.

These and other articles are part of our new, expanded effort to devote more attention to science, critical inquiry, and science education. Scientific and technological literacy has reached new lows, and this ignorance and indifference pose troubling challenges to education, economic competitiveness, the workings of representative democracies, and the very life and spirit of our society.

In future issues we hope to deal more with creative thinking and teaching, public understanding of science, and public misperceptions and social attitudes about science. We want to find new ways to reveal the fun and excitement of science and discuss some of its mysteries, major advances, and intense controversies. We want to continue our new effort to contrast real science with pseudoscience. We want to explore fields where legitimate science and perhaps spurious or misguided science are intertwined, and to help sort things out. And we want to examine some areas along the borders of science that just might be true.

And while we hope to stimulate a better appreciation of science, we also want to contribute to a better understanding of the workings of the human mind. We want to suggest, wherever possible, acceptable natural explanations for "anomalous" or "mystical" experiences. These experiences deeply trouble and puzzle many people who have them.

(Don't think we are abandoning hard-nosed investigative articles. In his special report, Philip J. Klass reveals virtual "smoking gun" evidence that one of the key documents of the notorious MJ-12 "crashed saucer" papers is a hoax. The Harry Truman signature on the "document" clearly appears to be a photocopy of a signature on an authentic Truman letter.)

And no matter what the subject, we hope to present it in a scientifically responsible, well-informed, interesting, and readable way. There's no reason why we can't all enjoy this voyage together.

We hope you will join with us in these new endeavors. Readership continues its long-term steady growth. We now have almost 40,000 subscribers. A number of you have been devoted readers since our earliest issues. Many others are new in the past year or so. We welcome you. We seek and appreciate everyone's comments, reactions, criticisms, suggestions. I regret that we long ago passed the point where all mail to the editor can be answered or acknowledged. But be assured that your comments are read with great interest, and often they end up shaping future articles and new directions.

—Kendrick Frazier

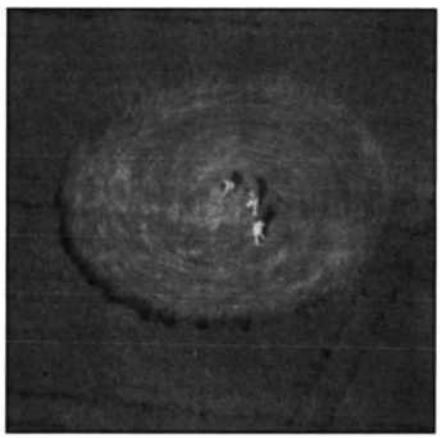
News and Comment

Crop Circles Create Rounds of Confusion

A genuine modern mystery appears every summer in the U.K.: crop circles. These are great, wide circles, often with an outer ring or two, that appear in fields of grain in southern England and Wales. All sorts of explanations have been proposed: demented hedgehogs, giant hailstones (possibly the contents of airplane lavatories), snared animals running in circles, mating deer, helicopters flying upside down, giant mushrooms, and recently, a hole in the ozone layer that allows ultraviolet rays to collapse the stalks. The tabloid newspaper *Today* reported that as of July 10, 1989, 165 rings had been reported, some up to 150 feet across. The plants' stems are unbroken, but flattened in swirls.

The circles even made media news in the United States, including a front-page feature article in no less than the *Wall Street Journal* ("Mysterious Circles in British Fields Spook the Populace") and an Associated Press article.

Reports of crop circles go back to 1948, but it has been only in the past decade that they have been so widespread. Most of the theories mentioned above have been dismissed as unlikely. *Today* explained that helicopters flying upside down do not leave crop circles, they leave piles of crashed helicopters. The London Meteorological Center noted that giant hailstones would probably have hit a city or two



Crop circles are modern mystery in the U.K.

by this time. Now, two new books have been published about the circles, and theories they propose have attracted considerable media attention.

In *The Circle Effect and Its Mysteries*, physicist Terence Meaden theorizes that the circles are caused by small, stationary wind vortices. Meaden runs the Tornado and Storm Research Organization in Bradford-on-Avon. Meaden earlier published an article in the *Journal of Meteorology* (May/June 1988: 203-212) on the natural atmospheric-vortex explanation, which has gained some support from meteorologists and officials. At somewhat the other extreme, in their book *Circular Evidence*, Colin Andrews and Pat Delgado propose that the circles are formed by an unknown

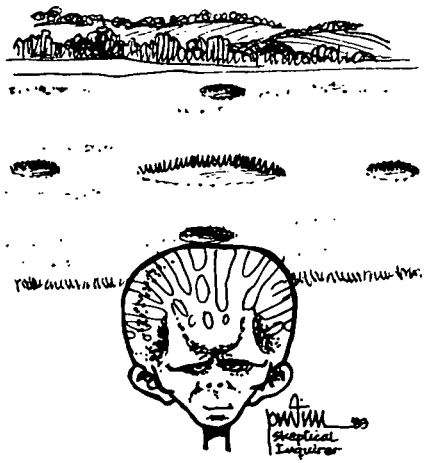
intelligence. Jenny Randles, who with Paul Fuller wrote an earlier book about the circles, *Controversy of the Circles,* criticizes this theory and its proponents. Randles is a member of BUFORA (the British UFO Research Association) and has published a number of books alleging government conspiracy to suppress evidence about UFOs. But she and Fuller complain that Andrews and Delgado are encouraging hoaxes; they also point out that Andrews and Delgado are consultants to *Flying Saucer Review.* Andrews and Delgado told the *Sunday Times* that they won't be fooled; they can identify genuine circles with dowsing rods.

Last October, the BBC devoted an episode of the television program "Country File" to the circles in Wiltshire. Andrews and Meaden talked about their different theories, and the BBC brought in a team who constructed a fake circle. By walking in the tractor lines, the team was able to reach the center of the field without leaving tracks. Then they linked arms and shuffled closely and carefully to make a very respectable circle. Andrews said it was obviously a hoax—it was too perfect. Unfortunately, the program did not make it clear whether Andrews was told it was a hoax before he went to look at it. The BBC said they were leaving a camera to watch the field. So far, nothing more has been reported.

Recently, Andrews has added a new twist. He and his partner found a lump of white jelly in the middle of one of the circles they investigated. This jelly has supposedly given everyone who examined it a severe cold within hours. *Today* reports that the jelly has been frozen and is being held in two laboratories, pending tests. In the meantime, dossiers have been submitted to Margaret Thatcher, the Ministry of Defence, the Ministry of Agriculture, and the Environment Secretary. A Tory MP has tabled two parliamentary questions. Things are getting serious, as shown by *Today*'s headline: "Defence probe jelly wobbles in great field circles riddle."

—*Wendy M. Grossman*

Wendy Grossman is founder of the British & Irish Skeptic *newsletter.*



'Science Guy' Blends Science and Humor, Is Skeptic Too

For the past two years, Seattle-area television viewers have been entertained by Bill Nye, the "Science Guy." A graduate engineer, Nye invented the Science Guy as a part humorous and part serious promoter of science. In addition to his weekly television appearances on KING-TV's "Almost Live" program, the Science Guy does several weekly radio spots.

Callers bombard Nye with all types of science-related questions. "Why is milk white?" and "How do steroids work for athletes?" are typical. One

caller asked why dumptrucks with pull-trailers have backward slanting pull-bars. (Incredibly, the Science Guy knew the exact reason.) The answers are a blend of true science and humor. By combining the technical language of science with the assumption that the caller is conversant with the detailed aspects of science, Nye affects a stereotypical Hollywood science genius. The listeners and viewers love this, and they laugh at their own ignorance while, at the same time, they soak up a bit of science.

"How does soap work?" one caller asks. The Science Guy replies: "Remember, when you studied molecular structure, there were molecules that were called long-chain molecules. One end is oleophilic, that's from the Greek meaning 'to love,' the opposite of phobic: to be afraid of. The other end is hydrophilic, water loving. So one end sticks to the water, *loving it* [said with emphasis]; the other end clings to the oil. It turns out that the oil's bond with the soap is stronger than its bond with the fabric and it is carried away with the water." Not a bad answer, especially if you consider that all of Nye's answers are extemporaneous.

Sometimes the questions are about paranormal topics: "Is 'lizard man' a real possibility?" "Did NASA really photograph a World War II aircraft on the moon?" The answer to this last query is in the form of a question: "Can you imagine the federal government keeping the lid on a secret like that since 1969?"

Despite a crowded schedule, which typically includes such events as flying to Florida to film an episode of the "New Mickey Mouse Club," the Science Guy has found time to help local skeptics. This past spring, Nye spoke about the need for critical thinking at the National Science Teachers Convention. He has participated in skeptics activities and has lectured at Pacific Lutheran University on the subject of extraordinary claims.

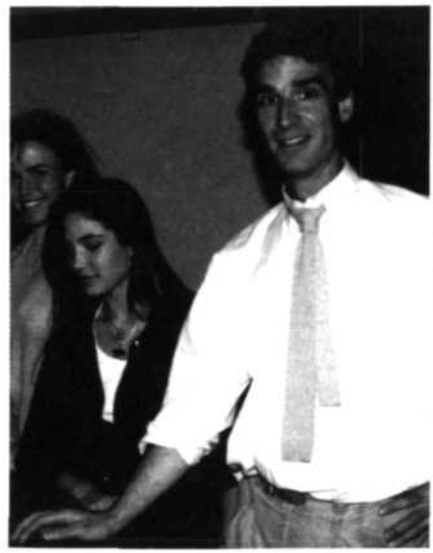


Photo courtesy Michael Dennett

"Science Guy" Bill Nye poses with students.

As a local celebrity who can handle a classroom as easily as he does an audience, Nye is a persuasive speaker for the scientific method. He says: "Along with getting kids interested in science we have to get them to question pseudoscience. So when I sign autographs I write: "Question things." And if there are two kids together I will write on the second one: "Are you sure?"

At the Pacific Lutheran University lecture, Nye did more than challenge the young people to ask questions about tales of the supernatural. A dynamic speaker, he captivated the class by supplying hard data about poltergeist events and firewalking. But perhaps his strongest point came at the end of the class when he equated the search for the truth of extraordinary claims with looking for a parking place in downtown Seattle. "How many parking places do we need," Nye asked? The answer, he

Our New Look

You will notice the different look of this issue of the SKEPTICAL INQUIRER. We have begun to implement a graphic redesign to give *SI* a fresh look. We hope it is more attractive, appealing, unified, and readable.

said, was one. Not ten or even two, and this is true of extraordinary claims. That is, he explained, we need only one *solid* item of evidence, one crashed flying saucer or one authentic case of reincarnation, in order to establish the existence of the phenomenon.

—*Michael Dennett*

Michael Dennett, a frequent contributor to the SKEPTICAL INQUIRER, lives in Federal Way, Washington.

Dowsing A Bestseller

Although the book sports only one author's name on the title page, noted writer Jan de Hartog claims to have had help from an unusual source in writing his latest novel, *The Centurion* (recently published by Harper & Row). In an interview in the July 7, 1989, *Publishers Weekly*, the 75-year-old Dutch author reports that his novel, set in Roman Britain, was "dictated to him by a mind in control of his dowsing pendulum."

As de Hartog relates in the preface to *The Centurion*, the book had its genesis in 1981, when he was dowsing one day in England's Shropshire countryside. That memorable day, he says, he not only discovered the buried ruins of a Roman castle but also realized that the pendulum had a story to tell. In the novel, the story is told in chapters that alternate between Roman times and the voice of a modern skeptic.

In spite of his remarkable claim, de Hartog calls himself a skeptic. His explanation of dowsing, however, appears to call for "skeptic" to be redefined as "believer": "Dowsing is a very *practical* thing, not a psychic thing. I think it is something else but don't ask me what it is. Most definitely not spirits. It has to do with a magnetic field or whatever—or maybe telepathy. If you call that 'psychic,' okay, but I don't."

Publishers Weekly reports that de Hartog is already at work on his next book, "also about arcane powers." The author wrote a million-copy bestseller more than 50 years ago, when he was 24, and *Publishers Weekly* predicts that *The Centurion* could repeat the earlier success. If so, other writers will likely begin swinging dowsing pendulums of their own—most would do more than that for a chance at bestsellerdom!

—*Lys Ann Shore*

Lys Ann Shore is a writer and editor in Washington, D.C., who writes frequently for the SKEPTICAL INQUIRER.

Monsters on the Beach: A Hoax Revealed

IN FEBRUARY 1984 a series of giant three-toed footprints, consistently measuring 14" × 11", were found along the beach near Clear-

water, Florida. The tracks made national news, and zoologist Ivan T. Sanderson visited Clearwater to investigate. A county sheriff's department spokesman was quoted as saying he had "studied the footprints carefully and was personally assured that, if a prank, it was one of the most masterful ever perpetrated." Sanderson agreed, the tracks were authentic. They were, the scientist speculated, made by some form of giant penguin, which he named "Florida Three-Toes."

The tracks continued to show up for years, even appearing along the banks of the Suwannee River, more than a hundred miles from Clearwater. Witnesses confirmed that a strange creature with a "head shaped like a hog's" was prowling the beaches.

No creature was ever caught, and for most the mystery was never solved. Not solved, that is, until Jan Kirby, a freelance writer, ran right into the real story behind the footprints. It turns out that two Clearwater businessmen, Al Williams and Toni Signorini, hoaxed the whole thing.

"The footprints were Al's idea," said Signorini of his late partner, adding that he had fun helping to make the tracks. Williams had seen some photographs of dinosaur tracks in the *National Geographic* and, with Signorini's help, tried to make a set of fake feet. After several attempts with concrete they decided something heavier would be needed to make good impressions. Eventually they got a foundry worker in St. Petersburg to cast the feet in iron.

Signorini revealed his secret to friends Bud and Joanne Lobaugh in 1965, but it was not until recently, when Kirby came to interview the Lobaughs, that any reporter was let in on the story. With Kirby present, Signorini hauled out an old cardboard box from under a workbench at his place of business and opened it up to reveal a set of cast-iron feet with a pair of black sneakers attached to the top. Each "foot" weighs about 30 pounds, Signorini explained, adding, "I had to be very careful not to get out of the boat too soon when Al rowed me to the beach." By swinging the heavy feet, Signorini discovered, he could easily make four- to six-foot strides. The two men continued the hoax for almost ten years before losing interest.

It was all done "for fun," says Signorini, who is enjoying the recent publicity as much as participating in the original hoax, but it was only after being encouraged by close personal friends that Signorini agreed to reveal the story.

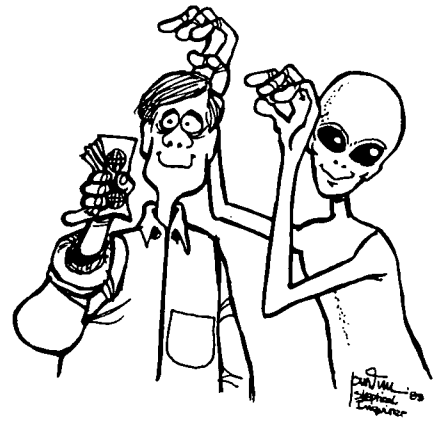
The pranksters had received a lot of outside help with the hoax. Several people called the police to say they saw the monster. Some area residents were frightened by the footprints, while others were skeptical. Retired police chief Frank Daniels told Kirby, "I don't think any of the [Clearwater] cops took it seriously." Indeed, Daniels claims that they suspected Williams "because he usually called in the reports of the monster and was such a local prankster, but we could never prove it."

Signorini's story is unquestionably authentic. Not only does his narrative fit the events, it turns out that both Williams and he had revealed the story to numerous people over the years. Moreover, his cast-iron feet are identical to the plaster casts of "Florida Three-Toes" held by Sanderson in 1948 newspaper photos.

Unfortunately, unlike the original prank, the real story has received only modest local coverage.

—Michael R. Dennett

Communion and Intruders: UFO-Abduction Groups Form



Two new UFO groups that will promote the idea of "UFO-abductions" have been created by the two rival gurus of the new cult—Whitley Strieber and Budd Hopkins. Each group has been named for the books that made each of these men famous. Strieber's is called the "Communion Foundation" and Hopkins's "The Intruders Foundation" (IF).

Hopkins is seeking contributions—tax-deductible—while Strieber is financing his new foundation with some of the more than $1 million in royalties earned from his UFO-abduction books. But Strieber says that as the foundation's "obligations grow we anticipate soliciting contributions."

Both groups will publish newsletters that focus on UFO-abduction claims. Strieber already has published the first issue of his quarterly newsletter—*The Communion Letter*—whose annual subscription price is $20.00. Hopkins says that a $25.00 contribution to IF "insures your membership and receipt of at least four copies of the *IF Bulletin*."

The two new organizations and their publications will compete with the nation's two major UFO groups—MUFON (Mutual UFO Network) and CUFOS (Center for UFO Studies)—for members and contributors, despite Hopkins's statement to the contrary. It would be surprising if Hopkins—a frequent contributor in the past to the *MUFON UFO Journal*—published his latest case reports in MUFON's journal rather than in his own newsletter.

Strieber, who first "discovered" he was a UFO-abduction victim under Hopkins's tutelage, subsequently broke with Hopkins. When MUFON and CUFOS questioned Strieber's abduction tales but continued to endorse similar accounts reported by Hopkins, Strieber broke with them too. Not surprisingly, Strieber offers no disclaimer about competing with MUFON and CUFOS.

In the introductory issue of the *Communion Letter*, Strieber writes: "Over the past two years I have been receiving an average of thirty letters a day from people who have had an encounter. . . . There must be hundreds of thousands of us. . . . And what an extraordinary group of people we are. . . . You are not generally suffering from mental illness. You're not even kooky!"

Strieber, in an oblique criticism of Hopkins, writes: "There are only a handful [of letters] that mention anything like [the] 'alien rape' scenario that is the main feature of books written by UFO 'abduction' researchers. It almost seems that you have to be hypnotized by one of these researchers, or become convinced by their books, in order to remember something like this.

"It seems important to avoid being hypnotized by 'abduction' researchers. They are not helping us to overcome our fears and build our relationship with the visitors. . . . It is beginning to seem more and more that the whole abduction/alien rape scenario may be a fantasy that started in the minds of the

'abduction' researchers themselves." (This echoes my own views, as detailed in my book *UFO-Abductions: A Dangerous Game.*)

In the first issue of Strieber's newsletter, he seeks reader reactions to the possibility of holding a national conference "at a resort or center in the upstate New York area where Whitley's cabin is located and where so many sightings and encounters are taking place. . . . The primary purpose of the gathering would be to meet each other, to come together in a warm and supportive setting, and talk about our experiences."

Strieber's proposed national conference for "abductees" would compete with one held annually for the past several years in Laramie, Wyoming, by Leo Sprinkle, a pioneer in the UFO-abduction field. Hopkins earlier established "support groups" for "abductees" in a number of metropolitan areas and Strieber disclosed he is doing the same.

Strieber reports that his foundation "is now arranging for witnesses who remember needle intrusions [in their heads] or have strange scars, to undergo Magnetic Resonance Imaging [MRI] scans of the areas where the intrusions took place." Strieber noted that his own MRI tests revealed "prominent unexplained spots in my brain."

The first issue of the *Communion Letter* highlights the themes of articles planned for future issues. One is "How to contact the visitors and do I want to do it? You can get in touch with them, and even draw them into your life. But is that wise?" Another: "Cluster sightings. Sighting reports seem to cluster around specific areas. What are some of these places and what has happened there?"

Hopkins, in describing the objectives of his IF foundation, tries to reassure MUFON and CUFOS that his group is not a competitive threat. He said: "IF is only concerned with the UFO abduction phenomenon, and will cooperate fully and *non-competitively*" with MUFON and CUFOS. (Emphasis supplied.)

To demonstrate this cooperation, Hopkins offers a special combination subscription to his *IF Bulletin,* to the *MUFON UFO Journal,* CUFOS's *International UFO Reporter,* and *UFO* magazine for $100.00. If purchased separately, subscriptions to the four publications would cost a total of $83.00. Hopkins said the combination "affords one-check convenience [but] it does not offer you a financial savings. It means only that in helping IF you are also providing support for the most essential periodicals in the field of UFO research and demonstrating the depth and seriousness of your commitment to the subject. Your exposure to all four publications will help to further elevate the standards of each, and to deepen our cooperative spirit."

Yet despite Hopkins's assurances and "generous" combination offer, his new group and its publication will necessarily compete with MUFON and CUFOS for members and contributions—if only because claims of UFO-abductions have become a dominant element of "New Age UFOlogy."

With the limited space available in the MUFON and CUFOS journals, when their editors face the choice of publishing a report of a seemingly mysterious light in the night sky (which could have a prosaic explanation) or a report of an exotic abduction experience with ETs, they are likely to opt for the latter. And if they don't, they will lose member-readers to the new Strieber and Hopkins publications that pander to such exotic fare.

—*Philip J. Klass*

Notes of a Fringe-Watcher

MARTIN GARDNER

The Great Urantia Mystery

No holy Bible offered to the Western world in the past few centuries is thicker, heavier, or stranger than *The Urantia Book.* This 2,097-page, 4.3-lb. volume purports to be written entirely by extraterrestrials and channeled through an unknown earthling. To members of the Urantia Brotherhood, a steadily, quietly growing cult headquartered in Chicago, the book supposedly contains the earth's fifth revelation from God, superior to mainline Christianity and destined to transform the world.

Nothing could persuade me to read every line of this monstrous mishmash of claptrap interspersed with puddles of pious platitudes, but I have perused it carefully enough to get the drift of its wild science-fiction themes. In a way, the book is more amusing than the Book of Mormon, translated from hieroglyphics by Joseph Smith with the aid of a pair of magic spectacles called the Urim and the Thummim. It is almost as funny as the ravings of L. Ron Hubbard or Sun Moon, the channeled fiddle-faddle of Jane Roberts or J. Zebra Knight, or the work of such earlier mountebanks as Mary Baker Eddy and Madame Blavatsky. Indeed it may be the largest, most fantastic chunk of channeled moonshine ever to be bound in one volume.

The book's first two thirds concern cosmology and the history of Urantia (pronounced you-ran'-sha), the name for Earth. We live on the 606th planet in a system called Satania, which includes 619 imperfect, evolving worlds. Urantia's grand universe number is 5,342,482,337,666. Satania, with its headquarters at Jerusem, is in the constellation of Norlatiadek, part of the evolving universe of Nebadon. Nebadon in turn belongs to a superuniverse called Orvonton. Orvonton and six other superuniverses, each unfinished and still evolving, revolve around the central universe of Havona. At the core of Havona is the flat, timeless, motionless Isle of Paradise. This is the dwelling place of the Great I AM, the ultimate, eternal, infinite Deity. His triune nature (Father, Son, and Spirit) is symbolized on the Brotherhood's stationery by three concentric blue circles.

The Urantia Book swarms with a thousand neologisms, but they lack the music of the made-up names in the fantasies of Lord Dunsany or James Branch Cabell and the punning humor of *Finnegans Wake.* Below I AM are billions of lesser gods and angels, including a finite deity who is evolving toward becoming the Supreme Being of all evolving universes. Pages would

be needed to list all their generic names. There are the Truth Revealers, the Mystery Monitors, the Universal Censors, the Divine Counselors, the Perfectors of Wisdom, the Ancient of Days, and a hundred others.

Technical Advisors include Supernaphim, Seconaphim, Tertiaphim, Omniaphim, Seraphim, Cherubim, and Sanobim. The Master Physical Controllers (some are machines) are the Power Directors, Mechanical Controllers, Energy Transformers, Energy Transmitters, Primary Associators, Secondary Associators, Frandalanks, and Chronoldeks. On Urantia's Advisory Council are Onagar, Masant, Onamonalonton, Orlandof, Porshsunta, Singlangton, Fantad, Orvonon, Adam, Eve, Enoch, Moses, Elijah, Machiventa Melchizedek, John the Baptist, and 1-2-3 the First.

Lucifer, one of three archangels who rebelled, is now the deposed sovereign of Satania, named after Satan, his first lieutenant. Under Satan are lesser rebels, such as Caligastia and Beelzebub. All these fallen angels are now imprisoned on Satania. Some have repented. Those who never repent will eventually be annihilated.

Urantia's first two humans were not Adam and Eve. They were the black-eyed twins Andon and Fonta, children of beasts. The Garden of Eden was not established until almost a million years later. Adam and Eve were eight feet tall, had blue eyes, and bodies that shimmered with light. Their offspring founded what the book calls the "Violet race." Although Adam and Eve disobeyed higher authorities by eating the forbidden fruit, there was no "fall of man." It is unthinkable that a loving God would allow us to suffer for the sins of Adam and Eve. The pair have since been "repersonalized" and live in Jerusem. Like the Koran and the Book of Mormon, *The Urantia Book* retells Old Testament yarns, but with many more corrections and embellishments.

Human souls are created at birth. When we die, our souls and their Thought Adjusters survive. Thought Adjusters are indwelling "fragments" of God. In due time we are reassembled on another planet, the start of a long series of reincarnations from planet to planet, universe to universe, until we finally reach Paradise, where we fuse with God. Guardian angels and indwelling Thought Adjusters help us along the way. The pilgrimage is not monotonous. There will be endless adventures and surprises.

Neologisms contaminate every page: mind-gravity circuit, absonity, reflectivity, trinitization, eventuation, finaliters, abandonters, tabamantia, midwayers, grandfada, everywhereness, ultimate quartan integration, and hundreds more. The authors of what cult members call "The Papers" have a curious compulsion to divide things into sevens. The Thought Adjusters, for instance, come in seven flavors: virgin, advanced, supreme, vanished, liberated, fused, and personalized. Here is a sample gem of opaque prose:

> The triodity of actuality continues to function directly in the post-Havona epochs; Paradise gravity grasps the basic units of material existence, the spirit gravity of the Eternal Son operates directly upon the fundamental values of spirit existence, and the mind gravity of the Conjoint Actor unerringly clutches all vital meanings of intellectual existence.

There are huge sections of phony science. X-rays, we are told, disintegrate atoms at the sun's core. The sun's "crust" as well as the entire

cosmos is permeated with calcium. An electron consists of a hundred smaller units called "ultimatons." And so on.

The last third of the book fleshes out in vast detail the life and teachings of Jesus. It seems that Paul, Peter, and others outrageously distorted this history, but records supplied by the guardian angel of the Apostle Andrew have set matters straight. We learn such things as that the young Jesus toured the Roman world accompanied by Gonad and Ganid, natives of India. The Man of Galilee was none other than Michael of Nebadon, one of hundreds of thousands of Sons of the Eternal Son, who is part of the ultimate trinity. He was the creator of our local universe. Coming to Urantia was his seventh and last incarnation as one of God's creatures.

Many of Jesus' miracles had natural explanations. He did not turn water to wine—he just called for wine—but the miracle of the loaves and fishes was genuine. After he cured a lunatic, a dog chased a herd of swine into the sea, giving rise to the legend that devils left the man to enter the pigs. Lazarus was the only person Jesus raised from the dead (the others were merely sleeping). Thanks to Lazarus's Personalized Adjuster, he was allowed to reenter his corpse. He lived to be 67, finally dying of the same disease that first killed him.

Although Jesus was crucified, his death was in no way a sacrificial blood atonement. Original sin is another of the Bible's grave errors. After Christ's death, entities rolled the stone from the sepulchre and snatched his body. When Jesus reappeared to his followers, it was in a reconstituted form. Eventually he will return to Urantia, but we have no inkling of when or where.

Why do I waste time on such a pretentious, preposterous tome? Two reasons. One, the Urantia movement

William S. Sadler (1964)

is gaining new recruits, thanks to the current channeling craze. More interestingly, the book's origin is a capital mystery. No one knows who wrote it.

The book was published in 1955 at the instigation of one of the strangest characters in our nation's religious history. He was William Samuel Sadler (1875-1969), surgeon, psychiatrist, and one-time ordained Seventh-Day Adventist minister who held prominent posts in Adventist hospitals. He was a close associate of the church's inspired prophetess Ellen Gould White. Because Adventists vigorously condemn Spiritualism and the occult, Sadler was impelled to write two books debunking such things: *The Truth About Spiritualism* (1923) and *The Mind at Mischief: Tricks and Deceptions of the Subconscious and How to Cope with Them* (1929).

In an Appendix to *The Mind at Mischief* Sadler writes that with one or two exceptions "all cases of psychic phenomena which have come under my observation have turned out to be those of auto-psychism." By this he means the influence of the subconscious. One phenomenon he could not

debunk involved an unnamed man who while in a deep trance became a "clearing house for the coming and going of alleged extraplanetary personalities." Sadler goes on to say that "all the information imparted through this source has proved to be consistent within itself. . . . It is essentially Christian and is, on the whole, entirely harmonious with the known scientific facts and truths of this age."

Was this unknown man Sadler himself? Could it have been his wife, her identity concealed by calling her a man? (His wife, Lena Kellogg, was the niece of Dr. John Kellogg, creator of Kellogg's Corn Flakes. He was a loyal Adventist until Ellen White excommunicated him.) All we know is that in the early twenties Sadler started in Chicago a group of some 150 people called "The Forum" to study the new revelations. His son, William Sadler, Jr., a psychiatrist (he died in 1963), was the Forum's first president and the author of two books about the Urantia papers. The Brotherhood's current headquarters is a three-floor brick mansion in Chicago that was the home of both Sadler senior and his son.

Harold Sherman, an Arkansas psychic, was a Forum member. In his book *How to Know What to Believe* he devotes a wild chapter to a conversation with the elder Sadler. Sadler said that the extraterrestrials were eager to answer questions. Forum members submitted 4,000. A few weeks later the trance channeler produced 472 handwritten pages that answered all 4,000 questions. More questions and answers followed until the revelations stopped—we are not told why—in the mid-thirties.

"The book is eventually to be published," Sadler told Sherman, "without any human personalities to be identified with it in any way and no authorship to be ascribed to it.

William S. Sadler, Jr.

These higher beings have refused to use their own names and have only specified their *type* of being in the universe. There are only a few of us still living who were in touch with this phenomenon in the beginning, and when we die, the knowledge of it will die with us. Then the book will exist as a great spiritual mystery, and no human will know the manner in which it came about."

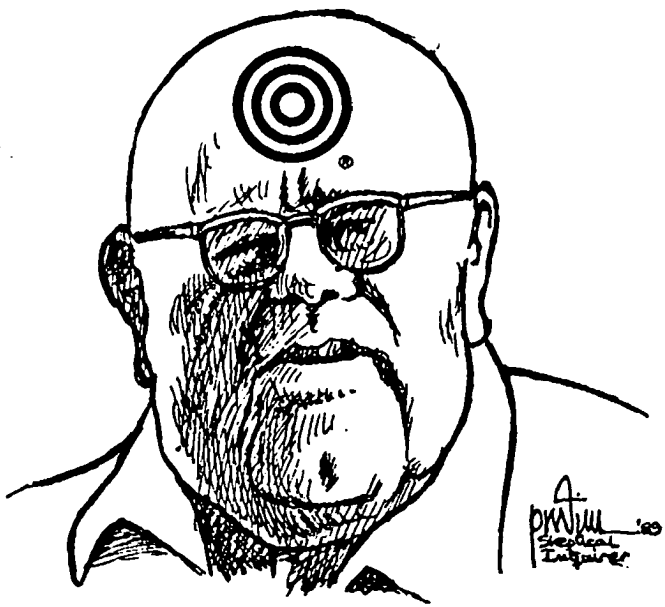
To this day the origin of the book remains a total enigma. Here is all the Brotherhood will say about it. I quote from their pamphlet "The Urantia Book: The Question of Origin":

> Who the human being was whose versatile Thought Adjuster aided in bringing the fifth epochal revelation to our world will never be known because the revelators asked the few people who knew to take a pledge of secrecy. They did not want any human beings to be mystically associated with *The Urantia Book*. It is amazing that the authors of the Urantia Papers tell us as much as they do. Upon reflection, you will recognize the persistent questions about the unrevealed "details" concerning the origin of the book as a psychological parallel to the reoccurring demand put to Jesus, "Show us a sign."

Now let us turn to the human side of the story which may be interesting, but has no spiritual significance. In preparation for presenting the papers of the fifth epochal revelation and placing them in the custody of a responsible group of human beings, the revelators made contact with a small group of people in Chicago. The leaders of this group were asked by the revelators not only to refrain from revealing the identity of the individual associated with the presentation of the papers, but also not to discuss details related to the arrival of the papers. We will, therefore, never know just where or how the papers were received. Even these early leaders were puzzled; no human being knows just how this materialization was executed. The reason given for this request of secrecy is the revelators are determined that future generations shall have *The Urantia Book* wholly free from mortal connections.

Like John Kellogg, Sadler broke with the Adventists when he became convinced that Ellen Gould White's visions were delusions. And this was the man who later gave to the world the biggest blast of subconscious rubbish ever put in print! In 1958 Sadler wrote: "While we are not at liberty to tell you even the little we know about the technique of the production of the Urantia papers, we are not forbidden to tell you how we did *not* get these documents." He then lists nine phenomena that he says were not involved: automatic (that is, subconscious) writing, talking, hearing, seeing, thinking, remembering, acting, personalization, and combined and associated psychic states.

Many aspects of Adventist doctrine, such as the denial of hell and the soul sleeping between death and reconstitution, appear in *The Urantia Book*. In describing Jesus on the cross, an alien entity quotes him as telling the good thief: "Verily, verily, I say to you today, you shall sometime be with me in Paradise." In the King James Bible a comma appears before the word *today*, not after, and there



is no "sometime," implying that on that very day the thief will enter Paradise. Adventists insist that the comma was misplaced. In keeping with this view, *The Urantia Book* shifts the comma. This is one of many indications that a former Seventh-Day Adventist channeled the Urantia papers.

Now in its ninth printing, *The Urantia Book* can be obtained by sending $36.50 (this includes postage) to the Urantia Foundation, 533 Diversey Parkway, Chicago, IL 60614. (A French edition costs $40.65.) The cult also issues books, pamphlets, study aids, a quarterly journal, and a directory of study groups you can join. The *Concordex* (an index to the book) and *Paramony* (25,000 cross-references between *The Urantia Book* and the Bible) are available from the Jesusonian Foundation, 1790 Thirtieth Street, Boulder, CO 80301. William Sadler, Jr.'s two books are obtainable from the Second Society Foundation, 333 N. Michigan Avenue, Chicago, IL 60601.

The senior Sadler was the author of dozens of popular books on health, diet, and sex, many of them written in collaboration with his wife. They bear such titles as *Modern Psychiatry* (896 pages); *Cause and Cure of Headaches, Backaches, and Constipation;* and *Sex Life Before and After Marriage.* Only one of his books is now in print (reissued by Gordon Press): *Race Decadence: An Examination of the Causes of Racial Degeneration in the United States.* You will find entries on him in early editions of *Who's Who in America* and in the ninth edition of *American Men of Science.*

Martin Gardner's latest book is How Not to Test a Psychic *(Prometheus Books, 1989).*

We invite you to join us in

Washington, D.C.

for the

1990 CSICOP Conference

to be held at

Hyatt Regency Crystal City
(at Washington National Airport)

Critical Thinking and Scientific Literacy

Friday, Saturday, and Sunday
March 30 through April 1
(Additional speakers to be announced.)

Friday, March 30

9:00 A.M. - 12:00 NOON: SCIENTIFIC LITERACY

Moderator: Paul Kurtz, CSICOP Chairman, professor of philosophy SUNY, Buffalo

Michael Zimmerman, associate dean and professor of biology, Oberlin College

John Paulos, professor of mathematics, Temple University, author of *Innumeracy*

Robert Crease, asst. professor of philosophy, SUNY at Stony Brook

12:00 NOON - 2:00 P.M.: Lunch Break

2:00 P.M. - 5:00 P.M.: Two concurrent sessions

I. CRITICAL THINKING IN PUBLIC EDUCATION

Moderator: Paul MacCready, scientist, engineer, AeroViroment, Inc.

Anton Lawson, professor of zoology, Arizona State University

Richard Schrock, assistant professor of biology, Emporia State University

Steven Hoffmaster, professor of physics, Gonzaga University

II. (1) PUBLIC POLICY AND THE PARANORMAL
(2:00 - 4:00 P.M.)

Ray Hyman, professor of psychology, University of Oregon, Eugene

Claiborne Pell, U.S. Senator from Rhode Island

II. (2) EVERYTHING YOU EVER WANTED TO KNOW ABOUT UFOs BUT WERE AFRAID TO ASK
(4:00 - 5:00 P.M.)

Philip J. Klass, aerospace journalist and UFO investigator

(program continued on next page)

5:00 P.M. - 8:00 P.M.: Dinner Break

8:00 P.M.: KEYNOTE ADDRESS

Gerard Piel, chairman emeritus, *Scientific American,* former president of AAAS

Saturday, March 31

9:00 A.M. - 12:00 NOON: ASTRONOMY AND PSEUDOSCIENCE

Andrew Fraknoi, astronomer, executive director, Astronomical Society of the Pacific

David Morrison, chief, Space Science Division, NASA

Bernard Leikind, physicist, General Atomics Inc.

12:00 NOON - 2:00 P.M.: CSICOP LUNCHEON (optional)

Hosted by Kendrick Frazier and Philip J. Klass

2:00 P.M. - 5:00 P.M.: Two concurrent sessions

I. PSYCHIC PHENOMENA AND THE LAWS OF PHYSICS

Moderator: James Alcock, psychologist, York University, Toronto

Milton Rothman, professor of physics (ret.), Philadelphia

Robert Jahn, dean emeritus, School of Engineering, Princeton

Victor Stenger, professor of physics and astronomy, University of Hawaii

Menas Kafatos, professor of physics, George Mason University

II. ANIMAL RIGHTS AND SCIENTIFIC RESEARCH

Moderator: Lee Nisbet, professor of philosophy, Medaille College

Randall Lockwood, director, Higher Education Program, Humane Society of the U.S., Washington, D.C.

Larry Horton, vice-president of public affairs, Stanford University

Franklin Loew, dean, School of Veterinary Medicine, Tufts University

7:00 P.M. - 10:00 P.M.: AWARDS BANQUET (optional)

Awards Presentation: Paul Kurtz, CSICOP Chairman

"Public Understanding of Science," Richard Berendzen, president, American University

Bill Nye, the "Science Guy"

(program continued on next page)

Sunday, April 1

9:00 A.M. - 10:30 A.M.: OPEN FORUM
with CSICOP Executive Council

11:00 A.M. - 1:00 P.M.: THE SKEPTICS' PERSPECTIVE

James McGaha, chairman, Tucson Skeptical Society, Mario Mendez-Acosta, chairman, Mexican Society for Skeptical Investigation, Al Seckel, exec. director, Southern California Skeptics, and others

REGISTRATION: Please use form below. Preregistration is advised. (Registration fee does not include meals or accommodations.)

Conference Registration Form

1990 CSICOP Conference, P.O. Box 229, Buffalo, NY 14215

☐ **YES, I (we) plan to attend the 1990 CSICOP Conference.**

☐ $89 registration ($99 after January 31, 1990) for ____ person(s), includes Keynote Address. (Students $45.00) $_____

☐ $20.00 Saturday Luncheon for ____ person(s) $_____

☐ $30.00 Saturday Awards Banquet for ____ person(s) $_____

☐ $7.00 Keynote Address (this fee is for nonregistrants only) for ____ person(s) $_____

☐ Check enclosed

Charge my MasterCard ☐ Visa ☐

Acct. # _____ Exp. _____

Name _____

Address _____

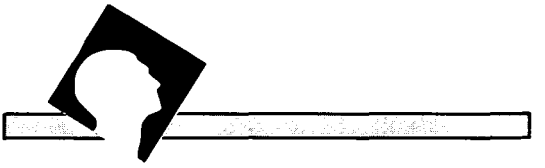
City _____ State _____ Zip _____

☐ No, I will not be able to attend the conference, but please accept my contribution (tax-deductible) of $_____ to help cover the costs of this and future CSICOP special events.

ACCOMMODATIONS: Hyatt Regency Crystal City at Washington National Airport. Telephone 703-418-1234. Single occupancy $85, double occupancy $95, triple occupancy $105, plus tax. 'Singles can arrange double occupancy when they call hotel for reservations.. For these special rates, request accommodations for CSICOP Conference. These rates will be honored for any night s from March 27 through April 3. Check-in time 3:00 P.M.; check-out time 12:00 NOON. Cutoff date for room bookings February 28, 1990. Complimentary van service to and from Washington National Airport.

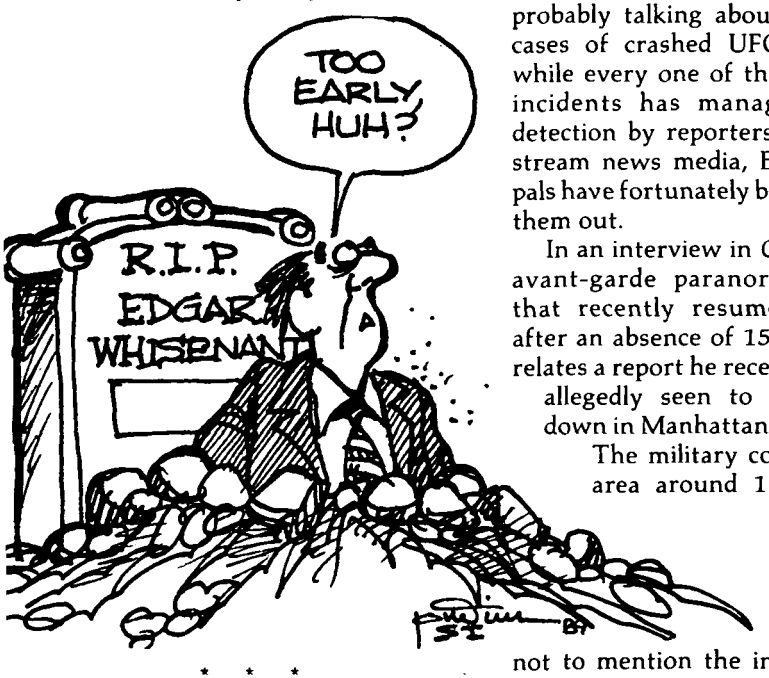
For further information, call or write: Mary Rose Hays, 1990 CSICOP Conference, P.O. Box 229, Buffalo, New York 14215, or call 716-834-3222.

Psychic Vibrations



ROBERT SHEAFFER

Edgar Whisenant attracted a lot of attention last year with his book *Eighty-eight Reasons Why the Rapture Will Be in 1988* (*SI*, Spring 1989: 257). Of course it didn't happen; the faithful did not fly up into the air September 11 that year, and the world still goes on pretty much as before. But Whisenant now says, "My calculations were off by one year." If the rapture has still not occurred by the time you read this, will he be saying his calculations were off by two years?



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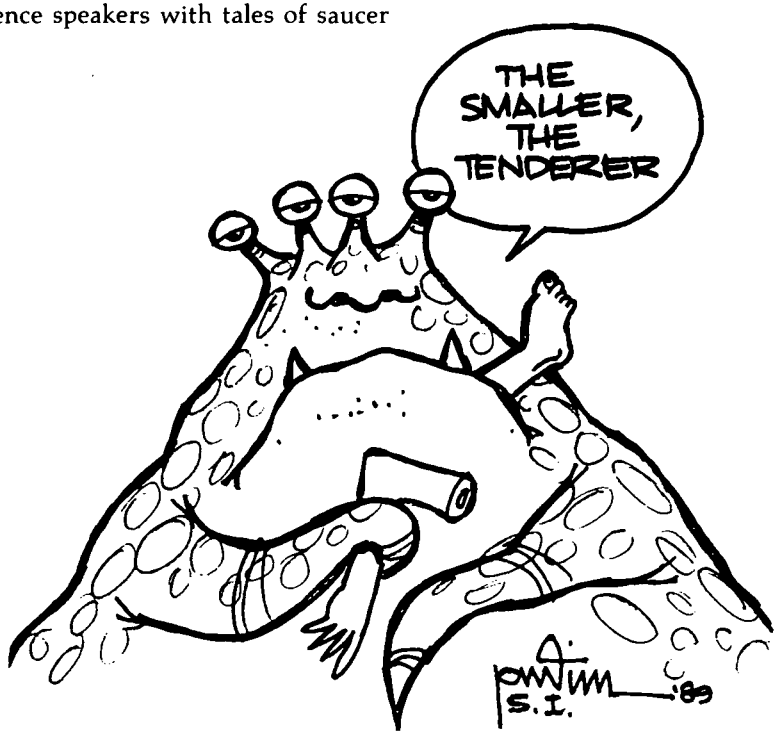
Most readers know about the flying saucer that is said to have crashed in Roswell, New Mexico, and about a couple of others that supposedly came down thereabouts (the southwest desert seems to induce mechanical problems in UFOs flying over it), but it's beginning to seem that these are just the tip of the iceberg. UFO writer and entrepreneur Timothy Green Beckley, who peddles piles of paranormal pamphlets under the labels "Global Communications" and "Inner Light," reveals that "there's not one case, there's not a dozen cases—we're probably talking about 100 or more cases of crashed UFOs now." And while every one of these remarkable incidents has managed to escape detection by reporters for the mainstream news media, Beckley and his pals have fortunately been able to sniff them out.

In an interview in *Caveat Emptor*, an avant-garde paranormal magazine that recently resumed publication after an absence of 15 years, Beckley relates a report he received of a saucer allegedly seen to come crashing down in Manhattan's Central Park. The military cordoned off the area around 113th Street as they searched for debris and told people who happened upon the site not to mention the incident. All the New York City papers must have dutifully complied, since not a word about this incident appeared in any of them.

The magazine's editor, Gene Steinberg, asked Beckley, "So you're saying that a UFO could crash anywhere in this country, even in the largest city in the nation, and, for the most part, the military could keep it quiet?" Beckley replied, "Well, to be honest with you, UFOs hardly make it into the papers in New York," going on to explain how New Yorkers seem to have tired of the whole subject. Now it is a well-known fact that New Yorkers have become jaded from their constant exposure to bizarre sights, but it seems to me that even the most "I've-seen-it-all" New Yorker might come at least a little unglued should a flying saucer be seen crashing down in the middle of town.

In other news on the saucer front, James Moseley reports from the 1989 MUFON Convention in Las Vegas what must be the ultimate in humiliation for saucerdom. After the reporters at a sparsely attended news conference had been regaled by conference speakers with tales of saucer crashes, cattle mutilations, and the like, MUFON's president Walt Andrus opened the floor to questions from the media—*and there were none!* Also at that conference, John Lear, whose bizarre claims of the U.S.-government collusion with vicious space aliens have previously enlivened this column, announced his retirement from UFOlogy. Lear was clearly miffed that while he was the MUFON conference chairman and did much of the organizing, when the big day arrived MUFON refused to let him speak at the main event! Perhaps they were afraid that Lear would repeat before the few reporters present what he had earlier told Paul Harasim of the *Houston Post:* that the majority of American children listed as missing each year have actually been eaten by space aliens. UFOlogy will indeed be less colorful without the contributions of John Lear, but there are plenty of other rising young stars whose imaginations are every bit as fertile as his.



SPECIAL REPORT

New Evidence of MJ-12 Hoax

PHILIP J. KLASS

A "smoking gun" recently has been discovered that confirms beyond any doubt that the alleged "Top Secret/Eyes Only" MJ-12 documents, which seemingly showed that the U.S. government had captured at least one crashed flying saucer and the bodies of several extraterrestrials in 1947, are counterfeit.

The MJ-12 documents were made public on May 29, 1987, by William L. Moore and two associates, Jaime Shandera and Stanton T. Friedman. If authentic, the documents would confirm claims made in a 1980 book, *The Roswell Incident*, authored by Moore and Charles Berlitz, of "Bermuda Triangle" fame.

Examination indicates signature on key MJ-12 document was photocopied.

The MJ-12 papers include what purports to be a one-page memorandum from President Harry Truman to Defense Secretary James Forrestal, dated September 24, 1947—several months after the alleged crashed-saucer recovery in New Mexico. The letter authorized Forrestal and Vannevar Bush to create a top-level Majestic-Twelve (MJ-12) group to analyze the crashed saucer and alien bodies. The other MJ-12 document is a lengthy status report on MJ-12's crashed-saucer research efforts, seemingly intended to brief President-elect Eisenhower, dated November 18, 1952. The briefing paper seemingly was written by Rear Admiral R. H. Hillenkoetter, who had earlier headed the Central Intelligence Agency and allegedly was a member of MJ-12.

A roll of 35-mm film, together with photocopies of these two "Top Secret/Eyes Only" documents, reportedly arrived at the home of Shandera by mail from an unknown sender on December 11, 1984. Moore, Shandera, and

Friedman claim that they spent the next two and a half years investigating the authenticity of the MJ-12 papers before making them public in May 1987.

Moore and his associates said that their lengthy investigation had failed to turn up anything that would cast doubt on the authenticity of the MJ-12 papers. My own investigation revealed many reasons to suspect the MJ-12 papers were counterfeit. (See my two articles published in *SI:* Winter 1987-88, p. 137; Spring 1988, p. 279.)

Recently, I discovered hard physical evidence that demonstrates that these documents are counterfeit. This is based on the fact that a person's handwritten signature is like a snowflake—no two are ever *identical.*

Before the advent of the "Xerox Era" and "signature-machines," the very existence of two identical signatures was considered to be *"very strong evidence of forgery,"* according to the book *Questioned Documents,* by Albert S. Osborn, published in 1978. Osborn notes that "the fact that two signatures are very nearly alike is not alone necessarily an indication of forgery of one or both but the question is whether they are *suspiciously alike."* (Emphasis added.)

The "Harry Truman" signature on the MJ-12 Truman memorandum of September 24, 1947, is *suspiciously like* the signature on the letter that Truman wrote to Vannevar Bush on October 1, 1947, the original of which I found in the Bush collection in the Manuscript Division of the Library of Congress and made several photocopies of it there.

In signing the authentic letter to Bush, Truman's pen accidentally skidded slightly, creating a small extraneous mark on the left upper part of the right-hand vertical stroke in the letter "H." *The same "skidmark" appears on the Truman signature of the MJ-12 memo of September 24, 1947.* It is slightly heavier on the MJ-12 memo because of the multiple photocopying operations used to make the hoax document.

(Photocopies of both signatures are shown on the opposite page. Readers who are sufficiently interested can make photocopies and superimpose them before a strong light to confirm that the two are identical.)

If the Truman signature is a counterfeit, then so is the alleged Hillenkoetter MJ-12 briefing paper, contained on the same 35-mm film, which makes specific reference to this "special classified executive order of President Truman on 24 September, 1947. . . ."

To obtain an expert corroboration of my own findings, I called David Crown, a professional "document examiner" in the Washington, D.C., area, who previously headed the Central Intelligence Agency's questioned documents laboratory. Crown informed me that the Truman memo had already been exposed as a hoax because it was written on a typewriter that "did not even exist in 1947." He told me that this discovery had been made by a highly respected document examiner, whose name and telephone number he provided. (I will refer to the latter document examiner as PT because of his reluctance to become a public figure in the MJ-12 controversy.)

When I called PT, he expressed great interest in obtaining a copy of

Opposite page: Authentic Harry Truman signature from letter of Oct. 1, 1947, to Vannevar Bush (*top*). This signature and the one on MJ-12 document (*bottom*) are "suspiciously alike"—indicating MJ-12 memo is a forgery. The MJ-12 skidmark on the "H" is heavier because of multiple photocopies used to create counterfeit document.

Dr. Bush:

I appreciated very much your good

of September twenty-sixth and I hope

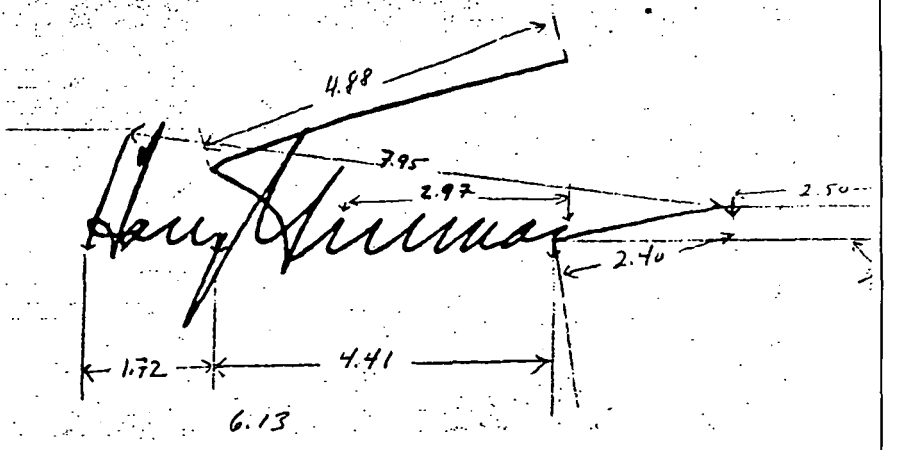
will work out in a satisfactory manner

oming season.

Sincerely yours,

Harry Truman

o be my feeling that any future
tive to the ultimate disposition
ld rest solely with the Office
llowing appropriate discussions
Bush and the Director of Central



3.2% longer than signature on Truman-Bush.

the authentic Truman-Bush signature of October 1 because he had earlier been drawn into the MJ-12 controversy through a friend, also a professional document examiner. PT's earlier analysis of the typeface of the machine used to prepare the MJ-12 Truman memo indicated that it was a Smith-Corona machine that first appeared in 1963—more than 15 years *after* the September 24, 1947, date on the memo.

PT asked me to send the October 1 memo to him by overnight mail because he was leaving in two days for a meeting of professional document examiners in San Francisco, and I did so. In our first conversation, I mentioned that the MJ-12 Truman signature was approximately 3.6 percent longer than the one on the October 1 letter, which I attributed to optical distortion during the several photocopying operations needed to produce a counterfeit. PT explained that Xerox, and its competitors, intentionally do not reproduce a thin border around the outside of a document to be copied—to avoid creating unwanted lines at the edges. To compensate for this, the original copy is enlarged by roughly 1.2 percent—which is imperceptible to the casual reader.

Thus, if a counterfeiter had needed three photocopying iterations to produce the MJ-12 memo—as my own experiments suggested—this would account for the fact that the MJ-12 signature is about 3.6 percent larger than the October 1 signature.

Eight days later, PT called and informed me that the MJ-12 signature was "a classic signature transplant," i.e., a photocopy forgery. In the authentic October 1 signature, a portion of the top of the "T" in "Truman" barely intersected the "s" at the end of "Sincerely yours." When the counterfeiter had used typewriter correction fluid to retouch out the "Sincerely yours," he had slightly "thinned" the width of the top of the "T." This retouching, PT told me, is the "kind of coup de grâce we look for."

PT told me he had made overhead projector transparencies of the MJ-12 and October 1 signatures and taken them to San Francisco to show at the meeting of professional document examiners. He first showed his audience the MJ-12 Truman memo typeface, pointing out that the Smith-Corona machine used did not exist in 1947. Then PT showed the MJ-12 Truman signature and superimposed a copy of the October 1 signature—enlarged by about 3.6 percent—and pointed out the "thinning" of the top of the "T." PT said his audience gave a verbal endorsement—"a chorus of 'Ah-haa!' "

PT told me he had already called Moore's longtime associate Stanton Friedman to inform him of PT's findings because "he had [earlier] sent me all this [MJ-12] material . . . [and] I felt I owed it to him to tell him that he should just wash his hands of this." (Friedman opted to ignore PT's advice. The next week Friedman spoke at a MUFON regional conference near St. Louis and repeated his earlier endorsement of the authenticity of the MJ-12 papers.)

Friedman, who has been the most outspoken defender of the authenticity of the MJ-12 papers, knew at least shortly after their release—more than two years ago—that the Truman signature on the MJ-12 memorandum "match[ed]" the one on a letter Truman wrote to Bush in October 1947.

Friedman reported this fact in his article published in the September/October 1987 *International UFO Reporter* claiming that this "match" confirmed the authenticity of the MJ-12 document. In fact, it really revealed just the opposite. (I am indebted to Chris-

topher D. Allan of the United Kingdom for bringing Friedman's claim to my attention, and to Joe Nickell for supplying references from the book *Questioned Documents.*)

Earlier this year, Friedman requested and received a $16,000 grant from the Fund for UFO Research (FUFOR) for further investigation into the authenticity of the MJ-12 papers. Ironically, he already had in his possession the "smoking gun." Friedman, in an interim report on his FUFOR funded research, published in the September 1989 *MUFON UFO Journal*—prior to receiving PT's call—said his research had found nothing to question the "legitimacy" of the MJ-12 papers.

Others have earlier pointed out another suspicious flaw in the alleged Truman memo to Forrestal. This is the fact that the numerical portion of the date—"24, 1947"—was typed using *a different machine* from the one used to type "September."

The logical explanation for this flaw is that the counterfeiter used an old-vintage machine to make it appear that the memo was written in 1947. But the machine's numerical keys were inoperative, forcing the counterfeiter to type the numerical part of the date on a different machine and paste it in. If this were an authentic Truman memo, it would indicate that the President's secretary did not have access to a fully operable typewriter—which is highly unlikely.

Friedman and Moore visited the library to peruse the Bush collection in 1981-1982, prompted by a 1950 memorandum written by Wilbert B. Smith, a Canadian engineer. Smith's memo claimed that the U.S. government was conducting a highly classified investigation into "flying saucers," directed by Bush.

In Moore's paper presented at a MUFON conference in early July 1982, he reported that he and Friedman had "spent considerable time in Washington, D.C. over the past year locating and researching dusty files and records. . . ." This enabled him to report that Vannevar Bush and Defense Secretary Forrestal had met with President Truman on September 24, 1947—the date of the MJ-12 memo—after Bush had agreed to head the Pentagon's new research and development board.

A third document made public by Moore, Shandera, and Friedman in the spring of 1987 was what purported to be a "Top Secret" memo from President Eisenhower's special assistant, Robert Cutler, to USAF chief-of-staff Gen. Nathan Twining. The memo, dated July 14, 1954, informed Twining of a slight change of plans for a White House meeting of the "NSC [National Security Council]/MJ-12 Special Studies Project" to be held on July 16.

Moore and Shandera said they found the unsigned carbon copy when they visited the National Archives in mid-1985. As Shandera explained to me, because the memo was found in the National Archives it seemed to officially confirm the existence of MJ-12. However, the Cutler memo lacked a registration number, which all other Top Secret documents in the same files had. Nevertheless, Friedman claimed the memo was authentic because it concluded with "your concurrence in the above change of arrangements is assumed"—almost identical language to that used by Cutler in an earlier memo to Twining, dated July 13, *1953.* Friedman and Moore had found this authentic memo in 1981 in the collection of Twining's papers at the Library of Congress.

Curiously, the MJ-12 Cutler memo was found in recently declassified USAF intelligence material—an unlikely place for a carbon copy

seemingly intended for White House files. Also, it had been folded as if it had been carried in the breast pocket of a man's suit. Subsequent investigation by the National Archives revealed that Cutler could not possibly have written the letter because he was out of the country on July 14, 1954. This and other questionable aspects of the document were detailed by a National Archives official in a three-page memorandum.

Did Twining attend an NSC meeting at the White House, as instructed by the MJ-12 Cutler memo? When I checked Twining's official log for July 16, 1954, it showed many appointments but no NSC briefing. When I pointed out this discrepancy to Friedman, he argued that the White House MJ-12 meeting was so secret that it would not be listed in Twining's official log.

If Friedman's logic were valid, then Twining's official log ought not show him attending the "Extraordinary Meeting of the National Security Council" referred to in the authentic Cutler memo of July 13, *1953*. Cutler's memo explained that "special security precautions" should be taken "to maintain absolute secrecy regarding participation" in the NSC meeting. For example, Cutler explained that Twining was to enter the White House grounds via a special entrance and his Pentagon limousine should not remain parked near the White House. No such security precautions were prescribed in the MJ-12 Cutler memo.

When I checked Twining's official log in the Library of Congress it *did* show that Twining attended the very secretive NSC conference in 1953. His log showed: "National Security Council at White House all day"—demolishing Friedman's claim. By a curious coincidence, this secret July 16, 1953, NSC meeting was held one year to the day of the alleged MJ-12 NSC meeting.

Ironically, in the introduction to a paper on crashed-saucer claims authored by Moore and Friedman, presented at the 1981 MUFON conference, they quoted Albert Einstein as follows: "The right to search for the truth implies also a duty; one must not conceal any part of what one has recognized to be the truth." This recalls the admonition by French philosopher Charles Peguy: "He who does not bellow the truth when he knows the truth makes himself the accomplice of liars and forgers."

Philip J. Klass is the leading skeptical investigator of UFO claims. His most recent books are UFO-Abductions: A Dangerous Game *and* UFOs: The Public Deceived. *He lives in Washington, D.C.*

• *Editor's Note: William L. Moore was informed of the investigation and conclusions reported above. In a letter (October 16, 1989), Moore acknowledged that the document examiner referred to as PT had indeed made his (hoax) findings available "some time ago" and "we have not yet published them." But, he said, PT was only one of four document examiners he and his colleagues had consulted and claimed the opinions of the four about the issues involved with the Truman document are "mixed." He did not name the other examiners. Moore said that a report would be published soon.*

The New Catastrophism

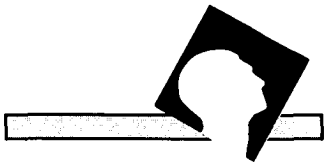
DAVID MORRISON and CLARK R. CHAPMAN

Catastrophism has had a bad reputation in science. Often associated with the "flood geology" of the creationists, the colliding worlds of Velikovsky, or the apocalyptic predictions of the millennialists, catastrophism has been almost automatically branded as unscientific. For more than a century scientists developed the alternate uniformitarian philosophy into a dogma. Catastrophist hypotheses in geology, astronomy, and biology were treated with scorn.

Yet the times are changing. Long banished to the fringes of science, catastrophism is becoming respectable. There is a new, scientific catastrophism, and it is markedly different from its pseudoscientific predecessors. In fact, it is now one of the most exciting areas in science.

Uniformitarianism is an outgrowth of the *concept of uniformity*—the notion that the laws of nature are constant with time. Without the concept of uniformity, there can be no science. But in the history of science—and of geology, in particular—this concept was carried to an extreme. A strictly uniformitarian philosophy sought to explain *all* geology in terms of the gradual action of existing forces. The concept of the forces of nature working slowly over the eons later became an essential ingredient of Darwin's theory of the evolution of species.

In its strictest form, uniformitarianism asserts that the past can be studied only by analogy with the present—that existing forces, given time enough, account for the observable state of the world. But what if the assumptions of uniformitarianism are not correct? Even if the laws of nature are constant, change may not always take place gradually. What if singular, rare events produce enormous consequences? That is the definition of a catastrophe:



It is now recognized that catastrophic events have profoundly influenced the history of our planet and the evolution of life, although not in the ways imagined by Velikovsky or the creationists.

a single event that has a greater effect than the cumulative action of all the more frequent but lesser events, including the gradual processes that are the mainstay of uniformitarian geology.

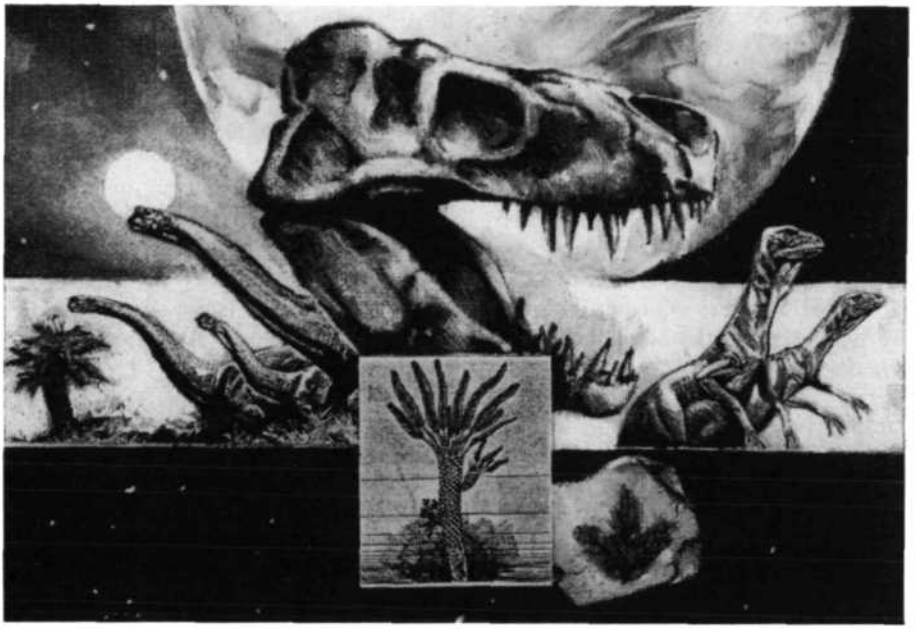
Traditional uniformitarian geology accepted the idea of cyclical changes, such as periodic ice ages, the rise and fall of sea levels, and epochs of mountain-building alternating with erosional cycles. It was not until the 1960s, however, that larger-scale, noncyclical changes were demonstrated. The theory of plate tectonics established that the configuration and position of the continents, and hence their climates, have changed dramatically with time. At about the same time, evidence began to accumulate that the earth's atmosphere had once been very different in composition, with the first free oxygen not appearing until about 1.5 billion years ago. But these changes were gradual, and they could be accommodated within the structure of uniformitarian geology.

The 1960s and 1970s also saw the first spacecraft exploration of the moon and the planets. We found that most planetary surfaces are dominated by impact craters, some hundreds of kilometers in diameter, formed by explosions with energies of millions to billions of megatons. Astronomers concluded that our cosmic neighborhood is a vast shooting gallery of comets and asteroids, from which the earth itself could hardly have remained unscathed. The energy released by the impact of a comet or an asteroid on our planet would exceed by many orders of magnitude the largest volcanic eruptions or earthquakes. Twenty-five years of planetary exploration compels most scientists to conclude that catastrophes far worse than those ever envisioned by biblical literalists must have affected the history of the earth and other planets.

These ideas gained wide attention in 1980, with the announcement by Luis and Walter Alvarez and their collaborators of evidence linking the mass extinction at the end of the Cretaceous period (known as the K-T—for Cretaceous-Tertiary—event) with an asteroidal or cometary impact. Their basic conclusion, that a cosmic impact 65 million years ago by one or more projectiles about 10 kilometers in diameter precipitated a global ecological disaster that was fatal to most living things, has since been abundantly confirmed and extended. This K-T event has become the prototype of what we call the "new catastrophism."

Catastrophism in Contemporary Science

The best understood catastrophes that have influenced the earth were the result of cosmic impacts. Although most evidence of past impacts on our planet has been erased through erosion and geological activity, the moon and the other planets provide an unambiguous record of such events. As a simple example, consider the large lunar craters in the maria—the extensive dark lava plains that cover about 6 million square kilometers of the lunar surface. There are half a dozen such craters with diameters greater than 50 kilometers, all formed during the 3.3 billion years since lunar volcanism ceased. The earth and the moon occupy the same part of interplanetary space and are subject to the same flux of impacting comets and asteroids; therefore, the earth must have received a similar number of impacts, multiplied by a factor of 80 to account for the larger surface area of our planet. This amounts to an impact explosion of 100 million mega-



tons or larger every 10 million years, on average. There is no way our planet could have avoided such events, any one of which would have been sufficient to disrupt the atmosphere, loft millions of tons of dust into the stratosphere, and temporarily alter the earth's climate.

Similar conclusions can be drawn from telescopic observations of the current population of comets and asteroids with earth-approaching orbits. There are thousands of such objects with diameters of one kilometer or greater that are capable of striking the earth. It is interesting that the size distribution of these potential projectiles favors the concentration of mass and hence impact energy in the larger objects. That is, the largest impacts release more energy than the sum of all the lesser impacts. This domination by the largest events is precisely the criterion for an inherently catastrophic scenario.

The consequences of large impacts are becoming better understood as we learn more about how our atmosphere responds to sudden perturbations. Particularly significant has been recent research on the concept of nuclear winter. It now seems clear that the impact of a 5-kilometer or larger comet or asteroid will, at a minimum, inject enough dust into the stratosphere to block all sunlight from the surface and depress temperatures worldwide by tens of degrees. Such conditions probably would persist for at least several weeks, and perhaps as long as a year. Impact energy can also generate large quantities of acid, while the hot ejecta from the explosion may be capable of igniting global fires that destroy much of the planet's biomass.

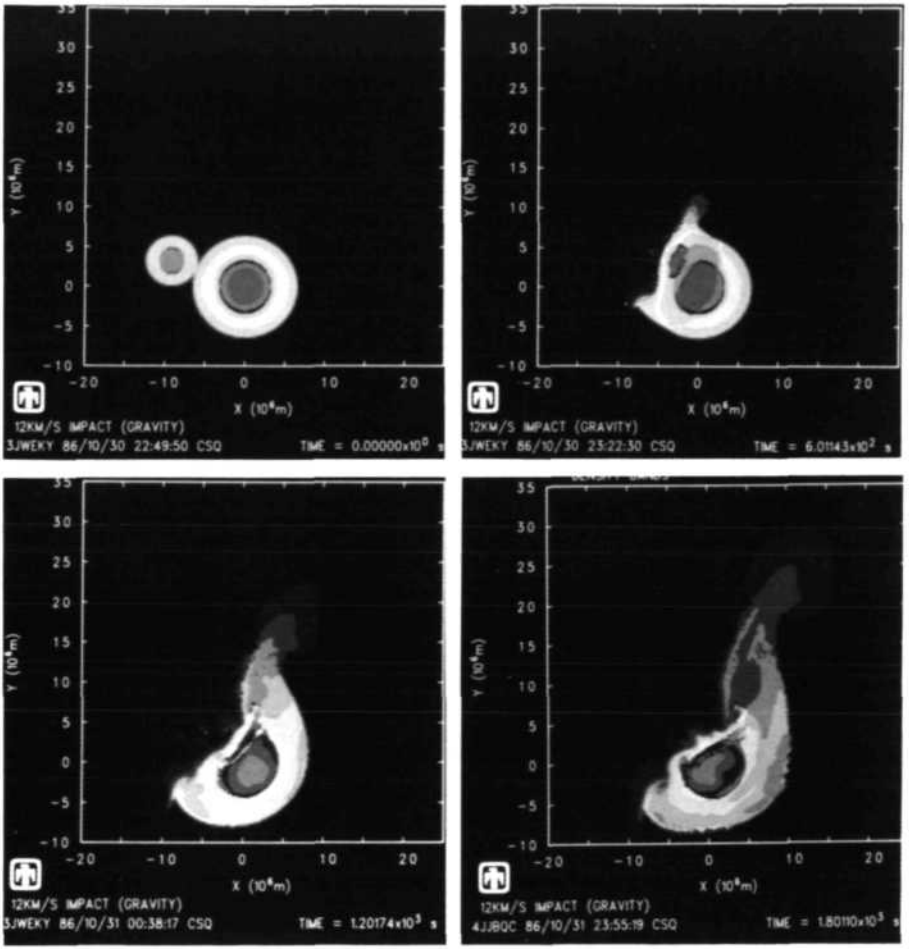
Any global environmental disaster of this sort will lead to widespread destruction of life, including the extinction of many species. The key here is the *global* nature of the catastrophe; no merely local catastrophe, however violent, will lead to a mass

extinction. At a scientific meeting in 1988, David Raup of the University of Chicago suggested that *most* biological extinctions resulted from impact catastrophes rather than from the traditional processes of competition and adaptation to gradually changing environments. Harvard's Stephen Jay Gould further noted at the same meeting that these ideas fundamentally alter the presumptions of Darwinian evolution. Perhaps the course of evolution has been determined more by the quirky ability of some organisms to survive random global catastrophes than by conventional competitive adaptation.

Cosmic impacts in the hundred-million-megaton energy range have taken place in the recent past (geologically speaking) and are inevitable in the future. But what of much larger impacts? Here, too, there is increasing evidence of violent collisions, confined (fortunately) to the earliest stages of planetary history. During the first hundred million years after the formation of the solar system, there were many—perhaps hundreds—of objects as large as the moon still orbiting the sun. Collisions among this early population of protoplanets were violent almost beyond imagining. Three examples attract the current attention of planetary scientists. First is the origin of the earth's moon, now widely thought to be the result of the collision of a Mars-size protoplanet with the earth, splashing out material that reaccreted in earth orbit to form the moon. Second is a postulated collision of even larger magnitude involving the proto-Mercury, in which that planet lost most of its silicate mantle, leaving little more than its metal core. Third, a giant impact is generally supposed to have reversed the spin of Venus, which is unique among the planets in its slow retrograde rotation.

One thread that runs through all of these ideas is that the history of the earth and other planets has been influenced by inherently random and unpredictable—but natural and statistically inevitable—events. This is an uncomfortable notion for science, but it is one we must confront. The new mathematical concepts of chaos are helping to define and quantify these ideas. It now seems clear, for example, that while the orbits of most planets are demonstrably stable for the 4.5-billion-year lifetime of the solar system, the orbits of many asteroids—and of the planet Pluto—are not. These objects occupy chaotic orbits, which means their future motions cannot be predicted over long timespans, even with ideal computing facilities. In many important ways we live in a universe ruled by chance, not by the traditional ideas of strict causality.

While our discussion has concentrated on impacts, other catastrophist ideas are also prevalent in studies of the earth and other planets. Although not so sudden and violent as collisions, these still represent a potential for destabilization and rapid evolution of a planet's surface and atmosphere. The best example is the so-called runaway greenhouse effect. Any planet with an atmosphere experiences some surface warming due to the greenhouse effect—the ability of an atmosphere to blanket the surface by inhibiting the outward flow of infrared (heat) radiation. Planetary scientists think that Venus and the earth may both have had similar atmospheres and climates several billion years ago, each with a modest greenhouse effect. However, the situation on Venus became unstable, surface temperatures rose, the oceans boiled, and a much enhanced greenhouse effect led to a new equilibrium state. Today Venus has a surface temperature hot enough to melt lead, sulfuric acid clouds, and surface pressure of



Supercomputer simulation of the impact of a Mars-sized planetoid with the very young earth, thought now by many scientists to be the most likely hypothesis for how our moon was created. The event would have happened over a brief period about 4.6 billion years ago. (Jay Melosh and Marlin Kipp, courtesy Marlin Kipp, Sandia National Laboratories.)

90 earth atmospheres. Computer models are being developed to determine whether the earth might suffer a similar fate as a result of global warming from consumption of fossil fuels and other effects of modern civilization.

These are some of the elements of modern scientific catastrophism. How do these ideas compare with past catastrophism or with contemporary catastrophist pseudoscience?

Creationist Catastrophism

In the late eighteenth and early nineteenth centuries, before uniformitarianism became the ruling paradigm of the geological and biological sciences, most natural scientists accepted some version of catastrophism. The development of observational geology in Europe and the discovery of sequences of fossils in the rock strata gave rise to the concept of a geological history

punctuated by global convulsions. While little was known about the nature of such convulsions, it was natural in a Judeo-Christian society to accept the biblical Deluge as such a global catastrophe, perhaps the most recent event in a long history of alternating periods of calm and upheaval.

In contrast to this traditional catastrophism, fundamentalist biblical literalism, and its offshoot "creation science," are essentially modern American phenomena. Their vision of a young earth, with its surface and atmosphere almost entirely the product of the Deluge about 6,000 years ago, contradicts modern geological and astronomical science. And because they equate Darwinism with Satanism, the creationists have been particularly vocal in their opposition to the concept of biological evolution.

The creationists begin with Creation, which purportedly took place fewer than 10,000 years ago and required just six days. The new earth was perfect, a "Garden of Eden," and much more heavily populated than now. Its surface was relatively flat, and the global climate was moist, warm, and tropical because of an atmosphere consisting primarily of water vapor and carbon dioxide, with a surface pressure many times greater than that today. A "vapor canopy" contained that part of the primeval water that had, on the second day of creation, been collected into "the waters that are above the firmament." Additional water was separately trapped beneath the crust as "the waters of the great deep." This world was without rain or other storms.

About 6,000 years ago, the biblical story goes, God became dissatisfied with his creation. Having warned Noah to construct an ark and bring together all of the species that were to be saved, he initiated the Deluge—the release of the waters that had been above and below the firmament, together with prodigious worldwide volcanism. The water submerged the land, destroying all land plants and animals except those preserved in the ark. Erosion from the Flood created all the earth's sedimentary rocks within less than a year, and it formed all known fossils by burial of the creatures drowned in this catastrophe.

After a few months the dry land reappeared, as a consequence of rapid elevation of the present continents. As described by Whitcomb and Morris in *The Genesis Flood*, "the termination of the Deluge proper, occupying a period of a little more than a year . . . , did not by any means mark the termination of the abnormal hydrologic and geomorphic phenomena. . . . The prediluvian topography was completely changed, with great mountain chains and deep basins now replacing the formerly gentle and more nearly uniform topography" (p. 287). There next followed a great ice age that came and went within a few decades, covering much of the Northern Hemisphere with ice and creating the extensive glacial deposits of our planet. All of this settled down, however, and by the time of the first written records from Sumer and Egypt (about 3000 B.C.) the world had assumed its present form and had been largely repopulated by the survivors of the ark.

Whitcomb and Morris claim that "a very substantial portion of the earth's structural geology must be explained in terms of the Flood" (p. 270), and they assign the formation of the present continents and mountains, and all erosional features on the land, to the past 6,000 years. Such claims obviously fly in the face of all the evidence of modern earth science. Greenland ice cores, for example, allow us to reconstruct annual layers

back more than 10,000 years. The solidification of igneous rocks can be dated from measurements of isotopes of radioactive elements, back to the oldest continental rocks with ages of 3.8 billion years.

The idea that most of the earth's sedimentary and volcanic deposits were produced during the short interval of the Deluge is also untenable. The transformation of mud and sand into rock is a slow process, yet this single year is said to have generated literally miles of superimposed sedimentary and volcanic layers. The Grand Canyon of the Colorado River represents just a small portion of the geologic column, yet who can hike into this mile-deep gorge and believe that all this was formed in a year (to say nothing of the carving of the canyon itself, which according to Flood chronology can only have begun in postdiluvian time, after the great uplift of the continents)?

Another stumbling block concerns the fossil record preserved in the sedimentary deposits laid down over the past billion years. According to the creationists, all of these plants and animals lived simultaneously and were killed and fossilized together during the Deluge, as the earth's sedimentary rocks were formed. The creationist model cannot explain the observed sequences of fossil types, as new (and often more complex) species are found in progressively higher (and younger) deposits. Their most common recourse is to deny outright the existence of a fossil sequence. The other, even more ludicrous approach is due to Henry Morris of the Creation Science Institute. Citing his training as a hydraulic engineer, Morris proposes that the flood waters sorted the drowned creatures so that the smaller ones sank more rapidly to the bottom and the larger ones were concentrated nearer the top of the forming sediment, thus mimicking in a general way the gross ordering of fossils. He suggests that the birds and mammals are near the top of the geologic column

because they fled to high elevations in the face of the onrushing waters and thus perished last.

This "creation science" has almost nothing in common with the new catastrophism. Today's catastrophists have been drawn to their ideas, often reluctantly, by the inability of the traditional uniformitarian paradigm to deal adequately with new evidence concerning the earth and other planets. In contrast, biblical catastrophism is founded on the "revealed truth" of the Scriptures and uses observations and experiment—if at all—merely as a way to support ideas that are already beyond challenge. Where data contradict these ideas, the data are dismissed.

Note some of the differences between the K-T mass extinction 65 million years ago and the biblical Deluge. First there is the time scale: An event of the magnitude of the K-T impact is expected from the current population of comets and asteroids every few tens of millions of years. In contrast, there is no suggested mechanism other than God's dissatisfaction with human progress to explain the Deluge. Second, the K-T event, which killed most living things by disrupting the delicate ecosystem, had a negligible effect on the earth as a planet. All it did was form one or more 100-kilometer craters—which have since apparently been destroyed by erosion—and generate a global deposit of ejecta a few inches thick. Compare this with the miles-thick layers of sedimentary rock attributed to the Deluge, followed by the formation within a few years of continents and ocean basins. Third, the K-T event is consistent with the geological record in terms of the observed global correlation of the iridium-enhanced ejecta layer with the mass extinction of marine life. The creationists, on the other hand, ask us to dismiss entirely the evidence of geological stratigraphy and fossil progressions. Finally, the K-T event produced a short-term perturbation of the environment, after which conditions returned to normal. The Deluge, however, is asserted to have fundamentally and permanently altered the crust and atmosphere of the earth.

Velikovsky's Colliding Worlds

Several decades before most scientists had become aware of accumulating evidence for violent and catastrophic events in the solar system, Russian-born psychiatrist Immanuel Velikovsky published *Worlds in Collision*. It was an instant success, earning Velikovsky widespread fame and a body of enthusiastic supporters. He claimed, long before it was fashionable to do so, that there have been collisions and near-collisions among the planets, and that the history of the earth has been marked by violent events of cosmic origin.

Velikovsky's ideas seemed more credible than those of the biblical creationists. He made an effort to ground his conclusions in scientific evidence. Now that catastrophist ideas have become acceptable, it is reasonable to look again at Velikovsky. Is he perhaps the unrecognized prophet of the new catastrophism, a person who overcame the prejudices of his time and leapfrogged into a new conception of geology and astronomy? Some people claim so, but we are not among them. The fact is that Velikovsky (who died in 1979) was almost entirely wrong in his ideas about earth history.

Velikovsky did not base his theory of planetary collisions on new evidence from geology or astronomy. He made no observations, did no experiments, and carried out no calculations. He was motivated to find a natural explanation for a variety of myths and ancient traditions, cutting across many cul-

tures, that recounted natural and supernatural catastrophes experienced millennia ago. He suggested that these events had been global and that they happened as a result of near-collisions of other planets with the earth.

Velikovsky's reading of ancient myths convinced him that Venus had first appeared on the celestial scene only about 3,500 years ago, traveling in an elongated (cometary) orbit. It nearly collided with the earth on several occasions, stopping and reversing the earth's rotation and generating widespread catastrophes, such as earthquakes, tidal waves, volcanic eruptions, and electric discharges. These interactions perturbed the orbits of both the earth and Venus, providing a few centuries of relative peace; then the wayward Venus encountered Mars, which was thrown into an earth-crossing orbit, and the disasters began again. There followed several close encounters between Mars and earth, generating a series of global catastrophes only a little less violent than those attributed to Venus. Finally, in about the eighth century B.C., Mars and Venus settled into their present nearly circular orbits, and planetary collisions ceased.

From the beginning, outraged scientists—especially astronomers—criticized *Worlds in Collision* and castigated a gullible public for giving any credence to such obvious nonsense. Velikovsky countered by saying that the ancient records said that these violent events actually took place. The evidence, he said, was in these writings. If the theories of modern physics and astronomy were not consistent with such celestial events, then the astronomers and physicists had better modify their theories.

However, Velikovsky's "facts" have often turned out to be suspect. He was highly selective in his choice of quotations from ancient writings, and he often used translations from older sources long-since revised by modern scholars. When these texts are examined in detail, they frequently contradict Velikvosky's interpretation. There is also the problem of literalism. The essence of Velikovsky's method is to interpret ancient myths literally. Thus, for example, when the Homeric poems refer to combat between the Greek gods Zeus (Roman Jupiter) and Ares (Roman Mars), for Velikovsky this is a record of an astronomical event, involving interactions between the planets Jupiter and Mars. Few classical scholars would agree.

Another difficulty with Velikovsky's approach concerns the timing of his catastrophes. It is true that many ancient legends describe violent natural events, such as floods and earthquakes, but it is not at all clear that these descriptions represent simultaneous global phenomena. To make his case for cosmic causes, Velikovsky had first to establish the worldwide synchronism of events described in his sources. Doing so placed him in direct confrontation with the evidence of archaeology. His Egyptian chronology, for example, required deleting four dynasties from the historical record and moving the famous Eighteenth Dynasty from the sixteenth century B.C. to the tenth. In his scheme Rameses II, usually believed to be the Pharaoh of the Exodus, became a contemporary of the kingdoms of Judah and Israel some 600 years later. His chronology wreaked similar havoc with the accepted notions of classical history, displacing the siege of Troy by Mycenaean Greeks to the period of the Argolid tyrants.

Although these problems with Velikovsky's sources and interpretation might have discredited his ideas from the start, most public discussion centered instead on his astronomy.

The idea of worlds in collision, of dramatic celestial events intimately connected with human religious history, had widespread appeal. As Carl Sagan has often noted, we seek cosmic connections, evidence that our human existence is related to the large-scale forces of the universe. Velikovsky provided just such a vision.

A number of authors have pointed out the problems with Velikovsky's astronomical ideas, and we will not repeat them in detail here. Time and again, space-age discoveries in geology and astronomy have contradicted his theories. For example, he predicted that Venus, having been incandescent a few thousand years ago, would be radiating more heat than it received from the sun and that it would be seen to be cooling down at a rate of several degrees a year, in accord with its young age. Both predictions were flatly refuted by spacecraft data. Another Velikovsky prediction about Venus concerned the composition of its clouds. He attributed the manna that fed the Israelites in the desert and the naphtha also reported in the Old Testament to hydrocarbons derived from the atmosphere of Venus, and he asserted that "the presence of hydrocarbon gases and dust in the cloud envelope of Venus would constitute a crucial test" for his theory. We now know that Venus has no hydrocarbons (its atmosphere is oxidizing) and that its clouds are composed of sulfuric acid.

Our third example of a planetary test of Velikovsky's hypothesis concerns the surface of the moon. What was happening to our satellite at the times Venus and Mars were interacting so dramatically with the earth? According to Velikovsky, the moon was even more roughly treated, as "the moon's surface flowed with lava and bubbled into great circular formations." On the eve of the Apollo landings he warned of frequent moonquakes and high levels of radioactivity and reasserted that the moon's surface was molten fewer than 3,000 years ago. In reality, there was no excess radioactivity, and the moon turned out to be more than a thousand times less active seismically than the earth. Further, age measurements of returned lunar samples revealed that even the youngest lunar lava flows solidified more than 3 billion years ago. Except for an occasional crater-forming impact, our satellite has remained remarkably unchanged for the past several billion years.

Some of the most straightforward tests of Velikovsky's theory are to be found on our own planet. In 1950, when *Worlds in Collision* was published, geology was suffering from the uncertainties and contradictions that preceded the development of the theory of plate tectonics, so perhaps one can forgive Velikovsky for some of his errors in discussing the evidence from geology. Since that time, however, our understanding of the earth and planets has come a long way, and ideas that might have seemed credible 40 years ago are no longer tenable.

An especially clear indication that the Velikovskian global disturbances are fictitious is provided by the Bristlecone pines from the arid mountains of the California-Nevada border, which provide a continuous tree-ring record that goes back at least to 3435 B.C. These rings reveal no climatic anomalies at the times of Velikovsky's supposed catastrophes. Similar conclusions can be drawn from the even longer climatic record preserved in the Greenland ice cores.

How do Velikovsky's collisions between planets compare with the impacts studied by planetologists today? The most obvious differences have to do with time scale. Velikovsky, basing his theories upon the written

record of human history, necessarily limited his vision to the past few thousand years. The large-scale collisions postulated by planetary scientists to explain the origin of the moon or the loss of silicates from Mercury happened 4.5 billion years ago, when conditions in the newly forming solar system were very different from those of today. Note that Velikovsky would have at least three of the nine planets—Earth, Venus, and Mars—experience major orbital changes in the past 4,000 years. According to Velikovsky, one of these—Venus—was formed within the same short span of time. How are we to reconcile this with the 4.5-billion-year age of the solar system? Velikovsky never says so explicitly, but the fact is that his ideas only make sense in the context of a young earth. He is cut from the same cloth as the biblical literalists, compressing the history of the universe into the timespan of human civilization. For all of his claims to be scientific, Velikovsky takes the biblical tradition as his revealed truth and accepts or rejects all other evidence according to its consistency with his preconceived conclusions.

What about Velikovsky's influence on mainstream science? It is difficult to be sure, for the human brain works in mysterious ways, but it seems to us that Velikovsky's work inhibited an open-minded appraisal of catastrophism rather than assisted it. The astronomers who attacked *Worlds in Collision*, and others who debated with Velikovsky's followers during the 1960s and 1970s, were repelled by the obvious illogic and absurd conclusions of purported recent cosmic catastrophes. If anything, those scientists who felt it necessary to defend the status quo may have been dissuaded from considering concepts of natural calamities with open minds.

Summary

Catastrophism has reemerged in contemporary science, but as a new concept, not a return to earlier ideas. Evidence from astronomy, geology, biology, and even mathematics has convinced many scientists to abandon, often reluctantly, strict uniformitarianism. We are forced to consider random and individually unpredictable events, some of them of great magnitude.

Cosmic impacts represent the most important catastrophic influence on earth history. Studies of earth-approaching comets and asteroids, discovery that the moon and the planets have been subject to a long history of impact cratering, and recognition of scars of ancient craters on the earth all demonstrate the role of cosmic impacts. Many of these impacts exceed by a million times the energy of the most devastating terrestrial volcanic explosions or earthquakes. The modern ecological movement has sensitized us to the fragility of the biosphere, and sophisticated computer models permit us to calculate the consequences of disturbances to the atmosphere. Contemporary paleontology recognizes the frequency and significance of mass extinctions in the fossil record, and the idea of punctuated equilibrium plays an important role in evolutionary biology. Finally, the direct evidence of the K-T impact has influenced scientific opinion in a number of disciplines, as well as catching the public's attention.

In contrast, the catastrophism of creationists or followers of Velikovsky has little to offer. The young earth and "flood geology" theories are scientifically indefensible, relying as they do on the literal interpretation of Scripture rather than on the evidence of observation and experiment. Velikovsky also rejected the evidence of

the physical sciences, preferring to base his theories on dubious interpretation of ancient myth rather than observation of the world around us. Velikovsky and the creationists both represent steps backward. In spite of wide public followings, they stand entirely outside of science, including the revolution in thinking that is giving rise to the new catastrophism.

David Morrison heads the Space Science Division at NASA Ames Research Center in California, and Clark R. Chapman is a senior scientist with the Planetary Science Institute in Tucson, Arizona. Morrison and Chapman are the authors of Cosmic Catastrophes *(Plenum, 1989), from which they have adapted part of this article. Asteroids 2409 Chapman and 2410 Morrison are named in their honor.*

A Field Guide to Critical Thinking

JAMES LETT

There are many reasons for the popularity of paranormal beliefs in the United States today, including: (1) the irresponsibility of the mass media, who exploit the public taste for nonsense, (2) the irrationality of the American world-view, which supports such unsupportable claims as life after death and the efficacy of the polygraph, and (3) the ineffectiveness of public education, which generally fails to teach students the essential skills of critical thinking. As a college professor, I am especially concerned with this third problem. Most of the freshman and sophomore students in my classes simply do not know how to draw reasonable conclusions from the evidence. At most, they've been taught in high school *what* to think; few of them know *how* to think.

Six simple rules to follow in examining paranormal claims

In an attempt to remedy this problem at my college, I've developed an elective course called "Anthropology and the Paranormal." The course examines the complete range of paranormal beliefs in contemporary American culture, from precognition and psychokinesis to channeling and cryptozoology and everything between and beyond, including astrology, UFOs, and creationism. I teach the students very little about anthropological theories and even less about anthropological terminology. Instead, I try to communicate the essence of the anthropological perspective, by teaching them, indirectly, what the scientific method is all about. I do so by teaching them how to evaluate evidence. I give them six simple rules to follow when considering any claim, and then show them how to apply those six rules to the examination of any paranormal claim.

The six rules of evidential reasoning are my own distillation and simplification of the scientific method. To make it easier for students to

remember these half-dozen guidelines, I've coined an acronym for them: Ignoring the vowels, the letters in the word "FiLCHeRS" stand for the rules of Falsifiability, Logic, Comprehensiveness, Honesty, Replicability, and Sufficiency. Apply these six rules to the evidence offered for any claim, I tell my students, and no one will ever be able to sneak up on you and steal your belief. You'll be filch-proof.

Falsifiability

It must be possible to conceive of evidence that would prove the claim false.

It may sound paradoxical, but in order for any claim to be true, it must be falsifiable. The rule of falsifiability is a guarantee that *if* the claim is *false,* the evidence will prove it false; and if the claim is *true,* the evidence will not disprove it (in which case the claim can be tentatively accepted as true until such time as evidence is brought forth that does disprove it). The rule of falsifiability, in short, says that the evidence must matter, and as such it is the first and most important and most fundamental rule of evidential reasoning.

The rule of falsifiability is essential for this reason: If *nothing* conceivable could *ever* disprove the claim, then the evidence that does exist would not matter; it would be pointless to even examine the evidence, because the conclusion is already known—the claim is invulnerable to any possible evidence. This would not mean, however, that the claim is true; instead it would mean that the claim is meaningless. This is so because it is impossible—logically impossible—for *any* claim to be true *no matter what.* For every true claim, you can always *conceive* of evidence that would make the claim untrue—in other words, again, every true claim is falsifiable.

For example, the true claim that the life span of human beings is less than 200 years is falsifiable; it would be falsified if a single human being were to live to be 200 years old. Similarly, the true claim that water freezes at 32° F is falsifiable; it would be falsified if water were to freeze at, say, 34° F. Each of these claims is firmly established as scientific "fact," and we do not expect either claim ever to be falsified; however, the point is that either *could* be. Any claim that could *not* be falsified would be devoid of any propositional content; that is, it would not be making a factual assertion—it would instead be making an emotive statement, a declaration of the way the claimant feels about the world. Nonfalsifiable claims do communicate information, but what they describe is the claimant's value orientation. They communicate nothing whatsoever of a factual nature, and hence are neither true nor false. Nonfalsifiable statements are propositionally vacuous.

There are two principal ways in which the rule of falsifiability can be violated—two ways, in other words, of making nonfalsifiable claims. The first variety of nonfalsifiable statements is the *undeclared claim:* a statement that is so broad or vague that it lacks any propositional content. The undeclared claim is basically unintelligible and consequently meaningless. Consider, for example, the claim that crystal therapists can use pieces of quartz to restore balance and harmony to a person's spiritual energy? What does it mean to have unbalanced spiritual energy? How is the condition recognized and diagnosed? What evidence would prove that someone's unbalanced spiritual energy had been—or had *not* been—balanced by the application of crystal therapy? Most New Age wonders, in fact, consist of similarly undeclared claims that dissolve completely when exposed to the solvent of rationality.

The undeclared claim has the advantage that virtually any evidence that could be adduced could be interpreted as congruent with the claim, and for that reason it is especially popular among paranormalists who claim precognitive powers. Jeane Dixon, for example, predicted that 1987 would be a year "filled with changes" for Caroline Kennedy. Dixon also predicted that Jack Kemp would "face major disagreements with the rest of his party" in 1987 and that "world-wide drug terror" would be "unleashed by narcotics czars" in the same year. She further revealed that Dan Rather "may [or may not] be hospitalized" in 1988, and that Whitney Houston's "greatest problem" in 1986 would be "balancing her personal life against her career." The undeclared claim boils down to a statement that can be translated as "Whatever will be, will be."

We must demand that the evidence for any factual claim be evaluated without self-deception, that it be carefully screened for error, fraud, and appropriateness,and that it be substantial and unequivocal.

The second variety of nonfalsifiable statements, which is even more popular among paranormalists, involves the use of the *multiple out*, that is, an inexhaustible series of excuses intended to explain away the evidence that would seem to falsify the claim. Creationists, for example, claim that the universe is no more than 10,000 years old. They do so despite the fact that we can observe stars that are billions of light-years from the earth, which means that the light must have left those stars billions of years ago, and which proves that the universe must be billions of years old. How then do the creationists respond to this falsification of their claim? By suggesting that God must have created the light already on the way from those distant stars at the moment of creation 10,000 years ago. No conceivable piece of evidence, of course, could disprove that claim.

Additional examples of multiple outs abound in the realm of the paranormal. UFO proponents, faced with a lack of reliable physical or photographic evidence to buttress their claims, point to a secret "government conspiracy" that is allegedly preventing the release of evidence that would support their case. Psychic healers say they can heal you if you have enough faith in their psychic powers. Psychokinetics say they can bend spoons with their minds if they are not exposed to negative vibrations from skeptical observers. Tarot readers can predict your fate if you're sincere in your desire for knowledge. The multiple out means, in effect, "Heads I win, tails you lose."

Logic

Any argument offered as evidence in support of any claim must be sound.

An argument is said to be "valid" if its conclusion follows unavoidably from its premises; it is "sound" if it is valid and if all the premises are true. The rule of logic thus governs the validity of inference. Although philosophers have codified and named the various forms of valid arguments, it is not necessary to master a course in formal logic in order to apply the rules of inference consistently and correctly. An invalid argument can be recognized by the simple method of counterexample: If you can conceive of a single imaginable instance whereby the conclusion would not necessarily follow

from the premises *even if* the premises were true, then the argument is invalid. Consider the following syllogism, for example: All dogs have fleas; Xavier has fleas; therefore Xavier is a dog. That argument is invalid, because a single flea-ridden feline named Xavier would provide an effective counterexample. If an argument is invalid, then it is, by definition, unsound. Not all valid arguments are sound, however. Consider this example: All dogs have fleas; Xavier is a dog; therefore Xavier has fleas. That argument is unsound, even though it is valid, because the first premise is false: All dogs do *not* have fleas.

To determine whether a valid argument is sound is frequently problematic; knowing whether a given premise is true or false often demands additional knowledge about the claim that may require empirical investigation. If the argument passes these two tests, however—if it is both valid and sound—then the conclusion can be embraced with certainty.

The rule of logic is frequently violated by pseudoscientists. Erich von Däniken, who singlehandedly popularized the ancient-astronaut mythology in the 1970s, wrote many books in which he offered invalid and unsound arguments with benumbing regularity (see Omohundro 1976). In *Chariots of the Gods?* he was not above making arguments that were *both* logically invalid and factually inaccurate—in other words, arguments that were doubly unsound. For example, von Däniken argues that the map of the world made by the sixteenth-century Turkish admiral Piri Re'is is so "astoundingly accurate" that it could only have been made from satellite photographs. Not only is the argument invalid (any number of imaginable techniques other than satellite photography could result in an "astoundingly accurate" map), but the premise is simply wrong—the Piri Re'is map, in fact, contains many gross inaccuracies (see Story 1981).

Comprehensiveness

The evidence offered in support of any claim must be exhaustive—that is, all of the available evidence must be considered.

For obvious reasons, it is never reasonable to consider only the evidence that supports a theory and to discard the evidence that contradicts it. This rule is straightforward and self-apparent, and it requires little explication or justification. Nevertheless, it is a rule that is frequently broken by proponents of paranormal claims and by those who adhere to paranormal beliefs.

For example, the proponents of biorhythm theory are fond of pointing to airplane crashes that occurred on days when the pilot, copilot, and/or navigator were experiencing critically low points in their intellectual, emotional, and/or physical cycles. The evidence considered by the biorhythm apologists, however, does not include the even larger number of airplane crashes that occurred when the crews were experiencing high or neutral points in their biorhythm cycles (Hines 1988:160). Similarly, when people believe that Jeane Dixon has precognitive ability because she predicted the 1988 election of George Bush (which she did, two months before the election, when every social scientist, media maven, and private citizen in the country was making the same prognostication), they typically ignore the thousands of forecasts that Dixon has made that have failed to come true (such as her predictions that John F. Kennedy would not win the presidency in 1960, that World War III would begin in 1958, and that Fidel Castro would die in 1969). If you are willing to be selective in the evidence you consider,

you could reasonably conclude that the earth is flat.

Honesty

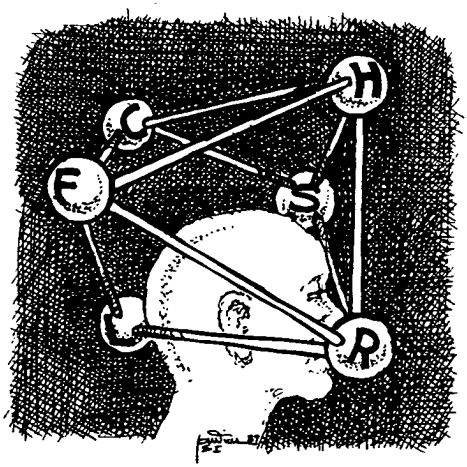
The evidence offered in support of any claim must be evaluated without self-deception.

The rule of honesty is a corollary to the rule of comprehensiveness. When you have examined all of the evidence, it is essential that you be honest with yourself about the results of that examination. If the weight of the evidence contradicts the claim, then you are required to abandon belief in that claim. The obverse, of course, would hold as well.

The rule of honesty, like the rule of comprehensiveness, is frequently violated by both proponents and adherents of paranormal beliefs. Parapsychologists violate this rule when they conclude, after numerous subsequent experiments have failed to replicate initially positive psi results, that psi must be an elusive phenomenon. (Applying Occam's Razor, the more honest conclusion would be that the original positive result must have been a coincidence.) Believers in the paranormal violate this rule when they conclude, after observing a "psychic" surreptitiously bend a spoon with his hands, that he only cheats *sometimes.*

In practice, the rule of honesty usually boils down to an injunction against breaking the rule of falsifiability by taking a multiple out. There is more to it than that, however: The rule of honesty means that you must accept the obligation to come to a rational conclusion once you have examined all the evidence. If the overwhelming weight of all the evidence falsifies your belief, then you must conclude that the belief is false, and you must face the implications of that conclusion forthrightly. In the face of overwhelmingly negative evidence, neutrality and agnosticism are no better than credulity and faith. Denial, avoidance, rationalization, and all the other familiar mechanisms of self-deception would constitute violations of the rule of honesty.

In my view, this rule alone would all but invalidate the entire discipline of parapsychology. After more than a century of systematic, scholarly research, the psi hypothesis remains wholly unsubstantiated and unsupportable; parapsychologists have failed, as Ray Hyman (1985:7) observes, to produce "any consistent evidence for paranormality that can withstand acceptable scientific scrutiny." From all indications, the number of parapsychologists who observe the rule of honesty pales in comparison with the number who delude themselves. Veteran psychic investigator Eric Dingwall (1985:162) summed up his extensive experience in parapsychological research with this observation: "After sixty years' experience and personal acquaintance with most of the leading parapsychologists of that period I do not think I could name a half dozen whom I could call objective students who honestly wished to discover the truth."



Replicability

If the evidence for any claim is based upon an experimental result, or if the evidence offered

in support of any claim could logically be explained as coincidental, then it is necessary for the evidence to be repeated in subsequent experiments or trials.

The rule of replicability provides a safeguard against the possibility of error, fraud, or coincidence. A single experimental result is never adequate in and of itself, whether the experiment concerns the production of nuclear fusion or the existence of telepathic ability. Any experiment, no matter how carefully designed and executed, is always subject to the possibility of implicit bias or undetected error. The rule of replicability, which requires independent observers to follow the same procedures and to achieve the same results, is an effective way of correcting bias or error, even if the bias or error remains permanently unrecognized. If the experimental results are the product of deliberate fraud, the rule of replicability will ensure that the experiment will eventually be performed by honest researchers.

If the phenomenon in question could conceivably be the product of coincidence, then the phenomenon must be replicated before the hypothesis of coincidence can be rejected. If coincidence is in fact the explanation for the phenomenon, then the phenomenon will not be duplicated in subsequent trials, and the hypothesis of coincidence will be confirmed; but if coincidence is not the explanation, then the phenomenon may be duplicated, and an explanation other than coincidence will have to be sought. If I correctly predict the next roll of the dice, you should demand that I duplicate the feat before granting that my prediction was anything but a coincidence.

The rule of replicability is regularly violated by parapsychologists, who are especially fond of misinterpreting coincidences. The famous "psychic sleuth" Gerard Croiset, for example, allegedly solved numerous baffling crimes and located hundreds of missing persons in a career that spanned five decades, from the 1940s until his death in 1980. The truth is that the overwhelming majority of Croiset's predictions were either vague and nonfalsifiable or simply wrong. Given the fact that Croiset made thousands of predictions during his lifetime, it is hardly surprising that he enjoyed one or two chance "hits." The late Dutch parapsychologist Wilhelm Tenhaeff, however, seized upon those "very few prize cases" to argue that Croiset possessed demonstrated psi powers (Hoebens 1986a:130). That was a clear violation of the rule of replicability, and could not have been taken as evidence of Croiset's psi abilities even if the "few prize cases" had been true. (In fact, however, much of Tenhaeff's data was fraudulent—see Hoebens 1986b.)

Sufficiency

The evidence offered in support of any claim must be adequate to establish the truth of that claim, with these stipulations: (1) the burden of proof for any claim rests on the claimant, (2) extraordinary claims demand extraordinary evidence, and (3) evidence based upon authority and/or testimony is always *inadequate for* any *paranormal claim.*

The burden of proof always rests with the claimant for the simple reason that the absence of disconfirming evidence is not the same as the presence of confirming evidence. This rule is frequently violated by proponents of paranormal claims, who argue that, because their claims have not been disproved, they have therefore been proved. (UFO buffs, for example, argue that because skeptics have not explained every UFO sighting, some UFO sightings must be extraterrestrial

spacecraft.) Consider the implications of that kind of reasoning: If I claim that Adolf Hitler is alive and well and living in Argentina, how could you *disprove* my claim? Since the claim is logically possible, the best you could do (in the absence of unambiguous forensic evidence) is to show that the claim is highly improbable—but that would not disprove it. The fact that you cannot prove that Hitler is not living in Argentina, however, does not mean that I have proved that he is. It only means that I have proved that he could be—but that would mean very little; logical possibility is not the same as established reality. If the absence of disconfirming evidence were sufficient proof of a claim, then we could "prove" anything that we could imagine. Belief must be based not simply on the absence of disconfirming evidence but on the presence of confirming evidence. It is the claimant's obligation to furnish that confirming evidence.

Extraordinary claims demand extraordinary evidence for the obvious reason of balance. If I claim that it rained for ten minutes on my way to work last Tuesday, you would be justified in accepting that claim as true on the basis of my report. But if I claim that I was abducted by extraterrestrial aliens who whisked me to the far side of the moon and performed bizarre medical experiments on me, you would be justified in demanding more substantial evidence. The ordinary evidence of my testimony, while sufficient for ordinary claims, is not sufficient for extraordinary ones.

In fact, testimony is *always* inadequate for *any* paranormal claim, whether it is offered by an authority or a layperson, for the simple reason that a human being can lie or make a mistake. No amount of expertise in any field is a guarantee against human fallibility, and expertise does not preclude the motivation to lie; therefore a person's credentials, knowledge, and experience cannot, in themselves, be taken as sufficient evidence to establish the truth of a claim. Moreover, a person's sincerity lends nothing to the credibility of his or her testimony. Even if people are telling what they sincerely believe to be the truth, it is always possible that they could be mistaken. Perception is a selective act, dependent upon belief, context, expectation, emotional and biochemical states, and a host of other variables. Memory is notoriously problematic, prone to a range of distortions, deletions, substitutions, and amplifications. Therefore the testimony that people offer of what they remember seeing or hearing should always be regarded as only provisionally and approximately accurate; when people are speaking about the paranormal, their testimony should never be regarded as reliable evidence in and of itself. The possibility and even the likelihood of error are far too extensive (see Connor 1986).

Conclusion

The first three rules of FiLCHeRS—falsifiability, logic, and comprehensiveness—are all *logically* necessary rules of evidential reasoning. If we are to have confidence in the veracity of any claim, whether normal or paranormal, the claim must be propositionally meaningful, and the evidence offered in support of the claim must be rational and exhaustive.

The last three rules of FiLCHeRS—honesty, replicability, and sufficiency—are all *pragmatically* necessary rules of evidential reasoning. Because human beings are often motivated to rationalize and to lie to themselves, because they are sometimes motivated to lie to

others, because they can make mistakes, and because perception and memory are problematic, we must demand that the evidence for any factual claim be evaluated without self-deception, that it be carefully screened for error, fraud, and appropriateness, and that it be substantial and unequivocal.

What I tell my students, then, is that you can and should use FiLCHeRS to evaluate the evidence offered for any claim. If the claim fails any one of these six tests, then it should be rejected; but if it passes all six tests, then you are justified in placing considerable confidence in it.

Passing all six tests, of course, does not guarantee that the claim is true (just because you have examined all the evidence available today is no guarantee that there will not be new and disconfirming evidence available tomorrow), but it does guarantee that you have good reasons for believing the claim. It guarantees that you have sold your belief for a fair price, and that it has not been filched from you.

Being a responsible adult means accepting the fact that almost all knowledge is tentative, and accepting it cheerfully. You may be required to change your belief tomorrow, if the evidence warrants, and you should be willing and able to do so. That, in essence, is what skepticism means: to believe if and only if the evidence warrants.

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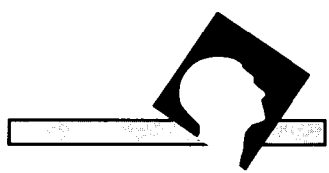
Cold Fusion: A Case History in 'Wishful Science'?

MILTON A. ROTHMAN

Creative science requires an interplay between two opposing modes of thought: imagination and skepticism (T. Rothman 1989). New ideas, concepts, theories, and inventions come into being by the use of free imagination, for only in this manner can elements of reality be arranged into new and unexpected patterns. However, the unfettered imagination, if not linked to reality by observation and experimentation, has a tendency to fly off into the realm of pure fantasy. Good science requires a balance between the opposing impulses of creative fantasy and reality testing. A scientist too much wedded to fantasy is prone to believe in untested hypotheses. On the other hand, too much fixation on mundane reality produces a dogmatic skeptic, a naysayer, the kind who "proves" that people cannot fly, that computers cannot think.



Scientists can fool themselves just like everyone else.

You might think that experimental scientists would tend to be more realistic than theoreticians. After all, their instruments determine what they see, and machines can do only what they must do. Yet Albert Einstein, the theoretical physicist, was the most realistic of philosophers. Many experimenters, on the other hand, are unable to locate the fine line separating fantasy from reality.

While instruments do not lie (although they can make mistakes), perceptual and conceptual hazards beset the experimentalists whenever they must interpret data so as to extract meaning from an experiment. Sometimes they interpret the numbers so that they will agree with a preconceived theory. At this point it is possible for errors to arise if care is not taken.

I have, on more than one occasion, listened to physicists describe results that were clearly beyond the capabilities of their equipment. One nuclear physicist, measuring the energies of gamma rays emitted by materials when bombarded by neutrons, claimed to have detected a large number of different energies in a narrow energy band. He simply ignored the fact that his instrument could not separate energies so close together. The most famous case of this kind is the observation of canals on Mars by the astronomers Giovanni Schiaparelli, Nicolas Flammarion, and Percival Lowell. They wanted to see canals, so they did, even though their telescopes were inherently unable to resolve such structures. (Photographs never showed them.) These experiences illustrate how the experimenters' expectations can color their judgment. Overwhelmingly strong expectations are the chief cause of what we might call "pathological science" or "wishful science."*

A seemingly prize example of wishful science has recently been reported. I refer to the controversy concerning the alleged discovery of "cold fusion," the release of energy from the fusion of deuterium nuclei within a palladium electrode at room temperature. If these reports had been true, then it would have been a discovery of the greatest importance; for the oceans of the world contain enough deuterium to supply civilization with power for many millions of years (Bishop 1958). Therefore a method to extract this power using relatively simple and inexpensive equipment would reward the discoverer with enormous wealth and honor.

Fusion reactions have been studied intensively by nuclear physicists since the 1930s, using particle accelerators to bombard a target with energetic ions. When a deuterium target is bombarded with deuterium nuclei, two different reactions take place, with equal probability. One of these reactions forms a helium-3 nucleus plus a neutron plus 3.2 Mev of energy; the other forms a tritium nucleus plus a proton plus 4.0 Mev. Therefore, whenever fusion takes place in deuterium, neutrons must be emitted. Indeed, this reaction is often used as a source of energetic neutrons.

Research aimed at using the fusion of hydrogen isotopes (deuterium and tritium) to generate useful power has been going on since the mid-1950s. Fusion-power research is based on the idea that to make two nuclei fuse it is necessary to overcome the mutual electrostatic repulsion that prevents them from getting close together. All methods considered in the past have depended on making the nuclei move fast enough to get past the energy barrier. This is done by heating the deuterium gas to extremely high temperatures. An offspring of this effort has been the development of plasma physics, the study of the properties of gases at temperatures so high that they are completely ionized—their atoms stripped of all their electrons.

My own experience in this en-

* In a famous lecture in 1953, the Nobel laureate chemist Irving Langmuir coined the term *pathological science.* He used it to refer to cases in which scientists "perfectly honest, enthusiastic over their work . . . completely fool themsleves." These are cases "where there is no dishonesty involved but where people are tricked into false results by a lack of understanding about what human beings can do to themselves in the way of being led astray by subjective effects, wishful thinking, or threshold interactions. These are examples of pathological science." Perhaps a better term is *wishful science.* (A transcription of Langmuir's lecture, circulated among academics for years, has at long last been published in full, in the October 1989 *Physics Today,* pp. 36-48.)


Fusion in a Jar Announcemer By 2 Chemists Ignites Uproa

Eager but skeptical, othe researchers await detail:

By MALCOLM W. BROWNE

SECOND FRONT PAGE

USA TODAY · THURSDAY, APRIL 13, 1989 · 3A

Fusion: Breakthrough or bust

Scientists excited, but wary

By Bill Nichols and Jack Williams USA TODAY

How fusion works

All the world's a lab

Scientists Say Nuclear Fusion Attained at Room Temperature

ALBUQUERQUE JOURNAL Friday, March 24, 1989

Scientists Claim Fusion Breakthrough

Room-Temperature Reaction Reported

LOS ANGELES TIMES

SALT LAKE CITY — Scientists announced Thursday that they have achieved nuclear fusion at room temperature, a long-sought breakthrough that if confirmed by other scientific experiments could move the quest for nuclear power into an entirely new arena.

a goal that has eluded scores of other scientists who have had at their disposal fusion research reactors costing hundreds of millions of dollars.

"The breakthrough means the

department of chemistry at the University of Utah, and his former professor, Martin Fleischmann, professor of electrochemistry at the University of Southampton, England, announced the results during a news conference on the uni-

several who were aware of the research said that it could not be dismissed. The two scientists have been working on the project for more than five years, and they have spent $100,000 of their own money on it.

"We thought the idea was so stupid that we decided to finance it

Initial cold-fusion claims sparked immediate worldwide excitement, interest and controversy.

deavor was as a member of the research team at the Princeton Plasma Physics Laboratory, where I did experiments with very large, complex, and expensive machines to learn how to heat the plasma to the required temperature. These machines, called *stellarators* (predecessors of the modern tokamaks), cost many millions of dollars to build and required dozens of physicists, engineers, and technicians to operate.

Therefore, when I first read of "cold fusion" in the newspapers, my first reaction was one of incredulity. For these reports claimed release of fusion energy in an apparatus built by two chemists on an ordinary lab table for a cost of less than $100,000. The claims were totally in opposition to the experience of previous fusion research. Yet the question had to be faced: Was it really possible that these people had discovered a reaction overlooked by all others during the past four decades?

The news reports told the following story: The two chemists, B. Stanley Pons and Martin Fleischmann, working at the University of Utah, claimed that they had electrolyzed heavy water (deuterium oxide) by passing electric current between a platinum anode and a palladium cathode immersed in the water. The released deuterium concentrated itself inside the solid palladium, which has long been known to be a good absorber

of hydrogen. When the deuterium within the palladium was sufficiently concentrated—so the story went—the deuterium nuclei fused together, and energy was released. The evidence for this was a measurement of more thermal energy coming out of the device than was put in by the electric current.

Another independent researcher, physicist Steven Jones, of Brigham Young University, had already been working along somewhat the same lines for about two years. His observations showed the emission of a very small number of neutrons, presumably from fusion reactions, but claimed no unusual production of heat. Jones became aware of Pons and Fleischmann's results when he was asked to review a grant proposal they had submitted to the U.S. Department of Energy. Since Jones had facilities for neutron measurements and the University of Utah group specialized in calorimetric measurements, Jones suggested that the two groups collaborate. Pons and Fleischmann were not receptive to the idea, but after some discussion it was agreed that they would submit research papers simultaneously to the prestigious British journal *Nature*. The date chosen for the submission was March 24, 1989 (Pool 1989).

On March 23 the University of Utah group called a news conference, at which they announced the results of their experiments. This was the day before they sent their paper to *Nature*. University officials stated that the reason for the premature press conference was that too many rumors and publicity leaks were already circulating and that it was important to claim priority for patent purposes. Jones felt that he had been sandbagged. *Nature* did not publish the Pons-Fleischmann paper because it wanted more details, and the experimenters—by that time up to their necks in controversy—were too busy to comply. Therefore they simply withdrew the paper ("Fusion Illusion?" *Time*, May 8, 1989, p. 72). In the meantime, the governor of Utah announced that he would ask the state legislature to provide $5 million for a fusion research lab at the University of Utah.

Following the initial Pons-Fleischmann news conference there was a stampede by dozens of labs to replicate the cold-fusion experimental results. Even though many physicists were dubious about the claims, they felt it necessary to duplicate the experiment in order to be sure they were not missing something new. Initial reports were conflicting. Some laboratories measured heat and no neutrons; others measured neutrons but no heat. Some of the experiments exhibited symptoms of hasty planning and execution. A group from the Georgia Institute of Technology reported copious neutrons issuing from the apparatus. Later they said their neutron detectors were curiously sensitive to temperatures. Finally they retracted their results entirely, blaming faulty detectors.

Theoreticians also had their day. Most prominent was Peter Hagelstein, of MIT, who tried to explain how a new kind of fusion reaction could produce heat without generating neutrons. This theory claimed that two deuterons joined to form a helium-4 nucleus, depositing the extra energy directly into the lattice vibrations of the palladium crystal. MIT promptly filed patent applications. Others tried to explain how the heat could be produced by reactions other than nuclear. Later, Hagelstein retracted his theory.

After the initial period of stumbling about, the more cautious labs had their say. Caltech, MIT, Yale, Brookhaven, Oak Ridge, and others said

their measurements had produced no evidence of either heat generation or emission of neutrons. As far as they were concerned, "cold fusion" was not taking place in beakers of heavy water. A meeting of the American Physical Society held in May unanimously rejected the Utah claims.

Whereupon members of the Utah contingent issued rude statements about "the mean bullies from the Eastern establishment," and things degenerated into a name-calling bout between the chemists and the physicists.

The negative statements from the various physics labs failed to stop the controversy. Those hoping for some important new discovery continued to explore various exotic aspects of the experiments. Some thought that electric fields established within cracks inside the palladium electrode might be accelerating deuterium ions so as to create a small number of fusions.

On June 15, an announcement from the Harwell Laboratory, the British government's major fusion laboratory, dealt a death blow to hopes for cold fusion. Working with the full cooperation of Martin Fleischmann, ten Harwell scientists had spent three months and a half a million dollars trying to replicate the original Utah experiment. After trying eight different types of palladium metal, they failed to find either production of fusion byproducts (helium-3, helium-4, or tritium), generation of heat, or emission of neutrons. A few weeks later, a committee formed by the

Tests, critical scientific scrutiny led to disillusionment and rejection.

Department of Energy in Washington concluded that there was no persuasive evidence of a new nuclear process called cold fusion and recommended the DOE not fund any new facilities or research efforts to find cold fusion.

What is the average citizen to make of this confusion? If even experts disagree, what can the layman do? What he can do is to sit tight and adopt an attitude of skepticism. An attitude of skepticism is not the same as an attitude of cynicism or disbelief. With proper skepticism one applies simple rules for judging newspaper stories (M. Rothman 1988). Some of these rules and their application to the cold-fusion controversy are:

1. *Don't believe everything you read or hear.*

The history of science is littered with theories that have fallen by the wayside and discoveries that have turned out to be illusory. Two examples are the claims of the detection of gravity waves and magnetic monopoles. While these discoveries were reported in legitimate scientific journals, most physicists doubt that anything was actually observed, because nobody but the original observer was able to get the same results. Nevertheless, the work was properly carried out, possible errors were thoroughly analyzed, and procedures and results were published for all to see.

Contrast this protocol with the cold-fusion proceedings, starting with the announcement to news media of a scientific discovery before it was published in a refereed scientific journal. The purpose of refereed publication is to ensure that the paper gives all the essential details of an experiment so that others can duplicate it. If an experiment cannot be duplicated, then it cannot be trusted, particularly if there are independent reasons for doubt (see Rule 3 below). Pons and Fleischmann violated this fundamental rule of research etiquette. Therefore skepticism was an appropriate response to their claims.

2. *Cast a cold eye on studies and experiments from which different workers elicit different answers.*

Contradictory results are endemic to studies in which one looks for small signals within a noisy background. Currently in the headlines are questions about the health effects of 60-cycle electromagnetic (EM) fields. The effects, if any, are so small that they are not easily detected, and so some of the studies say EM fields are bad for you, and other studies say there is nothing to worry about. A similar phenomenon is currently taking place among researchers looking for new kinds of gravitational fields. Some people say they have found a new, weak gravitational field that acts as a repulsion. Others claim a new field that does not follow the usual inverse-square law. The measured effects are so small that they are almost imperceptible. There is a possibility that the anomalous effects arise simply from errors in accounting for the distribution of mass in the earth's crust.

The research described above is legitimate. The cold-fusion experiments, on the other hand, are not dealing with tiny effects hidden by noise. If the process is to be useful as an energy source, cold fusion should generate easily detectible amounts of heat. Yet the reported results were as contradictory as possible. Some workers claimed generation of heat without emission of neutrons; others claimed detection of neutrons but little heat. Some who claimed neutrons then withdrew their claims because their detectors were not working properly. Then, when the

more cautious labs came in with their results, their unanimous finding was that nothing was happening. This sequence of events is evidence of wishful science.

3. *If a claim is made for a phenomenon that violates one or more of the laws of nature, be doubly cautious.*

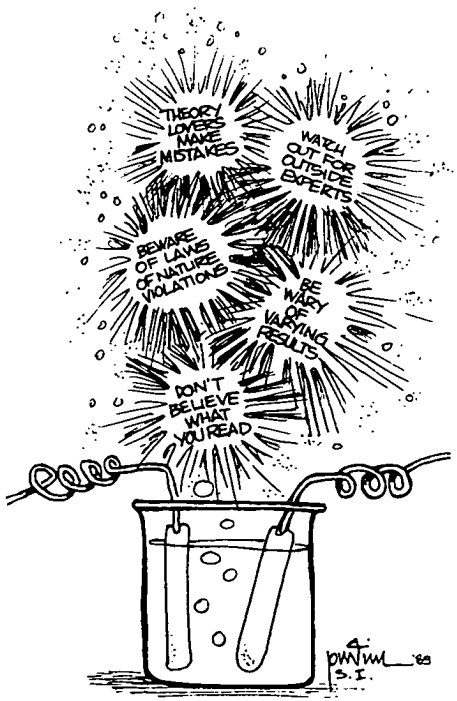
A law of denial is a law of nature that forbids the performance of certain actions (M. Rothman 1988). Two examples: (1) conservation of energy says that no reaction can take place that changes the amount of energy in a closed system; (2) conservation of momentum says that no reaction can take place that changes the total momentum of a closed system. We use these laws to decide between possibility and impossibility. Thus, when trying to judge an anomalous claim or a new theory, we must ask whether any law of denial is being violated.

But, in dealing with cold fusion we must first ask what kind of reaction is taking place. If known nuclear fusion reactions were taking place within the bottles of deuterium oxide, the neutron flux emitted would have been hazardous to the health of those in the lab. For each watt of power generated, the neutron flux at a distance of one meter would have amounted to about 4 rem/hour. This is far more than is allowable. Was any shielding seen around the apparatus in the Utah lab? No exceptional numbers of neutrons were detected by any of the later experiments.

For this reason some people have theorized that a new kind of nuclear reaction must have been taking place, perhaps one in which two deuterium nuclei fuse to form helium-4, giving the energy resulting from the reaction directly to vibrations of the palladium crystal lattice, without the emission of neutrons.

Two objections can be raised to this theory. First, it would be extremely odd if the environment *outside* the deuterium nucleus could *suppress* the normal nuclear reactions and substitute a previously unknown reaction. Therefore we must be given a reason for believing that the well-known and normal fusion reactions were *totally* replaced by a new and strange reaction. But even more important is that any reaction proposed must obey conservation of momentum. If the result of a reaction moves in one direction, something else has to move with equal momentum in the opposite direction.

How does this law apply to fusion? When two deuterium nuclei fuse together, the resulting "compound nucleus" has an excess energy of 23.6 MeV. Normally it gets rid of this energy by splitting into smaller particles that move off in opposite directions. There is also the possibility that a high-energy gamma ray photon



might be given off, with the helium-4 nucleus recoiling in the opposite direction. There is no mention of 23 MeV photons being observed. Instead, we are asked to believe that the 23 MeV energy is imparted directly to the crystal lattice, which then twangs like a tennis racquet. If you claim this mechanism, then you must explain what kind of force does the pushing. There is no nuclear force in existence that can cause this kind of action. The entire theory is highly implausible and was rightly withdrawn soon after being proposed.

4. *Be skeptical of the opinions of experts outside their areas of expertise.*

The difference of opinion between the physicists and the chemists about the worth of the cold-fusion experiments is going to fuel many dissertations by sociologists of science. The case illustrates vividly how scientific opinions are fashioned by subjective social causes as well as by objective evidence. It would be natural for chemists to side with their compatriots. However, it is also significant that the experiments of the physicists tended to show the absence of cold fusion, in disagreement with the more positive results of the chemists. In my opinion the reason for this difference is that the physicists were more experienced than the chemists in this kind of work and also more skeptical in their attitude. Also, the physicists are more accustomed to thinking in terms of particle and nuclear reactions.

It is in the area of neutron measurements that differences were most apparent. The initial newspaper accounts of Pons and Fleischmann's experiment did not even mention neutron detection, even though neutron emission is the prime indicator of fusion reactions. Later reports indicate that Pons and Fleischmann did use an indirect method for counting neutrons and found a flux a billion times smaller than would be expected if the heat production was a result of known fusion reactions. Jones's neutron count (obtained with a proper neutron spectrometer) was a hundred thousand times smaller (Levi 1989). Yale and Brookhaven found ten times fewer neutrons than Jones.

Careful measurements of neutrons require expertise. When Georgia Tech announced that copious neutrons had been detected coming from a cold-fusion reaction, then confessed that their neutron detector was strangely sensitive to temperature changes, and finally admitted that their results had been obtained with a malfunctioning detector, it was apparent that nonexperts were involved. When a physicist sets out to measure neutron flux, he first uses a radioactive neutron source to calibrate his detector so that he knows how many neutrons he is measuring. He then makes a background count in which he measures the neutron flux in the absence of a source. He then turns on the reaction of interest and counts the neutrons coming out of the reaction, if any. This procedure would have avoided the announcements and retractions seen in the press. The statement that the neutron counter was sensitive to temperature changes was absurd. There is no reason for a proper neutron counter to be temperature sensitive.

5. *Be wary of scientists (and economists and theologians) who fall madly in love with their own theories.*

Readers of this journal are familiar with this phenomenon. Except for cases of outright fraud, claims of the paranormal are invariably made by persons obsessed with their theories. This obsession interferes with scien-

tific research, since it encourages the scientist to make errors in judgment and procedure that tend to reinforce his or her own beliefs. The potential importance of the cold-fusion research made it essential that the most stringent controls be used and that particular care be taken in analyzing possible sources of error. Jones compared neutron fluxes obtained using ordinary water with those obtained with heavy water and found a difference. There is no mention of this sort of control in the University of Utah experiments.

Those of us on the outside have no way of getting inside the minds of Pons and Fleischmann to determine how much wishful thinking was involved. We have no way of divining how much responsibility should be laid at the feet of Chase Peterson, president of the University of Utah. We do know that the decision to hold a press conference before publication of the research results was motivated entirely by the anxiety to establish priority for purposes of obtaining patents and research grants. We know that Chase Peterson was at the side of Pons and Fleischmann when they testified before the House Committee on Science, Space, and Technology and asked for $25 million to set up a fusion research center at the University of Utah. Considering the enormous implications of fusion for the future of humankind, it would be surprising if psychological pressures did not play a part in distorting the interpretation of the experimental results.

The irony of the situation is that the betrayal of Stephen Jones by beating him to the press would not have done Pons and Fleischmann any good so far as obtaining a patent is concerned. Jones's dated notebooks proved that he had been already working on cold fusion for two years.

Consider the precedent of the scandal revolving around the invention of the digital computer. The ENIAC, built by John W. Mauchly and J. Presper Eckert at the University of Pennsylvania in 1946, was long accepted as the first automatic electronic digital computer. However, between 1937 and 1942 a man named John V. Atanasoff had developed and built an electronic digital computer on his own. Furthermore, Mauchly had observed Atanasoff's computer and knew how it worked. Because of Atanasoff's retiring personality, he made no claim on the patent until much later. Finally, in 1973 a court decision gave Atanasoff proper credit and patent rights. As any lawyer will tell you, a patent is mainly useful as a license for going to court.

One sign of wishful science was Pons and Fleischmann's refusal to disclose important details of their work that would have assisted others in replicating it. Their paper in the *Journal of Electroanalytical Chemistry and Interfacial Electrochemistry* was too sketchy to be of much use. Another sign was their insistence that their work was still valid even after many other labs had failed to show evidence of cold fusion.

Many man-hours of work will be expended to explain the anomalous results that were obtained by several observers. It is possible that something unusual was actually happening in those experiments that showed emissions of small numbers of neutrons. These experiments are still hard to explain and deserve explaning, but there is essentially no chance that cold fusion is going to become a source of energy in the future.

It was exaggerated belief in a theory that tilted the cold-fusion work into disaster. Without that psychological factor the case would simply have been a matter of experi-

mental error or misinterpretation of results, unfortunate circumstances that can happen to anybody. If the results obtained by Pons and Fleischmann had been sent to *Nature* without the initial publicity, the paper would have been reviewed according to normal procedure. Perhaps more information would have been requested by the journal. Perhaps a little later it would have been published. Eventually the published results would have been challenged by others, but there would not have been the feeling that something awful had happened. There would have been simply a minor embarrassment, something that could happen to anybody.

But overenthusiasm and apparent greed and hubris changed a minor event into a major embarrassment for all of science. The manner in which scientists are perceived by the public has been dimished as a result of this affair. Fortunately, science is a self-correcting enterprise. The community of scientists responded in a responsible manner by trying the cold fusion experiment in many independent labs before passing judgment.

Maybe the next college president tempted by fame and fortune will think twice before he encourages his professors to rush toward a conclusion that should be based on hard science rather than on politics. Perhaps in the future congressmen will allow scientists to decide among themselves who is doing valid work.

In the long run the controversy may have been for the best. The publicity helped the public see that science is not simple and that scientists are human beings. When millions or billions of dollars hang in the balance, scientists can get tempted into folly as easily as stock speculators can.

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The Airship Hysteria Of 1896-97

ROBERT E. BARTHOLOMEW

DURING the "Great Airship Wave" in the United States between November 1896 and May 1897, thousands of Americans claimed to have observed an airship.[1] This vessel was typically described as cigar-shaped, having wings and/or propellers and an attached undercarriage; yet, in terms of historical context, the nineteenth century lacked the technological sophistication to successfully fly heavier-than-air machines (Sanarov 1981:164; Klass 1976:302). The Wright Brothers did not fly until 1903, and attempts at earlier heavier-than-air flight were crude and erratic at best. According to British aviation historian Charles Gibbs-Smith (Clark and Coleman 1975:133):

> Speaking as an aeronautical historian who specializes in the periods before 1910, I can say with certainty that the only airborne vehicles, carrying passengers, which could possibly have been seen anywhere in North America . . . were free-flying spherical balloons, and it is highly unlikely for these to be mistaken for anything else. No form of dirigible (i.e., a gasbag propelled by an airscrew) or heavier-than-air flying machine was flying—or indeed could fly—at this time. . . .

Ambiguity, anxiety, excitement, newspaper articles, and fallibilities of human perception contributed to a wave of sightings.

Sociocultural Perceptions

During the period of the outbreak, although speculation about the stimulus for the sightings varied from misperceptions of natural or manmade bodies (i.e., heavenly bodies or fire balloons) to hoaxes, hallucinations, and so on, the overwhelming belief existed that an inventor

had secretly developed the first practical airship.

In terms of sociopsychological expectations of the era, most Americans possessed at least a general idea of how an airship and its occupants should appear. This conception was shaped by the popular literature of the time, which contained large volumes of stories on the sensational, and thus highly marketable, subject of attempts at early flight.

Aerial flight was very much in the public eye just prior to the wave. In 1895, the Swedish explorer Salomon August Andrée made headlines describing plans for an Arctic balloon trip, which he unsuccessfully attempted in 1896, just two months before the outbreak. Andrée died in a second attempt the following year. On May 6, 1896, Samuel Pierpont Langley, described by Gibbs-Smith (1985:63) as "the first major aeronautical figure in the United States," made headlines after successfully testing in flight his large aeroplane model no. 5. About one month before the outbreak, the *New York Times* (September 28, 1896) carried an article with front-page headlines describing the crash of the experimental airship *Albatross:* Inventor/navigator William Paul narrowly escaped serious injury after his craft "dropped rapidly, beat into a clump of trees, and fell." The article concludes: "The inventor says the experiment was unsuccessful because of the quartering northeast wind, and that but for this he would have made a flight to astonish the world."

Further, intense interest in the invention of mechanical contrivances, especially air machines, developed in the early 1890s and resulted in a major weekly series beginning in 1892 that achieved widespread readership (Clarke, 1986:589).

The sightings occurred in two separate waves: the first from November 17 to mid-December 1896, and the second, January 22 to May 1897 (Bullard 1982a:207, 211).

Sensationalistic "yellow journalism" typified the period just prior to and encompassing the sightings as newspapers often reported highly speculative stories (or in some case even made up stories) on a wide range of events. One purpose was to create news on "slow news days," in order to increase circulation (Hiebert, Ungurait, and Bohn 1982). One story in particular generated a tremendous amount of newspaper and magazine coverage speculating about the identity of an apparently fictitious airship inventor said to have been constructing such a craft. Whatever the editors' motivation, on November 1, 1896, the *Detroit Free Press* reported that in the near future a New York inventor would construct and fly an "aerial torpedo boat." Sixteen days later, the *Sacramento (California) Bee,* printed a telegram from a New York man claiming he and two friends would board an airship of his invention and fly to California, which he promised to reach within two days. Coincidentally, that night the first sightings in the 1896-97 wave were recorded as hundreds of witnesses in Sacramento reported sighting an airship.

This report, and the ones to follow, seemed to spark a snowball effect. Speculative stories about the possible existence of an airship and inventor(s), in addition to reports of other sightings, appeared in hundreds of newspapers and in nearly every state. Based on a collection by T. E. Bullard (1982b) of more than 1,000 separate airship-related newspaper stories from this period, a conservative estimate of the number of alleged individual sightings would be 100,000, as several sightings were said to have involved participa-

tion by entire cities and towns.[2] Bartholomew (1989) has analyzed newspaper accounts of witnesses during the wave who (usually alone, at night in isolated areas), similar to those in modern UFO waves, claimed to have conversed with the pilots. However, unlike modern-day encounters, witnesses described occupants "who appeared to be ordinary American citizens and claimed that their invention was about to revolutionize travel and transportation" (Sachs 1980:9).

Literature Survey

A survey of mass-hysteria literature reveals the importance of three key elements in the composition of any case: ambiguity, anxiety, and a redefinition of the situation from the general to the specific. Hall (1972:216) summarizes the role of these elements:

> The recipe for this type of hysterical outbreak is a combination of a high level of anxiety or tension with some kind of ambiguous event which is interpreted as posing a serious threat. The ambiguous event is transformed, in beliefs, into an unambiguously threatening event which apparently justifies the diffuse anxiety which was its antecedent.

Hall, a UFO proponent, finds fault with the suggestion that many UFO reports (past or present) are due to hysterical contagion. One of his central arguments is that UFO witnesses often fail to interpret the incidents as serious personal threats. Thus witnesses are frequently excited but not scared during an incident. I will argue that contagion can occur in situations where the actual hysterical belief is nonthreatening. The 1896-97 airship wave is viewed as a case of collective wish-fulfillment as a response to rapid sociotechnological strains and to rumors that someone had invented the world's first practical airship.

Generalized Belief

In the years leading up to and immediately prior to the airship sightings, the possibility that someone would soon perfect the first practical heavier-than-air flying machine was the subject of widespread speculation in science-fiction stories. This was given special emphasis as the twentieth century approached. In the 1890s, Americans were obsessed with science and inventions. According to Clarke (1986:589):

> The Frank Reade Library [was] . . . designed to meet the insatiable demand for tales of mechanical novelty by concentrating on a nonstop run of invention stories. The series opened on 24 September 1892 and continued for 191 issues. It was the first serial publication of any size ever to be devoted exclusively to science fiction stories; and every issue throbbed with the dynamism of coming things—robots, submarines, flying machines . . . and the rest of the imaginative bric-a-brac of an age that was in love with the great wonders of science.

Bullard (1982a:203) also notes that from about 1880 through the early twentieth century widespread publicity in books and magazines helped to mold a common belief that a heavier-than-air vessel would be perfected imminently:

> Magazines devoted to science and engineering vied with Jules Verne's *Robur the Conquerer* and other fictional publications to describe the flier which would soon succeed, and this literature fed the public a steady diet of aeronautical speculation and news

to prime people for the day when the riddle of aerial navigation finally would receive a solution.

Further fueling this generalized belief were the growing number of failed aerial trials making news. Although all were unsuccessful in perfecting a practical airship, during "the late 1890s numerous inventors in the United States obtained patents for planned airships" (Brookesmith 1984:107; Jacobs 1976:27).

Ambiguity

The boom in airship patents during the latter 1890s coincided with the airship wave. (For actual reproductions of some of the original patents, see Lore and Deneault 1968:16-17, 38-39). Intense competition to be the first to patent such a machine resulted in a shroud of secrecy, as many inventors often withheld vital data on their patents and experimental craft. As noted in Brookesmith (1984:107), the air of mystery surrounding the state of aerial development only fostered public belief that a practical airship had been developed.

This view is supported by historian David M. Jacobs (1976:27-28):

> In the late 1890s many people in the United States obtained patents for proposed airships. Most people believed someone would soon invent a flying machine, and many wanted to capitalize on the fame and fortune that would certainly come to the first person to launch an American into the skies. As soon as someone had a glimmer of an airship design, he immediately applied for a patent. These would-be inventors constantly worried over possible theft or plagiarism . . . [and] most people kept their patents secret. Given this atmosphere and the numerous European and American experiments with flight, it is not surprising that secret inventor stories so captured the public imagination and seemed such a logical explanation for the airship mystery.

Environmental factors further contributed to ambiguity during the episode. As there were a minimum of several thousand sightings, a specific breakdown of each case is unfeasible. However, Bullard (1984, personal communication), commenting on the approximately 1,000 newspaper stories detailing sightings that he had collected during the wave, noted that approximately 80 to 90 percent of the cases were reported to have occurred at night. Other researchers have noted the overwhelming tendency of the airships to appear at night (Berliner 1978:2; Sanarov 1981:166). Also, the wave occurred primarily during the winter months and abruptly ended in early spring, coinciding with a reduction in hours of sunlight.

Further inducing ambiguity were the mysteries associated with the airship. Who actually was the inventor? How had he accomplished this great feat? Who helped him, if anyone? Where was his secret hideout? Where would he test his machine next?

Anxiety and Intense Excitement

The wave occurred during a period of rapid technological change and amid intense public interest in airship development. As detailed earlier, a widespread belief circulated in the United States just prior to the outbreak that someone had invented the world's first practical airship. A major role in spreading this belief was played by period newspapers, characterized by sensationalism and intense speculation on issues of the day. Newspaper publisher William Randolph Hearst noted this in an editorial attacking such press coverage:

> "Fake journalism" has a good deal to answer for, but we do not recall a more discernible exploit in that line than the persistent attempt to make the public believe that the air in this vicinity is populated with airships. It has been manifest for weeks that the whole airship story is pure myth. (Klass 1976:314, citing *San Francisco Examiner*, December 5, 1896)

Bullard (1982a:224) and Klass (1976:314-315) also concur with the belief that newspapers exerted considerable influence in perpetuating and maintaining the outbreak.

A. M. Herring, writing in the *Scientific American* of June 26, 1897, noted the intense experimentation and the widespread publicity of the belief that a practical airship existed in the late 1890s, but "especially" in the period of time coinciding with the airship outbreak:

> This line of experiment has resulted in such great progress in the last few years (and especially so in the last six months) that attainment of long, free flight for man, which not long ago seemed an invention for the far distant future, is a thing now near, if not quite at hand. (403)

Neeley (1979:68) attributes the episode to social stress fostered, in part, by rapid technological changes. Neeley surveyed 223 Illinois newspapers during the outbreak. He clearly applies his Illinois findings to the larger pattern of reports across the United States:

> Let us first consider the people of 1897. They lived in very interesting and stress-filled times. They were amazed at the technological achievements of the time. The telephone was merely fourteen years old, electricity had just been made available for practical uses, x-rays had been discovered merely two years earlier. The horseless carriage was just around the corner as was flight. They had just dealt with a bad winter and spring had brought forth one of the greatest floods to hit the Midwest. It was raining constantly and only snow broke the monotony. A clear sky was a rarity. Affairs had just returned to normal following the Civil War and there were accounts of wars in Greece and Cuba. . . . Jules Verne was writing stories of . . . an electric airship. Suddenly the skies clear and in the northwest a bright light was seen. The cry "Airship!" went up and a crowd gathered to watch. Soon a cloud obscured it and the airship had "left." Or a bright light was seen in the southeast and the witnesses "followed" its path behind a cloud until a bright light was seen in the northwest. Surely they had seen the airship cross the sky.

Redefinition of the Situation

The airship wave occurred in two separate phases: the first primarily between November 17 and mid-December 1896, and the second between January 22, 1896, and late May 1897. The separate waves closely paralleled newspaper accounts of where the airship would appear. For instance, the overwhelming majority of sightings in the 1896 wave took place in California, and all of the sightings occurred within the general Pacific Coast region (Bullard 1982b). From a definitional view, it's interesting that the popular belief prior to and during the November-December 1896 wave held that an inventor would fly an airship to California and then slowly progress back across the country, ending in New York. The popular newspaper accounts circulating during the second wave (although there were a variety of stories) centered around

an inventor partaking in a transcontinental airship flight. One story told how the inventor would fly his airship across the country to Washington, D.C., where he would take out a patent. Another speculated that the United States government was secretly testing an airship by flying it across the country. Coincidentally, the second wave began in the western United States and worked its way eastward in an erratic but systematic pattern, so that the 1897 wave closed abruptly in early May with sightings on the coastal northeast:

> Suddenly the climax. The conclusion to the extraordinary transcontinental voyage was reached. On April 30, 1897, the great airship was seen over Yonkers, New York . . . at 3 A.M. . . . toward the sea.
>
> . . . Curiously, when the 1896-97 complex stopped, for all practical purposes it stopped cold. Various sightings continued to be recorded through the years, but this particular phenomenon reached a dead end at the shores of the Atlantic. . . . Virtually no new sightings emerged from the areas over which it had soared. It was all over. (Flammonde 1977:115-117)

During both waves, the cultural expectation of the time frames appears to have been shaped and defined by newspaper accounts and subsequently fulfilled by the pattern of reports. It appeared that the collective consciousness, as reflected and defined in newspaper stories, created a consensual belief that the airship had completed its transcontinental flight. This would explain not only the general west-to-east pattern across the country but also the abrupt end to the wave.

A survey of the more than 1,000 original airship reports from United States newspapers collected by Bullard (1982b) shows that most sightings of unidentified aerial objects between November 17, 1896, and May 1897 closely paralleled popular literature accounts of early heavier-than-air travel attempts. An examination of Bullard's data shows that whenever specific descriptions of airships were given, beyond the interpretation of ambiguous nocturnal aerial lights, eyewitness accounts vacillated between two types of craft. One was a large oblong or egg-shaped main structure having wings similar to those of a bird. These wings were frequently reported to be "flopping" in a birdlike manner. The second craft type also consisted of a large central portion, but sported propellers or fanlike wheels. Both types of craft were said to possess powerful searchlights and some type of motor propulsion system, and often had a carriage suspended under the main structure. The drawing in Figure 1 is of an airship reported by hundreds of persons on November 23, 1896, over the city of San Francisco. The description conforms to cultural expectations of how an American citizen of 1896 would project such a craft to appear. None of the vessels were described in terms of more contemporary disc or saucer shapes. Other sightings during the wave resembled a common type of UFO description. (See Figure 2.)

These descriptions closely mimic early heavier-than-air flight attempts. For instance, the first known manned powered flight was Heneri Giffard's steam airship (Figure 3). The large cigar-shaped top portion, with a smaller basket underneath, featured a structural design commonly reported 45 years later during the 1896-97 U.S. airship wave.

Figure 4 shows a model of the first airship to complete a circular flight. On August 9, 1884, the *La France* flew nearly five miles at an average speed of 13 miles per hour. A very similar type of airship was reported on April 10, 1897, over the city of Chicago.

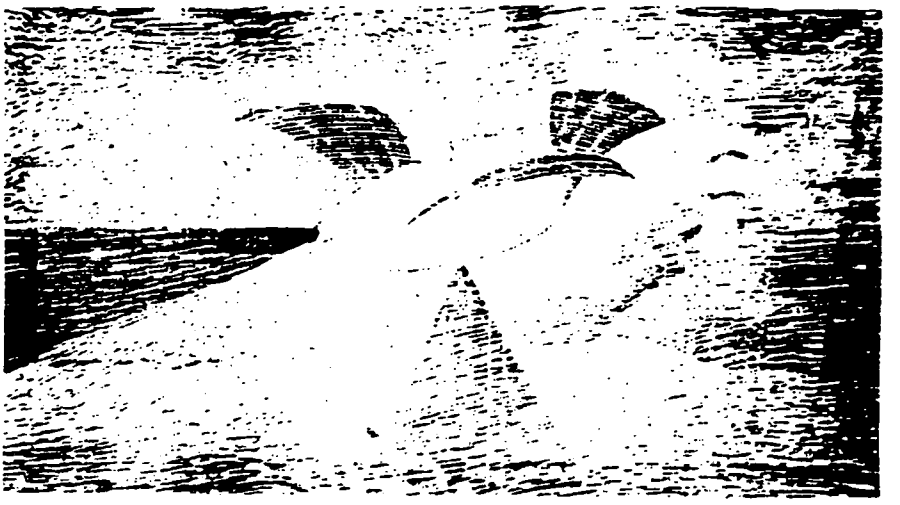

FIGURE 1. An artist's rendition of the airship reportedly seen by hundreds of people over San Francisco on November 23, 1896. (Source: *San Francisco Call*, November 23, 1896, p. 1.)

Grabbing his son's box camera, Walter McCann claimed to have taken two photographs. An etching of the best photo, appearing on the front page of the *Chicago Tribune* of April 12, is depicted in Figure 5. The picture was taken as the craft allegedly sailed over a suburb at approximately 6 A.M. The pictures were taken during the height of a monthlong airship wave in Illinois, with thousands of reported sightings.

Conclusion

In the presence of the widespread airship rumors holding that such an invention was on the verge of perfection, the ambiguity of the nighttime sky, and the intense emotions held by many Americans that such a dramatic achievement was at hand—and the fanning of these emotions by speculative and often fabricated newspaper stories—people attempted to relieve their emotionally aroused states by looking to the skies for proof or disconfirmation of the airship-invention stories. They expected to see airships and saw them. Whereas

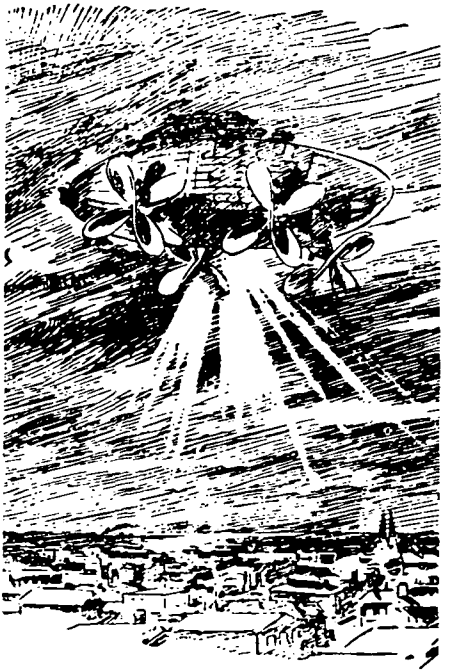

FIGURE 2. Airship sighted over Oakland, California, between November 17 and 19, 1896. (Source: *San Francisco Call*, November 19, 1896, p. 1.)

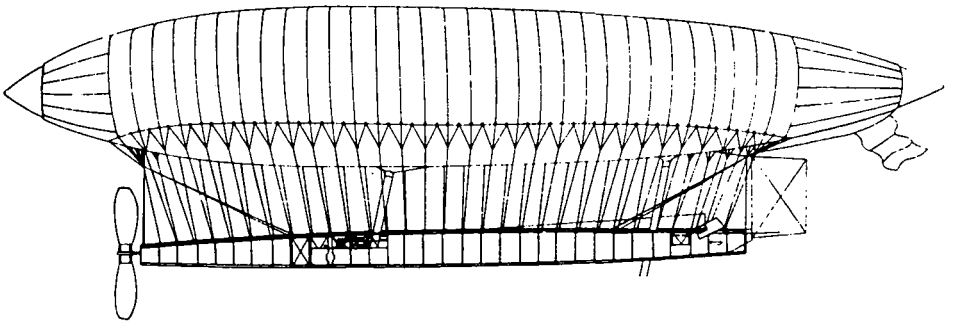

FIGURE 3. Heneri Giffard's 1852 steam-powered airship. (Source: B. Collier, *The Airship: A History*, Hart-Davis, MacGibbon, London, 1974, p. 29.)

contemporary people collectively perceive "flying saucers" from outer space, citizens in 1896-97 were predisposed by popular literature of the era to see airships. Research on autokinetic movement appears applicable, as it concerns problem-solving dynamics (Turner and Killian 1972:35). Interpretation of ambiguous stimuli within a group setting will result in members' developing an increased need to define the situation, depending less on their own judgment for reality validation and more on the judgment of others (reality testing).

> When the stimulus situation lacks objective structure, the effect of the other's judgement is . . . pronounced. . . . In one . . . study of social factors in perception utilizing the autokinetic phenomenon, an individual judged distances of apparent move-

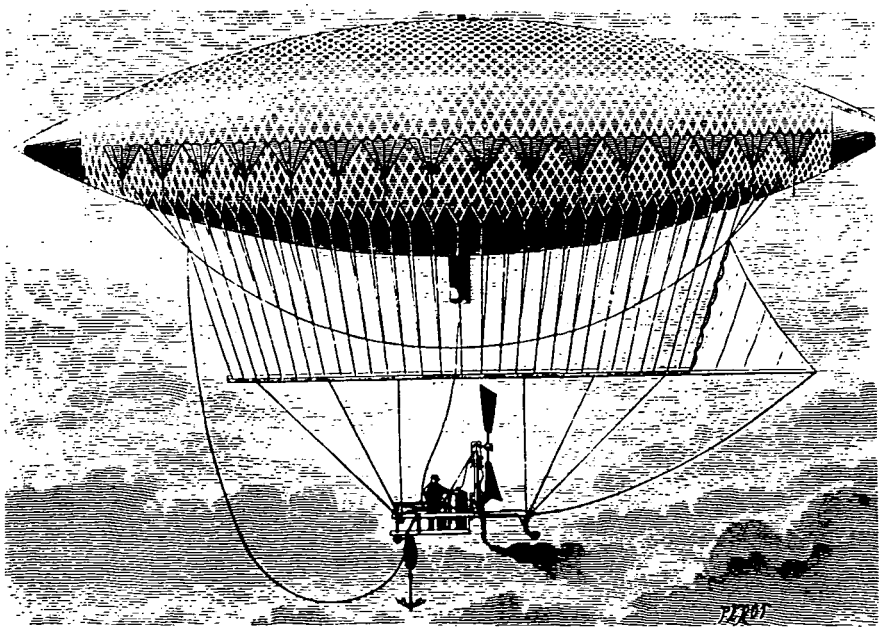

FIGURE 4. The *La France* circa 1884. (Source: C. H. Gibbs-Smith, *Flight Throughout the Ages*, Thomas Y. Crowell, New York, 1974, p. 76.)

FIGURE 5. Walter McCann's alleged photo of an airship over Chicago. (Source: *Chicago Tribune*, April 12, 1897, p. 1.)

> ment first alone and then with two or three other subjects. This unstructured situation arouses considerable uncertainty. Even though they were not told to agree and were cautioned against being influenced, the individuals in togetherness situations shifted their judgement toward a common standard or norm of judgement. . . . The influence of various individuals differed, and the emerging common norm for judgement was in various instances above or below the average of individual judgements in the initial session alone. (Sherif and Harvey 1952:302)

Research on the "autokinetic effect" is of more specific interest, as it has shown that individual judgments tend to agree in a group setting while observing the common stimulus of a pinpoint of light within a dark environment. This effect is well known in social psychology and was first demonstrated by Sherif (1936). Individuals in situations lacking in stable perceptual anchorages begin to feel a sense of uneasiness, with anxiety generated as the person experiences a heightened need to visually define or make sense of the light. In group settings, individuals will attempt to reduce the anxieties created by an uncertain situation. Beeson (1979:180) outlines this process:

> A viewer in a completely dark room seeing one pinpoint of light experiences a visual stimulus without its normal attendant visual context. Up, down, back, forward, far and near, exist in relation to other stimuli and when this frame of reference is missing, the light is free to roam in one's perceptual field. It is for this reason that considerable random motion will be experienced by anyone viewing the light.

Within highly ambiguous situations, such as the people scanning the nighttime skies for an imaginary airship, "inference can perform the function of perception by filling in missing information in instances where perception is either inefficient or inadequate" (Massad, Hubbard, and Newtson 1979). Accordingly, individuals with an airship "mind-set" perceived airships. Today, with the existence of a collective belief in extraterrestrials traversing the skies, usually at night, flying saucers are seen. Allan Hendry, former editor of the *International UFO Reporter*, a scientifically orientated UFO publication, provided a good example of this process. He noted in 1978 that a large number of advertising planes had been initially mistaken for UFOs and were described as having been distinctly disc- or saucer-shaped:

> In the three hundred calls that . . . [our organization] has dealt with that were based on confirmed ad planes at night, 90 percent of the witnesses described not what was perceptually available, but rather that they could see a disc-shaped form rotating with "fixed" lights; many of these people imagine that they see a dome on top and, when pressed, will swear that they can make out the outline with confidence.

Overall, the sightings appear to have functioned as a reassuring symbol during a period of great uncertainty with rapid technological changes at the end of the twentieth century. People had great affection for these technological marvels that were changing social patterns that had existed for thousands of years but were simultaneously concerned with the potential destructive power these machines could hold over their lives.

The airship wave functioned to show man's dominance over the untamed and previously sacred skies, leaving them with the comforting belief that a positive element was in control. In the words of Clark and Coleman (1975:163):

> Most of them [Americans] saw the craft as a sort of final triumph of technology, and something about which they must surely have entertained ambivalent feelings. All the talk about bombs and aerial machine guns, pointing toward a time when there would be no safety anywhere, must have been disconcerting in the extreme. Moreover, now the heavens had been violated; men had tainted even the domain of angels.

It is important to note that, although social strains generated by rapid technological advancement were especially acute during this period, Americans sighting these phantom craft clearly did not fear them. Airships were seen as a positive influence in reaction to the negative strains brought about by rapid technological advancements in a variety of fields. Hence the redefinition of the ambiguous, mundane, predominately nocturnal aerial stimuli (i.e., stars, planets) functioned to create a reassuring presence.

Notes

1. A am indebted to T. E. Bullard, folklorist, Indiana University, Bloomington, Indiana, for providing access to original airship data.

2. Any such specific estimate is hazardous. However this figure seems reasonably accurate as a conservative estimate of the minimum number of participants, based on Bullard's data.

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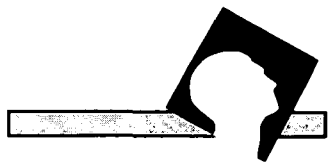
Newspaper Editors and the Creation-Evolution Controversy

MICHAEL ZIMMERMAN

AS THE GREAT population geneticist Theodosius Dobzhansky wrote in 1973, "Nothing in biology makes sense except in the light of evolution."[1] Nonetheless, laws dictating, and in most cases limiting, the evolutionary content of public school curricula have been in existence from 1922 to the present,[2] and repeated surveys of the general public have shown that the vast majority of people are sympathetic toward "creation science."[3] For example, sampling performed by groups as diverse as the Associated Press, the National Broadcasting Company, *Glamour* magazine, and the Institute for Creation Research has yielded similar results: Between 74 and 86 percent of those questioned wanted creationism brought into the public school classroom. These polls further indicated that a significant portion (10 to 16 percent) of the respondents prefer that *only* the creation model be taught.[4] Similarly, studies of college and university students have shown that a wide majority favor the introduction of "creation science" in the public schools,[5] while a recent survey of Ohio high school biology teachers found that at least 15 percent of the high school biology courses offered in that state present "creation science" in a favorable light.[6]

Although in June 1987 the U.S. Supreme Court ruled unconstitutional a Louisiana law that demanded equal time in the public schools for "creation science," it did so on relatively narrow grounds, and the issue of what is



Editors play an important role in informing the public. How knowledgeable are they about the issues in the creationism debate?

to be taught in public schools has not yet been definitively settled.[7] What makes the current debate most frustrating is the fact that the public is so willing to accept creationism as science while scientists themselves view it as a pseudoscience. Within the scientific community "creation science" is simply not a valid alternative to evolution.[8] That such a fundamental difference should exist between the lay public and professionals strongly suggests that communication is poor between the two groups. Such a lack of sophistication among the general public can have serious implications for the types of instruction offered in public schools. Indeed, public school curricula are often influenced in part, if not in whole, by public opinion.[9] Bergman, for example, concluded that since a majority of people favor the two-model approach, educators should move in the direction of implementing such a method of presentation.[10]

With the general public so misinformed about the substance of the evolution–"creation science" debate, an obvious question is: How knowledgeable about this issue are those in charge of informing the public, i.e., how much do the managing editors of the nation's daily newspapers know about this subject? A questionnaire was used to discern the editors' opinions on the general question of whether "creation science" should be introduced in public school classrooms, as well as their knowledge of the specifics of "creation science" and evolution. A number of questions also probed the editorial practices of the newspapers.

Methods

On July 10, 1987, a 29-item questionnaire (see pp. 184-185) was sent to the top news executive at each of the 1,563 daily newspapers in the United States. The first 22 items on the questionnaire were declarative statements; respondents were asked to indicate the degree to which they agreed or disagreed with each. The next seven items were multiple-choice questions. Along with the questionnaire was a covering letter explaining the purpose of the study and promising anonymity. A business-reply envelope was enclosed. A follow-up letter, another copy of the questionnaire, and a return envelope were mailed out to all nonrespondents on October 1, 1987.

Results

Responses were received from 534 (34.2 percent) of the 1,563 newspapers surveyed. Of those responses, 399 (74.7 percent) resulted from the initial mailing, and 135 were received after the follow-up mailing. A large range of circulation sizes was represented (see Figure 1).

To facilitate data analysis, the first 22 items on the questionnaire were divided into four broad categories: general information, "creation science," evolution, and personal opinion (see Figures 2–5). Questions 1 through 6, which comprise the general-information section (see Figure 2), were chosen because they all relate to some of the general premises of creationism. The results suggest that large numbers of newspaper editors were unwilling to disagree strongly with some of the clearly erroneous tenets of "creation science." Only 51 percent of the editors, for example, disagreed strongly with the statement "Dinosaurs and humans lived contemporaneously." Similarly, only 57 percent strongly disagreed with "Every word in the Bible is true"; only 41 percent strongly disagreed with "Adam and Eve were actual

Questionnaire

Use the following scale to rate your opinions on the statements that follow:

1 = Strongly Agree 2 = Mildly Agree 3 = No Opinion
4 = Mildly Disagree 5 = Strongly Disagree

_____ 1. Every word in the Bible is true.

_____ 2. Adam and Eve were actual people.

_____ 3. Most scientists are atheists.

_____ 4. Dinosaurs and humans lived contemporaneously.

_____ 5. The Earth is approximately 4-5 billion years old.

_____ 6. The Earth is approximately 6-20 thousand years old.

_____ 7. Creation science should be impartially taught in public schools. If you answered with a 1 or 2, in what subject? _____

_____ 8. Evolution should be impartially taught in the public schools. If you answered with a 1 or 2, in what subject? _____

_____ 9. Modern evolutionary theory has a valid scientific foundation.

_____10. Creation science has a valid scientific foundation.

_____11. Bringing creation science into the public school classrooms means bringing religion there as well.

_____12. Bringing evolution into the public school classroom means bringing religion there as well.

_____13. I accept the modern theory of evolution.

_____14. I accept the premises of creation science.

_____15. Most scientists accept the modern theory of evolution.

_____16. Aside from comparative religion and allied subjects, religion should not be introduced into public schools.

_____17. The recent U.S. Supreme Court decision overturning the Louisiana "equal treatment of creation science" law was a good one.

_____18. The above court decision was a very important news story.

_____19. Newspapers should devote equal time to creation science and evolution in their columns.

_____20. The mainstream scientific community is unfairly closed-minded with respect to creation science.

_____21. Creation science represents an anti-intellectual movement.

_____22. Creationists are unfairly treated in our society.

Please answer the following multiple choice questions by circling the one letter with which you are most comfortable.

23. Which of the following best agrees with your impression of the modern theory of evolution?
    A. The phrase "Survival of the Fittest."
    B. Evolution occurred because different individuals left different numbers of offspring.
    C. Humans evolved from either the gorilla or chimpanzee of Africa.
    D. Evolution involved a purposeful striving towards "higher" forms (that is, a steady progress from microbes to humans).
    E. Evolution occurred because the strong eliminated the weak.

24. If your newspaper were to receive a well-written story on creation science, it would most likely
    A. Publish it in the religion section.
    B. Publish it in the science section.
    C. Publish it in the general news section.
    D. Not publish it at all.

25. If your newspaper were to receive a well-written story on evolution, it would most likely
    A. Publish it in the religion section.
    B. Publish it in the science section.
    C. Publish it in the general news section.
    D. Not publish it at all.

26. In the past year or so, my newspaper has devoted
    A. Equal space to creation science and evolution.
    B. More space to creation science than evolution.
    C. More space to evolution than creation science.
    D. No space to either creation science or evolution.

27. My newspaper has taken the following editorial position
    A. We are in favor of creation science and evolution being taught in public school science classrooms.
    B. We are in favor of only creation science being taught in public school science classrooms.
    C. We are in favor of only evolution being taught in public school science classrooms.
    D. We are in favor of neither topic being covered in public schools.
    E. We have not taken an editorial position on the issue.

28. The approximate daily circulation of my newspaper is
    A. Less than 10,000
    B. 10,001 to 50,000
    C. 50,001 to 100,000
    D. 100,001 to 500,000
    E. 500,001 to 1,000,000
    F. Greater than 1,000,000

29. Additional comments:

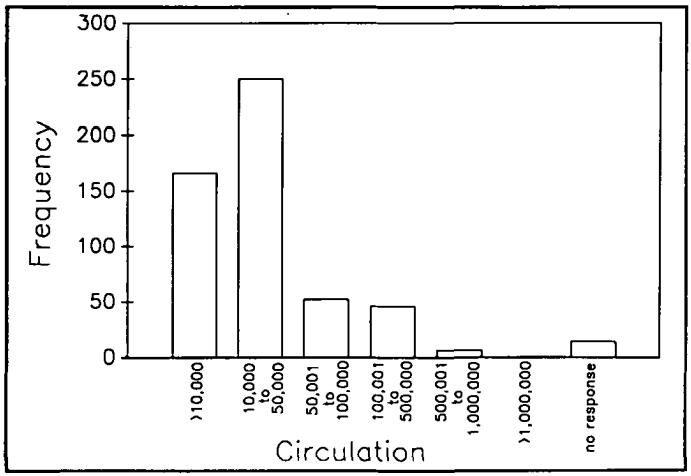


FIGURE 1. Frequency histogram of the circulation sizes of the newspapers responding to the questionnaire.

people"; and only 48 percent of the respondents strongly disagreed when presented with the contention that "most scientists are atheists." Editors had equally serious problems responding to statements about terrestrial chronology. A full one-third of the respondents did not disagree strongly when presented with the statement "The Earth is approximately 6-20 thousand years old." Similarly, only 42 percent of the editors agreed strongly with the correct statement "The Earth is approximately 4-5 billion years old."

Questions 7, 10, 11, and 14 comprise the "creation science" section (Figure 3) and attempt to gauge the respondents' feelings rather than their actual knowledge about the subject. Approximately 37 percent of the editors felt (either strongly or mildly) that "creation science" should be impartially taught in the public schools, although almost two-thirds (65 percent) felt that bringing "creation science" into the public classroom meant bringing religion there as well. Although only 16 percent of the editors thought that "creation science" has a valid scientific foundation, approximately one-quarter of them indicated that they personally accepted the premises of "creation science."

Questions 8, 9, 12, 13, and 15 comprise the evolution section (Figure 4) and, like the "creation science" section, address the editors' feelings rather than their actual knowledge about the subject. An overwhelming majority (88 percent) of the editors felt (either strongly or mildly) that evolution should be impartially taught in the public schools, although only approximately 55 percent strongly disagreed with the statement "Bringing evolution into the public school classroom means bringing religion there as well." An overwhelming majority (86 percent) of the respondents also felt (either strongly or mildly) that evolution has a valid scientific foundation, and only slightly fewer (79 percent) indicated personal acceptance of the modern theory of evolution. Somewhat surprisingly, in light of these numbers, only 48 percent of the editors agreed strongly

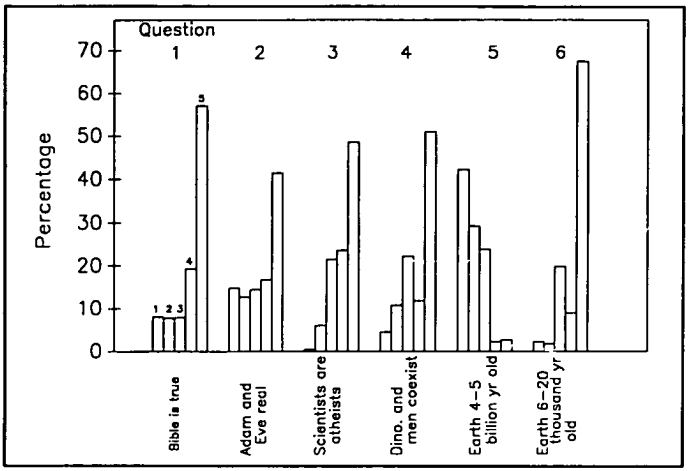


FIGURE 2. Responses to six questions comprising the general-information section and attitude section of the questionnaire. The responses to each question are arranged in the following order: (1) strongly agree; (2) mildly agree; (3) no opinion; (4) mildly disagree; (5) strongly disagree.

with the statement "Most scientists accept the modern theory of evolution."

Questions 16 through 22 comprise the personal-opinion section (Figure 5) allowing respondents to express their opinions on a number of related topics. Although 74 percent of the editors agreed (either strongly or mildly) that the Supreme Court decision overturning the Louisiana "equal time" case was a good one, a full 91 percent felt that the decision was an important news story. Only 56 percent of the respondents strongly agreed that religion, aside from classes in comparative religion and allied subjects, should not be introduced into the public schools. Only 20 percent of the editors agreed (either strongly or mildly) that "creation science" and evolution deserved equal space in newspaper columns, while 24 percent claimed that the mainstream scientific community is unfairly closed-minded with respect to "creation science." Forty-four percent of the respondents thought that "creation science" represents an anti-intellectual movement, while only 18 percent felt that creationists are unfairly treated in our society.

By examining pairs of questions it was possible to determine whether those editors who wanted creationism taught in the public schools agreed with some of its basic premises. A significant percentage of the respondents disagreed with each point, and a full 69 percent of those wanting "creation science" taught in the public schools disagreed with the creationist contention that the earth is approximately six to twenty thousand years old (Table 1), while 67 percent agreed that the earth is approximately four to five billion years old (Table 2). Slightly more than half (51 percent) of those wanting the subject presented in the public schools recognized that "creation science" does not have a valid scientific foundation (Table 1) while less than one-quarter (22 percent) indicated that "creation science" represents an anti-intellectual movement (Table 2).

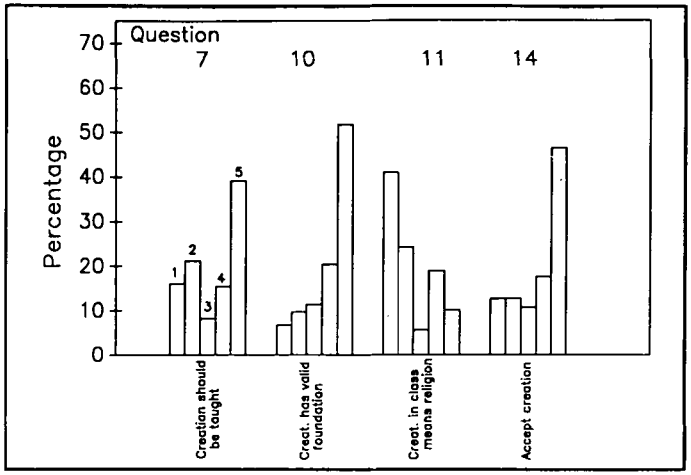


FIGURE 3. Responses to the four questions comprising the "creation science" section of the questionnaire. The responses to each question are arranged in the following order: (1) strongly agree; (2) mildly agree; (3) no opinion; (4) mildly disagree; (5) strongly disagree.

Editors suggesting that either evolution or "creation science" be taught in public schools were asked to indicate the subject in which such instruction should take place. The majority suggested the broad, generic subject of "science" (Table 3). The second most common subject suggested for the teaching of evolution was biology, while it was philosophy/religion for "creation science."

Question 23 allowed editors to indicate which phrase they felt best described the modern theory of evolution. The correct answer is the one referring to differential reproductive rates (B). The remaining options deviate to varying degrees from the correct description. Answers A and E both have to do with survival, and thus are related to the concept of differential reproduction: Dead organisms cannot reproduce. Neither C nor D can be considered accurate descriptions of modern evolutionary theory. The most common answer, that evolution involved a purposeful striving toward "higher" forms (Table 4), was one of those two responses that are not even partially correct.

Questions 24 and 25 asked editors how they would handle stories about "creation science" and those about evolution. The responses to the two

TABLE 1. Percentage of respondents who agreed (either strongly or mildly) that "creation science" should be impartially taught in the public schools who also disagreed (either strongly or mildly) with each of five other statements.

Statement	%
Every word in the Bible is true.	66.8
Adam and Eve were actual people.	39.7
Dinosaurs and humans lived contemporaneously.	48.7
The Earth is approximately 6-20 thousand years old.	69.4
"Creation science" has a valid scientific foundation.	51.3

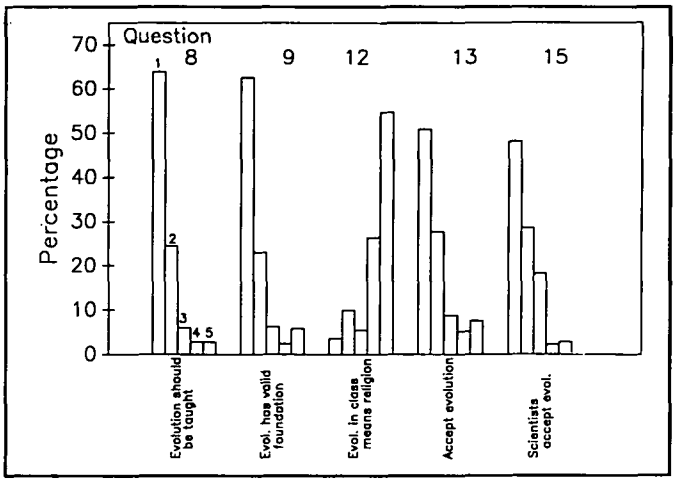


FIGURE 4. Responses to the five questions comprising the evolution section of the questionnaire. The responses to each question are arranged in the following order: (1) strongly agree; (2) mildly agree; (3) no opinion; (4) mildly disagree; (5) strongly disagree.

fields were quite different (Table 5). The most common response to a "creation science" piece was to publish it in the religion section, while the least common response was to publish it in the science section. Conversely, the most common response to an evolution article was to publish it in the general news section, while the least common response to an evolution article was to publish it in the general news section, while the least common response was to publish it in the religion section.

Questions 26 and 27 asked about publishing practices over the past year. A plurality of editors indicated that they had devoted approximately equal space to evolution and "creation science" (Table 6). The second most numerous response was that the newspaper in question had devoted no space to either topic during the preceding year. A majority of the papers took no editorial position on the teaching of these two subjects in public school science classrooms (Table 7). Of the papers taking an editorial position, the majority (64 percent) favored only evolution being taught, while three papers (1 percent) favored only the teaching of "creation science."

Discussion

The results of the questionnaire are, in many ways, quite disturbing.

TABLE 2. Percentage of respondents who agreed (either strongly or mildly) that "creation science" should be impartially taught in the public schools who also agreed (either strongly or mildly) with each of two other statements.

Statement	%
The Earth is approximately 4-5 billion years old.	67.3
"Creation science" represents an anti-intellectual movement.	22.6

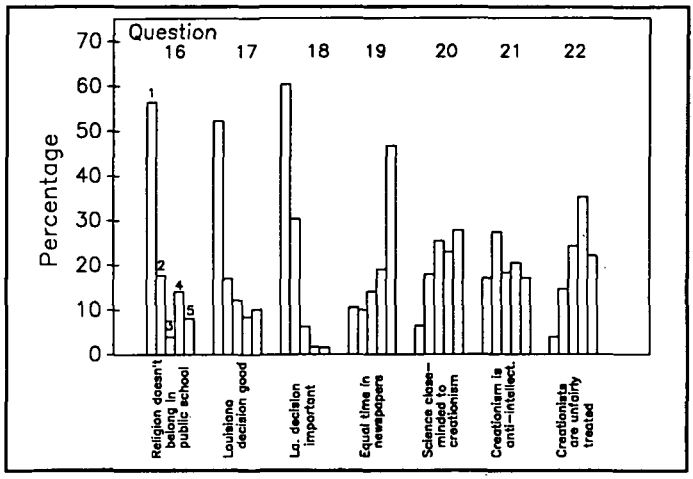


FIGURE 5. Responses to the seven questions comprising the personal-opinion section of the questionnaire. The responses to each question are arranged in the following order: (1) strongly agree; (2) mildly agree; (3) no opinion; (4) mildly disagree; (5) strongly disagree.

Although it is distressing to see so many editors' views at odds with those of the scientific community, it is even more alarming to note that large numbers of editors simply responded incorrectly to factual questions and that many held opinions that were internally inconsistent. Although there is absolutely no scientific doubt that dinosaurs and humans missed each other by millions of years, only 51 percent of the editors were confident enough of their knowledge of this information to disagree strongly with the statement suggesting that the two lived contemporaneously. This point is significant for two reasons. First, it shows that many editors have a poor appreciation for the full stretch of the earth's history. This lack of a time frame is well documented in two questions dealing with the age of the earth. Although we now know with great certainty that the earth is approximately 4.6 billion years old, shockingly large numbers of editors seemed unaware of this fact. Second, two of the basic tenets of "creation science" are coexistence of humans and dinosaurs and a young earth.

It is worth reiterating the point that "creation science" has been defined by its proponents, not as the biblical account, but as the body of scientific evidence for creation and inferences drawn from that evidence. However, even Henry Morris, head of the Institute for Creation Research, seems to disagree. In his book *The Twilight of Evolution* he states: "We are limited exclusively to divine revelation as to the date of creation, the duration of creation, the method of creation, and every other question concerning creation. . . . Further, God in grace has even revealed much concerning the true age of the creation, in His written Word, but men have simply refused to accept it."[11] Similarly, "creation scientists" abdicate the right to call themselves scientists when they join the Creation Research Society, one of the country's largest creationist organizations, because they must sign an oath dictating what they will and will not believe.[12] Science, by definition,[13] must be falsifiable, and scien-

TABLE 3. Frequency with which newspaper editors suggested that evolution and "creation science" should be taught in particular public school subjects.

Subject	Evolution N = 421	"Creation Science" N = 192
Science	255	80
Biology	102	13
History	37	28
Earth Science	7	3
All Courses	6	5
Social Science	6	21
Physics	3	0
Anthropology	2	0
English	2	2
Philosophy/Religion	1	38
Current Events	0	1
Electives	0	1

tists must be skeptical. Signing an oath of the sort demanded by the Creation Research Society forces members to commit themselves to a particular interpretation of the world regardless of what any data might ultimately show. By making such a commitment, adherents voluntarily remove themselves from the scientific community. It is also well worth noting that the evolution-creation controversy is clearly not one between religion and science as the creationists would like us to believe.[14, 15] Indeed, in both the Arkansas and Louisiana equal-time cases the leaders of most major religions allied themselves with the forces attempting to overturn creationists' equal-time laws.

Newspaper editors nonetheless seemed to have trouble in distinguishing science from religion as well as in knowing how to categorize either evolution or "creation science." The most common subject suggested for the teaching of either evolution or "creation science" was "science." Similarly, only slightly more than 50 percent of the respondents disagreed strongly with the statement that teaching evolution means bringing religion into the classroom, while only 41 percent agreed strongly that teaching "creation science" means bringing religion into the classroom. Interestingly, when it came to differentiating between these two subjects for inclusion in the newspaper, editors seemed prey to much less confusion. The least popular option for an evolution story was to run it in the religion section, while the least popular option for a "creation science" story was publication on the science pages.

The percentage of editors who felt that "creation science" should be taught in the public schools was very close to the percentage of high school biology teachers who felt similarly.[16] Not surprisingly, however, large percentages of those people had no solid conception of the basic premises of "creation science" (Tables 1 and 2). The coupling of ignorance of the specifics of "creation science" with support for the subject seems to be a common pattern, and one that the creationists encourage.[17] Knowledge of evolution was not much better (Table 4). The phrase editors most frequently selected to describe the modern theory of evolution was the

TABLE 4. Frequency with which respondents selected the following statements as the best definition of the modern theory of evolution.

Statement	N = 534
A. The phrase "Survival of the Fittest"	169
B. Evolution occurred because different individuals left different numbers of offspring.	23
C. Humans evolved from either the gorilla or chimpanzee in Africa.	16
D. Evolution involved a purposeful striving towards "higher" forms (that is, a steady progress from microbes to humans).	260
E. Evolution occurred because the strong eliminated the weak.	19
No opinion or multiple answers	47

one including the concept of "a purposeful striving towards 'higher' forms." This incorrect response suggests that evolution is goal-oriented and perhaps directed by some external power; in short, it contains obvious religious overtones.

Although a very large percentage of the editors indicated that they felt that the U.S. Supreme Court decision overturning the Louisiana equal-time law was a very important news story, more than 57 percent of the newspapers responding took no editorial position on the controversy. A significant number of editors suggested, in their written comments, that they were very careful to keep personal opinions from influencing the contents of their papers. As one editor wrote: "Journalistic discipline requires the putting aside of personal opinions and biases and reporting news as objectively as possible." Editorials, however, are by their very nature opinion pieces, and thus personal views are inevitably expressed. It is surprising that so many papers have ignored an issue so central to the teaching of science in the public schools.

The results of the questionnaire suggest that newspaper editors, like the majority of the public, are ill-informed about the facts in the evolution-creation debate. Although I would not presume to suggest that editors are allowing their personal

TABLE 5. Percentage of respondents who indicated that they would deal with stories on "creation science" and evolution in each of the following manners. Some editors listed multiple choices. Although publishing on the editorial page was not listed as an option, many editors indicated that that is what they would do.

Action	"Creation Science" %	Evolution %
Publish it in the religion section	36.8	2.5
Publish it in the science section	4.6	33.7
Publish it in the general news section	31.2	42.8
Not publish it at all	15.4	12.1
Publish it on the editorial page	6.1	3.6
No opinion	5.8	5.4

TABLE 6. Frequency with which editors indicated that, in the past year or so, their newspapers devoted the following amount of space to evolution and "creation science."

Space devoted	N = 534
Equal space to "creation science" and evolution	189
More space to "creation science" than evolution	65
More space to evolution than "creation science"	79
No space to either "creation science" or evolution	112
No response	89

opinions to influence their professional decision-making, it is important to recognize that meaningful decisions are hard to make when one is coming from a position of ignorance and that, even with the best of intentions, unintended biases can play an important role in decision-making.[18] The misperceptions that abound about both evolution and "creation science" are testimony that neither newspapers nor scientists have been successful in educating the public about this important issue.

Acknowledgments

I am particularly grateful to all of the newspaper editors who took the time to respond to my survey. This work was generously supported by the Research and Development Committee of Oberlin College and the Dana Foundation. I appreciate the help in collating data provided by Didi Heisler and the improvements made in the manuscript by Abby Frucht.

Notes

1. T. Dobzhansky, "Nothing in biology makes sense except in the light of evolution," *American Biology Teacher*, 35:125-129 (1973).

2. E. J. Larson, *Trial and Error* (New York: Oxford University Press, 1985).

3. "Creation science" has best been defined by Arkansas Act 590 of 1981: "Balanced Treatment for Creation-Science and Evolution-Science Act. "Creation-science" means the scientific evidences for creation and inferences from those scientific evidences. Creation-science includes the scientific evidences and related inferences that indicate: (1) Sudden creation of the universe, energy,

TABLE 7. Frequency with which editors indicated that their newspapers took the following editorial opinions.

Editorial Position	N = 534
In favor of "creation science" and evolution being taught in public school science classrooms	69
In favor of only "creation science" being taught in public school science classrooms	3
In favor of only evolution being taught in public school science classrooms	135
In favor of neither topic being covered in public schools	5
No editorial position taken	289
Unsure of editorial position taken or no response	33

and life from nothing; (2) The insufficiency of mutation and natural selection in bringing about development of all living kinds from a single organism; (3) Changes only within fixed limits or originally created kinds of plants and animals; (4) Separate ancestry for man and apes; (5) Explanation of the earth's geology by catastrophism, including the occurrence of a worldwide flood; and (6) A relatively recent inception of the earth and living kinds."

This definition itself is somewhat ironic since Judge W. R. Overton, in his opinion on the constitutionality of this law, found that there was no scientific evidence for "creation science."

4. P. A. Fuerst, "University student understanding of evolutionary biology's place in the creation/evolution controversy," *Ohio Journal of Science*, 84:218-228 (1984).

5. J. Bergman, "The attitude of university students toward the teaching of creation and evolution in the schools," *Origins*, 6:60-70 (1979); R. A. Eve and F. B. Harrold, "Creationism, cult archaeology, and other pseudoscientific beliefs: A study of college students," *Youth and Society*, 17:396-421 (1986); Fuerst, op. cit.; F. B. Harrold and R. A. Eve, "Patterns of creationist belief among college students," in *Cult Archaeology and Creationism*, 69-90, ed. by F. B. Harrold and R. A. Eve (Ames, Ia.: University of Iowa Press, 1987); M. Zimmerman, "The evolution-creation controversy: Opinions from students at a 'liberal' liberal arts college," *Ohio Journal of Science*, 86:134-139 (1986).

6. M. Zimmerman, "The evolution-creation controversy: Opinions of Ohio high school biology teachers," *Ohio Journal of Science*, 87:115-125 (1987).

7. W. Bird, "The Supreme Court decision and its meaning," *Institute for Creation Research Impact Series* No. 170:i-iv (1987); "Public school interest in creationism increases," *Acts & Facts*, 17:1 (1988).

8. J. E. Lloyd, "Creation-'science' and functional illiteracy: Spectre of a Christmas past or yet to come?" *Florida Entomologist*, 65:1-8 (1982); J. A. Moore, "On giving equal time to the teaching of evolution and creation," *Perspectives in Biology and Medicine*, 18:405-417 (1975); W. A. Moyer, "Arguments for maintaining the integrity of science education," *American Biology Teacher*, 43:380-381 (1981).

9. D. Nelkin, *The Creation Controversy* (New York: W. W. Norton, 1982).

10. Bergman, op. cit.

11. H. M. Morris, *The Twilight of Evolution* (Grand Rapids, Mich.: Baker Book House, 1978), pp. 58-59.

12. The statement that members of the Creation Research Society must sign says in full: "(1) The Bible is the written Word of God, and because we believe it to be inspired thruout, all of its assertions are historically and scientifically true in all of the original autographs. To the student of nature, this means that the account of origins in Genesis is a factual presentation of simple historical truths. (2) All basic types of living things, including man, were made by direct creative acts of God during Creation Week as described in Genesis. Whatever biological changes have occurred since Creation have accomplished only changes within the original created kinds. (3) The great Flood described in Genesis, commonly referred to as the Noachian Deluge, was an historical event, worldwide in its extent and effect. (4) Finally, we are an organization of Christian men of science, who accept Jesus Christ as our Lord and Savior. The account of the special creation of Adam and Eve as one man and one woman, and their subsequent Fall into sin, is the basis for our belief in the necessity of a Savior for all mankind. Therefore, salvation can come only thru accepting Jesus Christ as our Savior."

13. M. Ruse, "Creation-science is not science," in *Creationism, Science, and the Law*, 150-160, ed. by M. C. La Follette (Cambridge, Mass.: MIT Press, 1983). In this chapter, as well as in the court testimony in the 1981 Arkansas equal-time case accepted by Judge W. R. Overton, Ruse states that science consists of five straightforward points: (1) It is guided by natural law; (2) it has to be explanatory by reference to natural law; (3) it is testable against the empirical world; (4) it is tentative (i.e., its conclusions are subject to change); and (5) it is falsifiable.

14. Morris, op. cit. On page 18 Morris writes: "I think it is highly important to emphasize, however, that *all* of the anti-Christian systems of modern times have found their quasi-scientific basis in the supposed scientific fact of evolution."

15. S. J. Jansma, Sr., *UFO's and Evolution*, an (apparently) self-published book distributed by the Institute for Creation Research, 1981. On page 15 Jansma states: "In discussing a model for the origin of the universe and the earth, it is important to remember that there are basically only two positions possible: 'In the beginning God created' or 'In the beginning everything happened by itself.' Each position has its variations, but it is really a theistic/non-theistic question. If one rejects the former, he has no alternative but to hold to the latter, for there is no third choice."

16. Zimmerman, 1987, op. cit.

17. F. Edwords, "Why creationism should not be taught as science, Part 1: The legal issues," *Creation/Evolution*, 1:2-23 (1980); Zimmerman, 1986, op. cit.

18. M. Zimmerman, "Many editors ignorant of basic science facts," *Bulletin of the American Society of Newspaper Editors*, March, 1988, p. 23.

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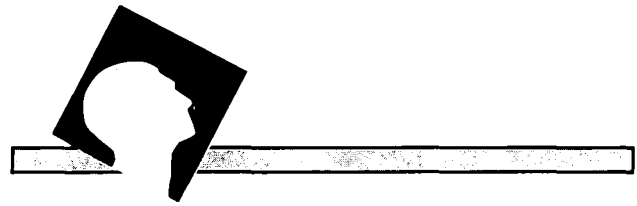
Book Reviews



Illness as Meaning, But Not Much Else

Ritual Healing in Suburban America. By Meredith McGuire and Debra Kantor. Rutgers University Press, New Brunswick, N.J., 1988. 336 pp. Cloth, $39.00. Paper, $13.00.

Erik Strommen

"Alternative healing" as a movement in the United States is an oft-discussed yet little-studied social phenomenon. *Ritual Healing in Suburban America,* based on more than 300 individual interviews and 250 site visits to alternative health centers in suburban New Jersey, is an attempt to fill this intellectual void and is intended as a contribution to empirical knowledge on the topic. Authors Meredith McGuire, a sociologist, and Debra Kantor, a doctoral student in anthropology, attempt to characterize alternative health beliefs and discover why people follow them. The result is an intriguing, informative, but ultimately frustrating book.

Alternative health philosophies, taken as a group, seem a veritable Tower of Babel. They represent a confusing democracy of beliefs, jargon, and ritual that together comprise an indistinct, overlapping collection of ideas. The authors manage to reduce this chaos to four broad types of movements, classified by the philosophical and explanatory concepts of their adherents. *Christian groups* (Woman's Aglow, faith healers, etc.) see God as the source of healing power, and sin as the source of illness. *Traditional metaphysical groups* (Christian Science, Unity, etc.) view the individual's faith (or lack of it) as the source of both illness and healing. *Eastern meditation and human-potential groups* (Buddhism, Transcendental Meditation, etc.) see "pollutants," both mental (negative thoughts) and environmental, as the cause of illness. They identify "energy," "balance," "purity," and other similar notions as the source of health. Finally, *psychic and occult groups* (astrology, Theosophy, etc.) view illness as a result of such things as "bad karma," "negative energy," and poor "mental habits, attitudes, and values"; health is described as "connectedness," "flexibility," and "wholeness." This typology is meant only to characterize the most general features of the groups described, and we are repeatedly reminded that not only is heterogeneity the rule within each category but there is also a significant cross-category overlap as well. How much overlap we're never allowed to determine. However, a major shortcoming of this work is that the authors do not provide a list of all the formalized belief systems they encountered, nor do they tell us how their classification system is employed so that we might analyze alternative

healing ideologies ourselves using the same framework.

McGuire and Kantor's specific argument (I use the term loosely) is bland anthropological fare. Alternative health philosophies, they explain, are ways of creating order and meaning when confronting illness. For alternative health believers, "healing" is a concept that extends beyond the curing of physical disorders; it has moral, political, social, and spiritual dimensions as well. The broadening of healing as an idea is accomplished by interpreting physical illnesses symbolically and assigning meaning on the basis of this symbolism. The examples of this process cited in the text are distressingly literal and simplistic; they reminded me of the Freudian analysis of hysterical illnesses, in which concrete symptoms are interpreted as representing an abstract psychological conflict. A woman who has shoulder problems, for example, says it's because she "can't shoulder her responsibilities"; another describes her arthritis as the result of her "inflexible" personality; one person even suggests that the prevalence of heart disease in American society is due to our unfeeling (i.e., heartless) and mean-spirited culture!

For me, the most troubling finding is that these individuals reject science and all things scientific in favor of the emotional, the religious, and the irrational. Reading these descriptions, and the generous interview excerpts that support them, one can see why logical and scientific arguments always fail to change the minds of alternative health consumers: They reject rationality. And yet, at the same time, they envy science. They want the legitimacy and respect science confers on a discipline.

This leads the followers of alternative medicine to try to mimic science and in the process they demonstrate the worst pitfalls of flawed reasoning. Rather than deny the reality of scientific findings, they eagerly distort and modify science to fit their moral views. They employ scientific metaphors and terminology and exploit scientific results that they believe support their philosophies, while freely rejecting those that contradict them. These people use the language of science, but the words don't mean the same thing to them as they mean to us. A dialogue doesn't seem possible, because they admire scientific validity only when results are consistent with their own preconceived ideas.

The authors of *Ritual Healing* demonstrate the same unfortunate tendencies. When they discuss conventional medicine, it is "science," the quotation marks undercutting and questioning the validity of the scientific method. But when they seek to have their readers accept alternative healing methods as valid, it is *science* without quotation marks, a respected method whose validity is assumed. Vague and unsatisfactory evidence, the placebo effect, and recent evidence of the effects of mood on health are offered as proof that alternative medicine "works." The limitations of these results, however, and readily available contradictory findings are not mentioned. Both in the alternative health community and in this book, it seems that scientific methods and findings are valid only when they support one's own biases.

Perhaps most troubling is the book's failure to explicate any of the limitations or problems of these belief systems. Personally, I found their subjects shockingly self-centered and almost egocentric in their attitudes. Many of the people interviewed, for example, see environmental pollution as a cause of illness. Is their solution to work politically to pressure govern-

ment and industry for a cleaner world? No. They purify their own water and air using elaborate home filtration systems; the rest of us be damned.

More serious, and to my mind more reprehensible, is the fact that in one way or another, most of these groups find a way to blame the ill person for being sick. Whether it is sin, karmic payback, or living an "unhealthy" lifestyle, sufferers are seen as bringing ailments on themselves. Similarly, their failure to get well reflects their own weaknesses, whether in this life or the last. The authors portray this victim-blaming by the various groups as an innocent exercise in "creating meaning," but I wonder what responses they would have received if they asked them to describe their views on AIDS.

This book does help us to understand what compels people to adopt these philosophies. It shows how their thinking proceeds, not only when reasoning about illness, but about larger issues of personal values and meaning. I didn't like it, but I could understand it. If you can stomach the incoherent analysis, and get by on a good "feel" for an idea, *Ritual Healing* is a worthwhile, if limited, contribution to our understanding of "alternative" healing.

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Alcoholism, Disease, and Myth

Heavy Drinking: The Myth of Alcoholism as a Disease. By Herbert Fingarette. University of California Press, Berkeley, Calif., 1988. 166 pp. Cloth $16.95.

Jeffrey A. Schaler

ON APRIL 20, 1988, the U.S. Supreme Court agreed with *The Big Book*, the bible of Alcoholics Anonymous (AA). AA is one of the strongest proponents of the disease model of alcoholism. The court upheld the authority of the Veteran's Administration to define alcoholism as the result of "willful misconduct" (*Traynor* v. *Turnage* and *McKelvey* v. *Turnage*, U.S., 56 USLW 4319, 4324). And as *The Big Book* says: "The main problem of the alcoholic centers in his mind rather than his body."

Although Justice Byron R. White, writing for the majority, said that the Court was not deciding "whether alcoholism is a disease whose cause its victims cannot control," he noted that there was "a substantial body of medical literature that even contests the proposition that alcoholism is a disease, much less that it is a disease for which the victim bears no responsibility." Herbert Fingarette's *Heavy Drinking: The Myth of Alcoholism as a Disease* is just such a work. The book could drive some people in the alcoholism-treatment industry to drink.

Fingarette is a professor of philosophy at the University of California

and an internationally distinguished scholar. For the past 40 years he has devoted himself to the study of the ethical and legal significance of mental illness, alcoholism, and addiction.

Carefully refuting the alleged "scientific" claims by advocates of the disease model, Fingarette demonstrates that "almost everything that the American public believes to be scientific truth about alcoholism is false." He also points out how continued belief in the myth is actually a "hindrance rather than a help in addressing the broad problems of heavy drinking in our society."

In 1811, Dr. Benjamin Rush first propagated the disease-model theory of alcoholism with *An Inquiry into the Effects of Ardent Spirits.* This position was later seized upon by advocates of prohibition. No scientific evidence for their position existed, and they based scientific theory on faith and what appears to be the alcoholism expert's favorite tautology: "People who frequently drink heavily often have a strong desire to drink."

In 1946 and 1952, E. M. Jellinek, then a research professor in applied physiology at Yale University, set forth the first "scientific" understanding of alcoholism. His work appeared to confirm the AA assertion that heavy drinkers lose behavioral control because of the presence of a disease. Jellinek outlined the pattern of an alcoholic's decline in a predictable fashion. He identified specific stages and alcoholic types, which he categorized and labeled with Greek letters. AA members then proceeded to argue and defend their loss of control theories with new scientific authority. Today, alcoholism is called "Jellinek's disease" by true believers.

As Fingarette points out, Jellinek's results were based on questionnaires designed and distributed by AA members and sent out in an AA newsletter called *The Grapevine.* The questionnaire was completed by 98 male members of AA. He chose to eliminate 60 of the 158 questionnaires returned because some AA members had shared one newsletter and pooled and averaged their answers on a single questionnaire. He also deleted all questionnaires filled out by women, because their answers differed greatly from the men's. In 1960, Jellinek admitted there was no scientific foundation for his proposals.

Later in the 1960s, national surveys of heavy drinking began to appear that further contradicted the sequence of phases described by Jellinek. People identified problems with drinking, but they did not report loss of control.

Disease model advocates claim that loss of control occurs after the first drink; hence the AA slogan "One drink, one drunk." As long as an alcoholic can refrain from that one drink everything will be all right. Total abstention is their only hope. Fingarette elucidates: "If loss of control is triggered only after the first drink, and not before, why should the alcoholic have any special difficulty mustering the self-control to simply avoid that first drink? Why should abstinence pose any special problem?"

Several studies are cited that prove the loss of control theory is a stereotype "born of faulty observation and a misunderstanding of drinkers' behavior." These studies indicate that the social setting, not any chemical effect of alcohol, influences a drinker's ability to exert control over drinking. As Fingarette says: "Clearly it is each drinker's perception of the pattern of positive and negative motivations, and not an uncontrollable abnormal chemical-physiological reaction, that decisively affects the choice to drink, to abstain, or to drink in moderation."

Further convincing evidence shows that alcoholics choose to control their

drinking for reasons that are important to them. The choice is a function of the various outcomes a drinker believes will occur. These, of course, are how we all make decisions about our own personal actions. In this sense Fingarette stresses that "what takes place in the drinker's environment may be more important than what takes place in the drinker's body."

Consider other inconsistencies in the claim that alcoholism is a disease, including the ever-present genetic defense: The unaccounted for variance between those genetically predisposed individuals who do not get the disease and those not genetically predisposed who do become alcoholics can only be attributed to a strength in will. The will varies for diverse psychological reasons. A person may be very weak physically and have a strong will. The opposite is true too.

Advocates of the disease-model of alcoholism love to use diabetes as a metaphor to describe the behavior of an alcoholic. The analogy is not reciprocal. A diabetic is not like an alcoholic. A person does not will the onset of diabetes, essential hypertension, the presence or absence of a malignant tumor. Here it would be wrong to assign responsibillity for the disease. Responsibility may be exercised by the diabetic in relation to the disease but not for it. This is not the case with an alcoholic or drug addict. A person both enters and exits usage through an act of will. This fact differentiates that which is a disease from that which is not.

A disease is a dysfunction of the body. There is no clear definition of what the mind is, let alone an understanding of the relationship between the mind and brain/body. To a neurologist there is no such thing as the mind.

Since the word *addiction* is defined as a volitional act (from the Latin *dicere*, to say, consent) and the relationship between the mind and the body is unknown, it is inaccurate to state with certainty that a behavior like alcoholism (or drug addiction) is a disease. The mind can't be sick. Mental illness is a similar contradiction in terms.

We do not really know what the mind is, so we describe it through metaphor. We transfer an understanding of the body to the mind in order to talk about it. Still, this transference remains a figure of speech, a metaphor, not to be taken literally.

How does the myth of alcoholism as a disease continue? Many disease-model spokespersons are recovered alcoholics and have an emotional investment in viewing themselves as helpless to their own behaviors. A majority of these people are seriously lacking in scientific backgrounds. Unlike scientists they place little credence on scientific validity. They say that to do so "interferes with the process" of helping people who need help, and they claim special qualification to help others by reason of their own experience. Since their own treatment was effected at a time when the classic disease concept of alcoholism was dominant, they tend to have faith in the old dogma and perceive any challenge to the disease concept as "a challenge to the validity of their own emotional ordeal and conversion to sobriety" (Fingarette).

The treatment industry has a substantial economic investment in maintaining the disease concept. As long as alcoholism and drug addiction are considered diseases, medical insurance pays for the treatment.

Finally, many people are simply afraid of challenging medical authority. Fingarette warns that "anyone who publicly doubts or challenges the disease concept is likely to be ignored, dismissed, or ostracized. In this version of the emperor's new clothes,

truthfulness can threaten, block, or ruin the truthteller's career."

Is the disease model of alcoholism scientific? No. Simply calling behavior a disease process does not make it one, even if doing so assists in creating sobriety. Is treatment policy based on bad science? Yes. Is there any chance that this attitude will change in the near future? Not really.

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Who Says Literature Isn't Lucrative?

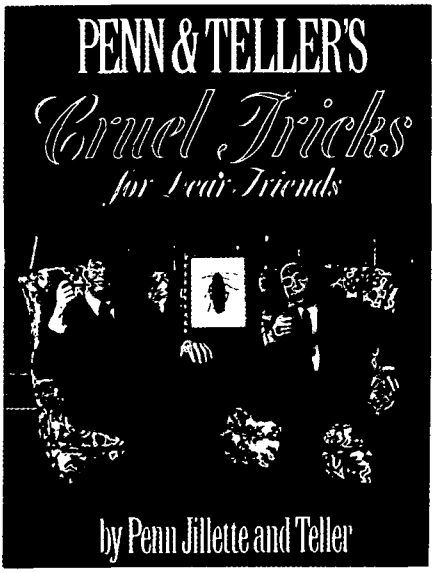
Cruel Tricks for Dear Friends. By Penn Jillette and Teller. Villard Books, New York, 1989. 203 pp. Paper, $15.95.

M. B. Gehrman

I know a lot of you people out there are skeptical. I'm skeptical too—some might even go out on a limb and say *cynical*—so when I called Villard Books and asked them to send me a review copy of Penn and Teller's *Cruel Tricks for Dear Friends*, I thought: What a great scam. I'll get this free book, and not even have to do any work.

But I have to admit that when the book arrived and I started playing with it, I got pretty jazzed about it. I decided to give it some free publicity after all, and the editors of *SI* thoughtfully provided me with a forum.

You may have noticed that I did not say, "When the book arrived and I started *reading* it." That's because Penn and Teller and the nice folks at Villard have tried to make this book impossible to read, by using "trick printing, special binding, and . . . neat, secret gimmicks." Part of the reason for this is that if the book were *easy* to read, you would not be able to use it in the manner the authors intended: against the people who trust you. Yes, Penn and Teller actually want you to "take that trust and twist it so you can steal



the dignity (and in some cases real cash money) from these poor saps."

But the reader is also reminded that this "is more than just cheesy magic tricks in book form to make a quick couple/three bucks for a pair of two-bit swindlers. It is also real literature." This should be immediately apparent to anyone who went to high school and learned that real literature is hard

to read. I vaguely remember high school, and because of this, I considered it to be my scholarly obligation to read this book in addition to playing with it.

I also read *Would Could Should*, "the little book that comes packaged right with the big book." In it are nine of the "true and semi-true (false) stories about TV stars, con men, Indians, strippers, mad scientists, carnies, monsters, and existential novelists" that Penn and Teller give you as a sort of bonus for wading through their cruel tricks and nauseating photos. They call these stories "filler," for those "solitary moments, when there's no one to humiliate." A skeptic with a sense of humor will like these stories; a skeptic with a warped, twisted, *sick* sense of humor will love them. Anyone who has ever suffered through a torturous long-distance "relationship" will chuckle knowingly, if painfully, at "A Slightly Different Reality to Ponder." Anyone who hated being teased by the "cool" kids in grammar school will identify with "Alva Boyle," if only in a secret, put-it-out-of-your-mind, *guilt*-inducing way. And for *SI* readers, "Snapshots of a Monster" alone may make the price of this package worthwhile (though I can't say for certain, since I got mine for free).

As for the big book, *Cruel Tricks for Dear Friends*, it is just chock-full of pertinent information for those who wish to prove, with Penn and Teller's help, that they are superior to the "latent chumps" they call their pals. The authors give thanks for modern science, muse over the "random, godless universe," and try to make sense of their "pointless, obscure lives." They trash Jesus freaks, psychic surgeons, backward masking, televangelism, the New Age, cryptozoologists, and more. All of this should make skeptics very happy.

Some skeptics, however, say they are *not* happy that Penn and Teller actually tell you how to pull the wool even farther over the eyes of the gullible. (A typical example: "Use [the Psi TV Scam] to punish 'enlightened' believers in the occult—you know, the ones who scoff at demonic possession but read up on trance channeling; laugh at astrology but schedule their lives around biorhythm charts; sneer at fairies but spend their vacations watching the skies for the UFOs that built the Pyramids.")

But Penn and Teller are straightforward. They are honest. And when they're not being honest, they tell you. They don't mind showing you how to reshape the future of other people's money, as long as you do it in the name of reason. This is the way they have chosen to pay homage to the Enlight enment. Consider this passage, attributed to "Kamus, King of Cards":

> There have always been men to defend the rights of the irrational. The tradition of what may be called humiliated thought has never ceased to exist. The criticism of rationalism has been made so often that it seems unnecessary to begin again. Yet our epoch is marked by the rebirth of those paradoxical systems that strive to trip up the reason as if truly it had always forged ahead. But that is not such much a proof of the efficacy of the reason as of the intensity of its hopes.

For illusionists, these guys are pretty realistic.

Penn and Teller are not for everyone. Many will furrow their brows and tsk tsk and consider them just another example of whatever it is that this world is coming to. And that's okay with them. In fact, they go out of their way to keep people from liking them, just as they go out of their way to keep people from reading their

book—the book in which they insult not only each other but your "dear friends"—and you—freely. They know how to make people hate them, and they love it. By their own description, they are "snotty, condescending, self-righteous, and holier than thou." This is part of their charm. Another part of their charm is that every now and then they slip and let their warm and fuzzy side show through. For instance, "The Best Magic Trick I Ever Saw" and "The Creation of Life" chapters show that, in the true spirit of modern cynicism, although Penn and Teller may be cruel to people (who, after all, often deserve it), they are kind to animals.

Still, these guys are on the cutting edge of cutting, practicing metacondescension at its best: If you are in on the joke, you're part of the joke. Now that celebrities feel snubbed when their names do not appear in the scandal sheets, and black-clad city dwellers stand on line in the middle of blustery nights just for the privilege of being rejected, metacondescension is good. It's hip. It's where it's at.

Knowing that, of course, may make you unhip again, kind of like a double negative. It's hard to say, and contemplating it could fling you unsuspecting into hipster hell. Next thing you know you'll be wandering around gallery openings muttering about giant silver bunnies.

But I liked the book anyway. I even *read* it—even the pages with itty-bitty tiny irritating psycho-print with patterns printed over it. *That* was tough going. But it was worth it, especially since "only people who have paid the price of this book deserve to be able to take advantage of it."

M. B. Gehrman, formerly on the staff of the SKEPTICAL INQUIRER, *is managing editor of* FREE INQUIRY *magazine.*

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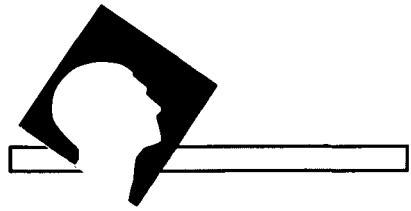

Listing here does not preclude review in a future issue.

Asimov, Isaac, Martin H. Greenberg, and Charles G. Waugh, eds. *Tales of the Occult.* Prometheus Books, Buffalo, N.Y., 1989. 354 pp. $22.95, cloth; $14.95 paper. Twenty-two short stories by well-known authors about the mystic and occult, each followed by a brief afterword by Asimov placing the belief involved into scientific, factual perspective.

Cohn, Victor. *News & Numbers.* Iowa State University Press, Ames, Iowa, 1989. 178 pp. [no price given], paper. Guide by a veteran science writer to reporting statistical claims and controversies in health and related areas.

Gardner, Martin. *How Not to Test a Psychic.* Prometheus Books, Buffalo, 1989. 264 pp., $24.95, cloth. Detailed examination of a decade of experiments with Pavel Stepanek, said to be the most respected living subject of psi investigations and "the best clairvoyant ever tested." A serious examination with valuable lessons for parapsychologists and others.

Goran, Morris. *The Dangerous Ideas of Science.* Peter Lang Publishing, New York, 1989. 213 pp. [typescript], $34.00, cloth. Scientist considers the "dangerous ideas" of science: "those that have been attacked by some religious, government, industrial, or other societal force." Among them are the heliocentric view and organic evolution (attacked by religious groups), Nazi science and Lysenkoism (taken over by pseudoscientists and governments), and "the method and spirit of science," which has had many opponents.

Gordon, Henry. *It's Magic.* Prometheus Books, Buffalo, N.Y., 1989. 92 pp., $7.95, paper. Easy-to-learn magic tricks for families and children.

Hassan, Steven. *Combatting Cult Mind Control.* Park Street Press, One Park St., Rochester, VT 05767. 226 pp., $16.95, paper. An expert on counseling people away from destructive cults (and himself a former member of a controversial cult) presents techniques that can be used to undo cult mind-control and help people break away from cult domination. He also tells the inside story of his own recruitment, indoctrination, disillusionment, deprogramming, and recovery to a normal, healthy life.

Hyman, Ray. *The Elusive Quarry: A Scientific Appraisal of Psychical Research.* Prometheus Books, Buffalo, N.Y., 1989. 447 pp., $24.95, cloth. Much-needed collection of Hyman's major essays and papers. The author, a research psychologist respected by both skeptics and parapsychologists for his knowledge, fair-mindedness, and thoroughness, has participated in most of the major controversies about

serious parapsychological claims in the past two decades. Included are his classic paper on "cold reading," his critical appraisal of ganzfeld experiments (including the unprecedented "joint communique" with Charles Honorton), a paper and subsequent discussion on "pathological science," papers examining the pitfalls of physical scientists' involving themselves in psychical research, his examination of Helmut Schmidt's PK experiments, his writings on Geller and on Targ and Puthoff's remote-viewing claims, an examination of dowsing, and his brief essay "Proper Criticism," plus other reviews and discussions.

Nickell, Joe. *The Magic Detectives: Join Them in Solving Strange Mysteries.* Prometheus Books, Buffalo, N.Y., 1989. 115 pp., $7.95, paper. One of the first books for children (ages 9 to 15) aimed to encourage critical skills in examining unusual claims. Presents 30 "paranormal" investigations as brief mystery stories. Clues are embedded in each. The young reader is encouraged to find the solutions to the mysteries. Only after that are the conclusions reached by professional "magic detectives" given. With illustrations by the author.

Steiner, Robert A. *Don't Get Taken! Bunco and Bunkum Exposed.* Wide-Awake Books, Box 659-L, El Cerrito, CA 94530, 1989. 206 pp., $14.95 (plus $2.00 postage and handling), paper. Lively guide on how to protect yourself from confidence games and a variety of other cons and bunkum. Topics addressed include psychics, police psychics, astrology, blood readers, the pigeon drop, the bank-examiner scam, pyramid schemes, gambling scams, home-improvement scams, psychic surgery, and faith healing. Steiner, a magician, lecturer, and veteran investigator of bunco and psychics, provides valuable practical insights into how common deceptions that harm people's health and livelihoods are carried out, and how to avoid them.

Zollschan, G. K., J. F. Schumaker, and G. F. Walsh, eds. *Exploring the Paranormal: Perspectives on Belief and Experience.* Avery Publishing Group, 350 Thorens Ave., Garden City Park, NY 11040 (and Prism Press, Bridport, Dorset, England), 1989. 373 pp., paper, $10.95. A collection of articles for the intelligent lay reader devoted to understanding paranormal belief and experience. No "party line" on authenticity of claims is sought. Most chapters are by those who accept the validity of some claims, but others are by skeptics. The attempt is to have fruitful debate. Chapters are arranged into sections on explaining, experiencing, researching, and debating the paranormal.

—Kendrick Frazier

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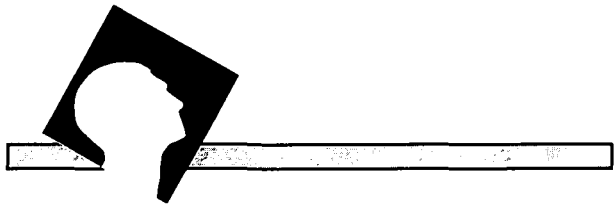


Badash, Lawrence. "The Age-of-the-Earth Debate." *Scientific American*, August 1989, pp. 90-96. How the controversy embroiling Archbishop Ussher, James Hutton, Lord Kelvin, Ernest Rutherford, Bertram Boltwood, and Arthur Holmes has "aged" the earth 4.5 billion years during the past three centuries.

Campbell, Steuart. "UFO: Hoax or Mirage?" *British Journal of Photography*, June 15, 1989, pp. 15-19. Examination of the controversy surrounding the Trinity Island "UFO" photographs taken by Almiro Barauna on January 16, 1958.

Coates, Wendy, Dietrick Jehle, and Eric Cottington. "Trauma and the Full Moon: A Waning Theory." *Annals of Emergency Medicine*, 18:763-765, July 1989. Retrospective study by three physicians tests the belief in causal relationship between moon phase and incidence of major trauma. Reviewed 1,444 trauma victims admitted to the Allegheny General Hospital in Pittsburgh in one calendar year. There was no statistical difference in the number of trauma admissions between the full moon (129 patients per 36 days, mean of 3.58) and non-full-moon days (1,315 patients per 330 days, mean 3.98). Mortality rates, mean injury severity score, and mean length of stay were not significantly different during full and non-full-moon phases. Victims of violence were admitted at a similar frequency on full-moon (mean 0.444) and non-full-moon days (mean 0.555). "We conclude that the belief in the deleterious effects of the full moon on major trauma is statistically unfounded."

Crowe, Richard A. "UFO Cover-Up? Alive and Still Crazy After All These Years." (Unpublished manuscript, 1989, available from author at Dept. of Physics and Astronomy, University of Hawaii at Hilo, HI 96720; enclose $2.) Detailed criticism of the two-hour syndicated television "documentary" "UFO Cover-Up" aired on the Fox Network in the United States October 14, 1988.

Durant, John R., Geoffrey A. Evans, and Geoffrey P. Thomas. "The Public Understanding of Science." *Nature*, 340:11-14, July 6, 1989. Full results of surveys in Britain and the United States (see *SI*, Summer 1989: 343) on scientific literacy and public understanding of scientific concepts. How much science does the general public understand? "Not much."

Fraknoi, Andrew. "Your Astrology Defense Kit." *Sky & Telescope*, August 1989, pp. 146-150. A guide astronomers, active amateurs, and armchair astronomy buffs can use in responding to claims of astrologers and those who ask about them. Includes the tenets of astrology, "ten embarrassing questions," testing astrology, and resources about astrology.

Gould, Stephen Jay. "The Chain of Reason vs. the Chain of Thumbs."

Natural History, July 1989, pp. 12-21. Detailed report and commentary on Franz Anton Mesmer's animal magnetism theories of the 1780s, with specific emphasis on the investigation by the high-powered Royal Commission set up by King Louis XVI to evaluate the claims. "Never in history has such an extraordinary and luminous group been gathered together in the service of rational inquiry by experimental science." Benjamin Franklin and Antoine Lavoisier were the leaders of this scientific commission, and Gould describes in detail their innovative controlled studies that demonstrated conclusively that the power of suggestion rather than some undetectable magnetic fluid was the operative force in people's responses to "mesmerization." Gould calls their report "a key document in the history of human reason, a masterpiece of the genre, an enduring testimony to the power and beauty of reason," and one that "should be rescued from its current obscurity."

Ince, Susan. "Blaming the Victim." *Savvy Woman*, August 1989, pp. 82-83. Article on how some New Age practitioners overstate the power of positive thinking in curing illness. "A kernel of truth from the mind/body philosophy" has been inflated "to religious proportions, saying that depressed people create their colds or cancer and could heal themselves if only they practiced more positive thinking."

Lynch, Lisa. "Spinning the Twins." *Metamorphoses* (386 Main St., Redwood City, CA 94063), Summer 1989, pp. 27ff. How the seemingly bizarre similarities between identical twins raised apart were hyped by the media. No judgment is offered on the science of these studies (most of which have not yet been published), but the self-selection of the experimental subjects and the media's focus on supposed startling similarities between raised-apart twins has distorted the topic.

Massey, Walter E. "Science Education in the United States: What the Scientific Commuity Can Do." *Science*, 245:915-921, September 1, 1989. Article based on AAAS presidential address suggests ways government and scientists can improve science education. Urges that scientists and educators make a significant personal commitment to the goal.

Nardi, Peter M. "Toward a Social Psychology of Entertainment Magic (Conjuring)." *Symbolic Interaction*, 7, no. 1, pp. 225-242. Compares similarities between entertainment magic and everyday social life. Has sections on the dynamics of magic acts, the magician's role, and the audience's role.

Neter, Efrat, and Gershon Benk-Shakhar. "The Predictive Validity of Graphological Inferences: A Meta-Analytic Approach." *Personality and Individual Differences* (U.K.), 10, no. 7, pp. 737-745, 1989. An examination of the validity of graphology by applying meta-analysis to 17 published studies of the validity of graphology as a personnel tool. The data set included 63 graphologists and 51 nongraphologists (as a control group) who evaluated 1,223 scripts. The results show that graphologists are no better than nongraphologists in predicting future performance on the basis of handwriting. In fact, the graphologists' predictions had somewhat lower correlations than those of nongraphologists. There are some indications that graphologists may make use of the content of the script; their performance decreases significantly when they do not use content-laden scripts.

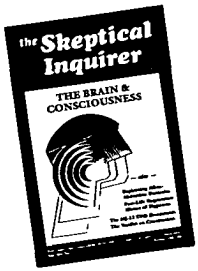
Sagan, Carl. "Why We Need to Understand Science." *Parade,* September 10, 1989, pp. 6-12. With 94 perecent of Americans "scientifically illiterate," Sagan laments this "clear prescription for disaster." Considers how bad it is (very bad), why we are flunking, and what can be done about it. "I'm haunted by the vision of a generation of Americans unable to distinguish reality from fantasy, hopefully clutching their crystals for comfort, unequipped even to frame the right questions or to recognize the answers. . . . America needs, and deserves, a citizenry with minds wide awake and a basic understanding of how the world works."

Truncale, Joseph H. "Guide to Science vs. Pseudoscience." *Law Enforcement Technology,* March 1989, pp. 45-46. Veteran police officer provides a concise guide to help fellow law-enforcement officers avoid confusion about what is valid science and what is considered pseudoscience.

Tudor, Andrew. "Seeing the Worst Side of Science." *Nature,* 340:589-592, August 24, 1989. Essay on how horror movies have, since the 1930s, reflected public anxieties about science and technology.

Tyler, Varro E., and Virginia M. Tyler. "Modern Herbalism—A Dr. Jekyll or Mr. Hyde?" Proceedings of the Fourth National Herb Growing and Marketing Conference, July 22-25, 1989, San Jose, California. Purdue University scholars examine what they call "paraherbalism," pseudo-scientific twisting of true herbalism. In contrast to the wise use of safe and effective herbs and the scientific study and testing of herbs ("true herbalism"), paraherbalism is marked by ten tenets. Among them: the medical establishment is in a conspiracy to discourage use of herbs; natural and organic herbs are superior to synthetic drugs; whole herbs are more effective than their isolated constituents; anecdotal testimonials are highly significant. Urges attention and support for the "positive and hopeful side of modern herbalism" for the continued benefit of humankind.

—Kendrick Frazier



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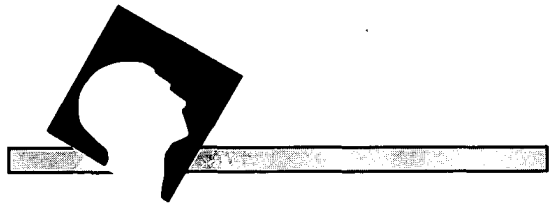
Letters to the Editor



The New Age and science

In her article "New Age Reflections in the Magic Mirror of Science" (*SI*, Summer 1989), Maureen O'Hara complains about the self-confidence of science and makes the supposition that science has failed to answer certain questions. To blame science for the "starvation of millions," the "polluted environment," and "bigotry and injustice" is barking up the wrong tree. These problems are all caused by shortsighted governments. Scientists, for instance, know how to reduce pollution, but these measures are not implemented because governments are not willing to do so. Their reasons are short-term. No scientific advancement can help to convince a politician, thinking of reelection in a year or two, to commit to programs that will show effects in tens of years. The only help is a more scientifically literate general public that will demand changes even if they mean short-term inconveniences. But this educational effort also would have to be initiated as a long-term effort by the same politicians: catch-22.

Unfortunately, I am afraid that the New Age movement does not have answers for these problems either. Unless governments and the general public begin to think and act much more rationally and scientifically, I am afraid we will continue to stumble from crisis to crisis and solve the problems in patchwork fashion at the last possible moment. Sooner or later the politicians (not the scientists) will be too late in solving one of the problems and we will have a major disaster on our hands—be it a runaway greenhouse effect or nuclear war.

Please don't blame the scientists. They are working hard under often very frustrating circumstances. Put the blame where it belongs: on the governments.

Guenther Eichhorn
Steward Observatory
University of Arizona
Tucson, Ariz.

O'Hara's characterization of modern science as "materialistic," which is for her a term of reproach, is accurate if it simply means that science does not invoke the activity of ghosts, angels, demons, or undetectable occult forces to account for unexplained events. There are reasons other than "hubris" for this rejection: The assumption that such entities exist is unsupported by evidence and has been theoretically sterile. Perhaps, however, in referring to the "transcendental dimensions of experience," she has something else in mind. I am at a loss to know what it might be if the expression is intended literally; if it is metaphorical, can the metaphor be translated into an intelligible form?

O'Hara seems to be ambivalent in her attitude toward science, taking away with one hand what she gives with the other. She acknowledges "its successful challenge to superstition" and "its recognition of the need for objectivity," but later says that objectivity (in the social sciences) has been exposed as a myth. She adds that the assumption that one truth system is superior to others threatens to involve us in a holy war, yet she cringes at some of the notions entertained by her colleagues. This reference to different, competing "truth systems" baffles me unless it is interpreted to mean that there are systems, each consisting of propositions believed or alleged to be true, any two of which are mutually inconsistent. In that case,

logic tells us that not more than one of them can be true. The expression "different belief systems" is then appropriate, but "different truth systems" is not.

O'Hara clearly believes that the prevalence of psychopathology has increased relative to that of former times and that the rise of "scientific materialism" is the cause. The remedy, she implies, is available in theories such as those of Fromm, May, and Rogers, which "reaffirm the personal, experiential dimension of all knowledge" as well as "the significance of the person." How could anyone, even a materialist, be so mean spirited as to oppose such laudable objectives? But a problem remains. For most patients who consult a psychotherapist, the important questions are: (1) Will the treatment be effective? and (2) What will it cost, in time and money? Concerning (1), would O'Hara agree that a therapist's good intentions, expressed in flights of rhetoric, are insufficient criteria and that a comparison with rival treatments is essential? This comparison would involve an elaborate experimental design, with control groups, randomization, specification in advance of what counts as improvement or cure, and appropriate statistical tests. The design should, in particular, take account of the placebo effect; it seems that almost any treatment (maybe even Dianetics!) yields better results than none.

To confirm the alleged role of materialistic science in causing psychological problems, relevant and reliable historical data would be needed. Such data are not available. Where is the evidence that the current incidence of neurosis or psychosis exceeds that of three or more centuries ago?

O'Hara notes correctly that science has not eliminated war or injustice. Science, in essence, is just systematically organized knowledge. It is almost a platitude to say that moral rules are not deducible from it and that its application can lead to disaster as easily as to progress. But let's put the blame where it belongs: on ourselves, not on the tools that we fail to use wisely. History suggests an unflattering view of our species and leads one to doubt that religion, science, mysticism, or anything else can transform us into a community of saints and sages.

David A. Shotwell
Alpine, Tex.

O'Hara's and Schultz's apologias for mysticism and subjectivism (*SI*, Summer 1989) are unconvincing. One does not demonstrate the inadequacy of science by reference to pseudoscientific concepts. To speak of feminist psychology, black sociology, third-world anthropology, and the like, is tantamount to demanding a different chemical theory for every separate class of compounds. Hypotheses concerning the "subconscious mind" are untestable, and "spiritual" is a meaningless term.

We need discrete articulations of sociocultural change: affectively through the arts, and conceptually through mathematics, science, technology, and value declaration. None of these, however, need be or, to be contemporarily meaningful, can be mystical.

Nor was religion undermined, and skepticism introduced, by Newtonian or modern science. Lucretius, in the first century B.C., formulated prototypical, anti-religious statements. Protagoras and Gorgias, some 300 years earlier, dealt with issues, significant again for contemporary sociologists of knowledge. New Age irrationalism is not a response to recent developments, but a variant of recurrent anti-intellectualism, related to periodic intellectual reorganization.

Hugo O. Engelmann
Dekalb, Ill.

New Age and consumers

Jay Rosen, in his article "Consumer Culture and the New Age" (Summer 1989), presents an eloquently stated but hopelessly confused vision of New Age

origins. If I understand him properly, Rosen contends the "New Age" is symptomatic of the spiritual poverty of American culture, which in turn somehow resulted from the need for businesses to "create" a market for their goods by encouraging feelings of anxiety among consumers through the use of pernicious advertising techniques. Although the bones of this argument are hardly compelling, he fleshes it out a bit with references to the "rootlessness" of American life, and how all of this leads to general feelings of anxiety and "narcissism."

As a skeptic and sometime professor of economics and finance, may I point out a few things that Rosen has overlooked. American economic thinking in the late nineteenth century was dominated by what we now call "classical economists," men like Alfred Marshall, whose work was characterized by the notion that "supply creates its own demand." No one, literally no one, in the business community, in the academic sphere, or in government, thought it necessary or even possible to "create" demand, as Rosen contends. In fact any businessman in our capitalist society who was bold enough to make and offer a product that no one wanted, i.e., a product for which demand would have to be "created," soon suffered the dire results of his experiment. . . . The essence of business was, and is, to find a need and fill it. The usefulness or uselessness of anything is determined by the consumer, not the producer, no matter how clever his advertisers may be.

Is it really necessary to construct some sweeping sociological theory to deal with the New Age phenomenon? Why not just let it rest with the comment that people sometimes believe—without reason—in the magical and the fantastic. These beliefs are part of human nature (Rosen might benefit from a reading of *The Golden Bough*) and enjoy various cycles of popularity. As skeptics we should not be condemning a movement or speculating on the social psychology of belief, but should be critically examining those beliefs to determine whether they are nonsense or, indeed, are true and wise. Rosen fights nonsense with nonsense and this certainly does not help to advance the cause of truth and reason.

William J. Ryan, Jr.
Duluth, Ga.

New Age egos

Your recent articles analyzing New Age fads were intriguing. What is puzzling, though, is that none of them seemed to acknowledge that New Age fads are egocentric—that their strongest appeal is to the "Me" generation of the past three decades. The "Me" psyche's search for answers tends toward theories or "isms" that depict each individual as someone special in the scheme of things. They have personal channeling, personal crystals, personal exotic prior lives, even personal mystic powers. Most formal religions do not satisfy this need. They are too altruistic, expounding brotherhood, humility, etc.

What is more intriguing, New Age fads seem uninterested in why this organic growth exists on the third planet of an insignificant star. They only seek to have each growth endowed with strange personal powers.

F. G. Kammler
Hatboro, Pa.

In defense of Seth

While I applaud your attempts to expose fake channelers, I must take strong exception to James E. Alcock's discussion of the Seth material in his article "Channeling: A Brief History and Contemporary Context" (Summer 1989).

The fundamental error Alcock makes (typical of the self-appointed "debunkers") is to attack the phenomenon of channeling without attempting to comprehend the writings themselves. Had he made even the slightest effort to familiarize himself with the material, perhaps he wouldn't have displayed such ignorance in his piece.

Alcock's attempt to lump Seth and Jane Roberts with J. Z. Knight are pathetic. While stating that Knight "has been able to gross between $100,000 and $200,000 for an evening's work, all he can manage about the Seth books is that they were sold by "the hundreds of thousands." Does the fact that the books were successful imply guilt? How many issues of your magazine do you have to sell before your readers should question your integrity?

Alcock then turns his suspicions to the sessions themselves. He is apparently convinced that, because Robert Butts preferred to take notes rather than use a tape recorder, there must have been something funny going on. The fact is, many sessions were taped by a variety of people, and the tapes exist today. More important, Alcock's statement that the sessions were conducted "almost always without witnesses" is a blatant untruth. In fact, weekly class sessions were held for several years, and many individuals of various backgrounds and professions attended (including skeptics).

I fail to see why Jane Roberts's being an "avid reader" and creative individual discredits the material. I also fail to see why her own struggling to come to terms with the phenomenon should be held against her. On the contrary, she should be commended for being sober and critical in light of what was happening to her.

Alcock states that "for many people the Seth materials stands in a league above other . . . texts." Perhaps there is a reason for that. If he had bothered to look, he would have found that the material has a unity, intelligence, and wit that is consistent throughout the many years of its creation.

Seth never set himself up as a god, never solicited "personal consultations," and never dispensed "hedonistic and narcissistic wisdom." His only message is: "You create your own reality, and you are responsible for it." It's a message Alcock seems to be afraid of.

Jerry P. Cohen
Seattle, Wash.

James E. Alcock responds:

The point of contention between Jerry Cohen and me is simply this: Are we to accept the writings of Jane Roberts as representing the wisdom of some disembodied spirit ("Seth"), or do we attribute them to the unconscious, semiconscious, or conscious productions of Jane Roberts herself? Some people argue that Roberts was somehow incapable of producing the writings on her own. In pointing out that (1) she was by profession a writer, (2) she admitted to having read a great deal of material directly relevant to the Seth productions, (3) even her husband stated that Seth's productions sometimes picked up where Jane's reading left off (for example, when she had been studying Jung), and (4) Jane herself claimed to have difficulty knowing where her ideas stopped and Seth's started, I was suggesting that there is no need to invoke the intervention of some supernatural being to accoount for the writings. Indeed, the onus is on those who promote the supernatural explanation to demonstrate that such an explanation is required.

Although "Seth" may have given many public sessions, the materials used in the Seth books were collected in situations where witnesses were almost never present. Since the dictation was recorded only in a private shorthand, there is no evidence even that the material in those books was dictated directly, rather than being worked on and revised in the manner that most books are written. There was the opportunity to revise, edit, and rework ideas, whether that opportunity was taken or not.

Cohen is obviously impressed by the writings themselves. Contrary to his claim, I have familiarized myself with the Seth books, and I simply fail to see any "unity, intelligence, wit, and consistency" that is beyond the capacity of an intelligent and motivated author. Many thousands of people attempt to become published authors each year. Few succeed. To be able to get one's ideas into print, to become famous, is a very powerful motivator and reinforcer for any writer.

In my view, Roberts had the ability, the motivation, and the opportunity to write such books. Whether she did so consciously or not, we shall probably never know. To use Cohen's phrasing, the fundamental error he makes is in accepting the phenomenon of channeling on the basis of his awe at the writings, rather than stopping to think about how they might have been produced without the intervention of some supernatural agency.

Channeling and disorders

I enjoyed reading "The Psychology of Channeling" by Graham Reed (*SI*, Summer 1989). It may have fairly accurately described many channelers as those who use dissociation as the primary mechanism by which they produce their messages. A few points are that other diagnoses besides "hysterical personality" may use dissociation as a defense, and other mechanisms besides dissociation may cause channeling.

Any of the personality disorders in the dramatic-emotional cluster of the DSM-III-R are prone to use dissociation.[1] (Dr. Reed should update his reference of DSM-III, 1980, to the DSM-III-Revised, 1987.) These personality disorders include the histrionic, borderline, narcissistic, and antisocial. Multiple personality (classified as a dissociative disorder in DSM-III-R) happens to be a topic of great scientific interest in the final decades of this century, not only of the last century. This disorder is thought to result from multiple dissociations as a way to separate out traumatic memories and feelings. Field studies are currently under way for DSM-IV.

The other possible causes of channeling not mentioned by Reed include magical thinking (seen in the schizotypal personality) and substance abuse, particularly those that might induce a psychosis: hallucinogens, cocaine, amphetamines, etc.[2] Reed is correct in that "true psychotic symptoms are not under conscious control." Many schizophrenics, however, know that others think strangely about their bizarre ideas and hallucinations and can consciously be guarded in speaking about them. Additionally, in prodromal, remitted, or residual schizophrenia, psychotic symptoms may emerge easily if the patient's reality testing becomes impaired by the lack of cues usually present in the environment that emphasize reality (for example, in the trance-inducing setting of a channeling session). Also, psychotic features may sometimes only be elicited on certain topics around which the delusions are systematized and where the integrity of thought may break down. These symptoms are otherwise subtle and may be difficult to elicit.

Additionally, borderline personalities are notorious for their transient psychotic episodes that can be precipitated under stress.[3] Although dissociation is likely to be more common than psychosis as a mechanism in channeling, I would not rule out the psychotic conditions altogether.

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The best ever

A short note to congratulate you on your Summer 1989 issue. The articles concerning the "New Age" were very much broader and more understanding of the dilemmas life faces us with, than I would have expected from you. The choices between science, which is still learning; revealed religions, which I find it hard to learn; and the incomplete knowledge we have of ourselves—well, is it surprising that things are as they are! That issue was the best for me. Please reach that level again sometime.

P. A. Durgnat
Cortaillod, Switzerland

Micro-PK test flaws

John R. Smyrk cautions us in his letter (Summer 1989) not to dismiss the overall hit rate of 50.02 percent found

in Schmidt's and Jahn's experiments in micropsychokinesis (Fall 1988). He correctly points out that over 78 million trials the probability of this degree of success is quite low (around .0001), and that "we cannot reasonably accept the 0.02 percent difference as arising by chance." "We must therefore conclude," he goes on to say, "that other mechanisms are represented in the data." What he neglects to mention, however, are the methodological flaws of this research subsequently discussed by Kendrick Frazier in that same article (p. 40). In sum, other mechanisms are indeed indicated, but readers should not conclude that these are necessarily "micropsychokinetic" ones.

Leonard S. Newman
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New York, N.Y.

John Smyrk's discussion of statistical significance is breathtakingly naive. Is he totally unaware of the concept of bias in statistical sampling? To use Smyrk's example, I would expect to get 50 percent heads when flipping a coin only if the coin is absolutely unbiased. The hypothesis that the coin is unbiased is an empirical one, not provable mathematically. If in fact the coin is slightly biased, it may well be that I "should" expect 50.02 percent heads. But how am I to know this? All random-number generators have such a bias, and many ESP experiments with results encouraging to believers have come to grief because of demonstrable bias. Surely the burden of proof that a random-number generator is sufficiently unbiased—it cannot be *perfectly* unbiased—lies with those who use it as a tool of investigation. Without some provable upper bound on the bias, any results are worthless. Using 78 million trials would be like turning up the volume on a radio when the signal is being overwhelmed by static: It won't make things any clearer.

Roger Cooke
Burlington, Vt.

Hypnosis and pain

In his reply to my letter (Fall 1988) Spanos writes: "Gibson took particular issue with my statement that 'nonhypnotic control subjects who have been encouraged to do their best respond just as well as hypnotic subjects to suggestions for pain reduction. . . .' According to Gibson, this position has been abandoned 'by most significant research scientists.' Unfortunately Gibson never tells us who these scientists are or what evidence led them to abandon this position." It is therefore up to me to provide readers of *SI* with the relevant information.

Unfortunately it would take up many pages of space to detail all the names and published studies, but fortunately I can tell readers where to find the evidence set out very plainly, and references to most of the relevant published studies. I would refer readers to the journal *Behavioral and Brain Sciences* (1986) 9, pp. 449-502; (1987) 10, pp. 519-529 and 773-776; (1988) 11, pp. 712-714. Spanos does indeed refer to the 1986 volume, but readers unfamiliar with this journal might well suppose that all 54 pages consist of an article of his authorship. This is not the case. The initial contribution is his, but this is followed by no less than 22 contributions of other scientists, some of them highly critical of his work, charging him with failure to cite all the relevant evidence and providing many additional references. The controversy continues in the further issues of *B&BS* I have listed, 12 more scientists contributing. Spanos writes a reply in each issue. I do hope that readers of *SI* will take the trouble to look up *B&BS* and make up their minds about the issue. I take exception to Spanos's implying that I have made a statement without adequate supporting evidence. I hope to develop the matter in an article on "Hypnosis and parapsychology" in the *British & Irish Skeptic.*

H. B. Gibson, President
British Society of Experimental
and Clinical Hypnosis
Cambridge, U.K.

The Clamart controversy

It is with great regret that I must disagree in some respects with Dr. Elie Shneour's comments in "The Benveniste Case: A Reappraisal" (*SI*, Fall 1989). I will briefly observe that Dr. Shneour seems unwilling to contemplate, even for a moment, the remote possibility that someone at the Benveniste lab in Clamart, France, could have been cheating, even with the best of intentions. As support for that opinion, which I feel he, as an academic, is forced to adopt, Shneour says, "Any document, of whatever nature, could be freely photocopied and removed from the laboratory without any restriction. This is hardly the behavior to be expected from the perpetrators of fraud."

I hardly know what to say in response. It was quite difficult for Walter Stewart to obtain permission to make photocopies of Benveniste's data. Perhaps Shneour has chosen to uncritically accept the facts as offered him in Clamart. As a layman, I must ask whether academics usually resist giving information freely.

My procedure of taping the codes to the ceiling of the lab resulted in the discovery that someone tampered with them during the night when we were away from the premises. Whoever tampered with the envelope was unsuccessful in obtaining the information, due to the manner in which it was sealed; the tampering was evident, from the design, but actual violation of the contents would have visibly and grossly destroyed the integrity of the container. To Dr. Shneour, such procedures are anathema, suggesting that cheating might take place.

I will not comment further, except to make a prediction. It is my understanding that Benveniste has been offered a certain period of time in which to re-examine his data and come to a conclusion on this painful matter. Based upon my previous experience with similar personalities, I believe that this gentleman will conclude, at the end of his re-examination, that he has discovered even more significant results in his data than he previously found.

My involvement in this affair has not been a happy one, and I am severely limited in what I may—and should—say about it.

James Randi
Plantation, Fla.

Adventist extremism

As an ex-Adventist (now an atheist), I appreciated Martin Gardner's article on Robert V. Gentry and his "Tiny Mystery" (Summer 1989). The author seems to have a pretty good grasp of not only Gentry's Adventist idiocy but the church's problem as well.

Over almost a lifetime as a member of Adventism, I had found it loaded with all kinds of extremes, from those who some would call "Whiters" (ultraconservative), to those with a more pragmatic (liberal) approach to the world of a soon-coming Christ. And, because of these variations in recent years, the church by its own admission is hemorrhaging and losing 50 percent of its members (note similarity with Canright's time). For a church that values education, it cannot enlighten its youth and expect them to remain in the ignorant stagnation of its inerrant, hopeless message of 1844, which is the foundation of its particular message!

Gentry's arguments represent all the benightedness that Adventism produces in its extremism. He is a prime example of what true primitive Adventism is, and he, I betcha, has a true following of those "Whiters" who say *Amen!* to all his inerrant ramblings. To them Adventism is the remnant church, and only those that keep the seventh day will be saved! So evolution, which decries the Sabbath, is the epitome of Satanic thought in these days before Christ comes (to save the Sabbath keepers).

There are now Adventists who look differently at the earth's age, as well as those who believe that modern humanity goes back 100,000 years. And because of this there is a split developing between them and the literal creationists

that is tearing the church asunder. Gentry, in his obvious ignorance of his chosen faith, is the champion of those who would preserve the tradition and cornfield experience (their 1844 Sanctuary message) from which the church has developed.

Adventism is in a crisis, for Christ has not come as they predicted 145 years ago. Men like Gentry are the result of this desperation, which I might add is not a new issue.

Robert F. Erickson
Placerville, Calif.

A century earlier

In Martin Gardner's "Robert Gentry's Tiny Mystery," a reference on page 360 to "some who had witnessed the great meteor shower of 1933" should have read "1833."

Bigfoot print scenarios

Michael Dennett's recent article (*SI*, Spring 1989) discussed many evidences that thoroughly discredit the Mill Creek "Sasquatch" prints. Dennett also proposed a possible explanation for the origin of the supposed dermal ridges on the prints (suggesting that they were made from a plaster cast that was made from a wax mold of a large human foot). However, there are other possible explanations as well, which may be even more plausible.

One point Dennett did not address is that the prints, besides being very large (37 to 38 cm), are not normally shaped even for a large human; they appear abnormally flat and ill-proportioned. Even if a man with such feet existed, why would a hoaxer go to the trouble of making molds of this man's feet and then casts from the molds, when he simply could have had the man walk at the site? This would have saved much time and effort and left more convincing prints. Yet several evidences cited by Dennett confirm that a walking man did *not* leave the prints.

It is possible, but seems unlikely, that a man did have feet shaped like those in the Mill Creek prints but could not be brought to the site, prompting a hoaxer to make the casts and molds that Dennett proposed. However, there are other possibilities that do not require a man with such unusual feet, either at the site or as a casting subject.

Perhaps the simplest alternative explanation is that a hoaxer first made fake Bigfoot prints (lacking dermal ridges) and then lightly impressed his own (or someone else's) bare feet into portions of the large prints, creating patches of dermal ridges. This method would account for the shape of the prints as well as the relatively small size of the dermal ridges found in them.

Other possibilities involve the use of one or more rubber casting materials, such as liquid latex, RTV silicones (several types), and polysulfide rubber. Dennett mentions plaster and wax, which are capable of recording dermal ridges; however, rubber casting compounds can record even finer details and have the additional properties of flexibility and expandability, which might be used in a variety of ways by a hoaxer.

One scenario, which again does not require a large or strange-footed man, is as follows. First a silicone rubber mold is made of the bottom of a normal human foot, recording dermal ridges in reverse relief. From that mold, a thin latex cast or "peel" is made, leaving the dermal ridges in positive relief. This peel, or pieces of it, could then be attached to (or fitted over) a larger fake Bigfoot foot, so that dermal ridges would appear in prints made from it. The spotty nature of the dermal ridges on the prints, and some abrupt changes in ridge directions, may suggest such a method.

The discussion above leads to the question asked, but not answered, by Dennett: whether a smaller cast could be expanded to Bigfoot-sized proportions. The answer is yes. Not only can a thin rubber cast be stretched over a larger (or differently shaped) frame, but a latex cast may also be expanded by soaking it in kerosene, gasoline, or other petroleum-based liquids. Although it

seems unlikely that any major expansion of casts was involved with the Mill Creek prints (since the dermal ridges are somewhat smaller than expected), it is possible that a thin latex cast from a large human foot was fitted over a somewhat differently shaped fake Bigfoot foot (accounting for the odd shape of the prints as well as the dermal ridges). In any case, skeptics should be aware of the possible use of these techniques, in case they are involved in other Bigfoot footprint claims.

Although it is difficult to know exactly how the Mill Creek prints were produced, the possibilities discussed above are more than sufficient to refute the assertion by some that such prints would have been "impossible to fake" (Krantz, Grover S., "Anatomy and Dermatoglyphics of Three Sasquatch Footprints," *Cryptozoology*, 2 [Winter 1983]: 67).

Last, I would like to comment that the Bigfoot controversy appears to have many parallels to the Paluxy dinosaur/"man track" controversy, which I have been studying for the past ten years. One parallel is the tendency of some to insist that certain tracks could not have been faked or misidentified, whereas careful study of the prints and exploration of alternative possibilities often reveals quite the opposite.

Glen J. Kuban
North Royalton, Ohio

I greatly enjoyed your Spring 1989 issue, particularly the articles by Dennett and Freeland and Rowe on Bigfoot.

In 1969 I did quite a bit of research on Bigfoot, visiting many sites where the creature had supposedly been sighted as well as interviewing many people, from California to southeast Alaska, who claimed to have seen it. It was a fun endeavor, but I regret to say that I turned up nothing that convinced me beyond doubt of Bigfoot's existence.

What struck me most forcibly in your articles is that Bigfoot research seems stuck today in exactly the same stage it was stuck in 20 years ago. Then, as now, there were hairs, droppings, hazy photos, and many plaster casts of footprints, some realistically detailed. As in the studies of UFOs and lake monsters, what is perennially lacking is a specimen.

One would think that eventually, in this increasingly overpopulated world, someone would, by the law of averages, stumble across a dead Bigfoot and haul it forth from the timber for public view. But it hasn't happened yet. Until it does, Bigfoot "research" remains at a standstill.

Richard L. Tierney
Mason City, Ia.

I was glad to read that the hoaxers are getting smarter in their bid to keep the legend of Sasquatch alive and to fool the scientists. The Bigfoot museum Freeman intends to open *should* become a successful venture with the support of learned scientists like Grover Krantz. It will also give anyone with big feet an opportunity to make a little extra money by casting a mold.

The scientists should be listening to men like Rene Dahinden, Joel Hardin, and Rant Mullens. Mullens, in an *Omni*, September 1982, article, claimed to have whittled giant feet in the late twenties to play a practical joke on some berry pickers. This practical joke grew from footprints with woodgrain into the elaborate fraud footprints with dermal ridges.

Far more evidence exists that the legend of the Sasquatch is a hoax than that it has actual existence. The myth should live in the mind and, for anyone who has seen the movie *Harry and the Hendersons*, in the heart. Thank you Michael R. Dennett for your interesting article.

Jim Megson
Victoria, B.C., Canada

Chaos

With reference to Keith Lockett's letter (Summer 1989), I have frankly had Chaos Theory thrown at me (along with Post-Modernism and the Frankfurt School) in support of the contention

that: there is a transcendent reality; that there is no such thing as reality; that we all make our own reality; that there is no such thing as truth.

I have armed myself with the idea that scientists who know about Chaos Theory talk about the *onset* of chaos; they are not contending that reality is chaotic all the time.

But I am afraid Chaos Theory's time has already come.

Lucy Fischer
London, U.K.

Backmasking and subliminals

I suppose I should feel flattered that audiologist Michael Walker (*SI*, Spring 1989) and psychologist James McConnell (*SI*, Summer 1989) both complain that their research is not cited in my article on backward masking (*SI*, Fall 1988). If I had known of their work I might have mentioned it, but it is not directly relevant to my topic. My article was concerned with pseudoscientific beliefs about backward masking and subliminal perception and with related odd notions about music. My interest was more in what people believe than in the scientific evidence refuting these beliefs (which, as McConnell notes, has been around for a long time and keeps getting rediscovered).

Walker's research demonstrates that some recognizable words and messages are indeed implanted in rock music, and shows how this can be done by the performer. I freely acknowledged that such cases exist; but since Walker and I both agree that such messages cannot be perceived as claimed, the specific techniques of their implantation, while interesting, are not directly relevant to my topic. Of greater interest to me is the fact that such messages are so often claimed to exist even when they do not.

Similarly, McConnell's complaint that I did not examine or refer to all his studies regarding the effectiveness of subliminal advertising does not affect my discussion of backward-masking beliefs. Again, we both agree that, while some forms of subliminal perception do exist, the backmasking and subliminal advertising claims are "bunk." Why then flog a dead horse? I mentioned only the most recent scientific confirmation, one which specifically addressed the backmasking claims; that was quite sufficient. My primary concern was with other aspects, particularly fundamentalist belief in backmasking; and with that aim, I concentrated my research on fundamentalist sources.

Regarding Walker's observation that some rock musicians insert backmasked messages in emulation of Aleister Crowley, this is well known, and is very prominently featured in most of the fundamentalist anti-backmasking literature. Anthropologists have long known that alien or evil beliefs and practices are typically expressed as literal inversions of accepted cultural norms: e.g., the Black Mass and the upside-down cross used in Satanic rites. Crowley, in that respect, was upholding an age-old and universal tradition.

Tom McIver
Santa Monica, Calif.

Scrutinize pop 'therapies'

In the Summer 1989 issue, two letters appeared commenting on my News and Comment piece (Winter 1989) on the donations of *Dianetics* to national (and, as one writer stated, international) libraries.

Both letters were written by librarians, and both seemed to feel that I advocated censoring the Scientologists and refusing the donation. I did not say that in my piece, nor do I advocate censorship. I only made a very vague reference to some hoped for "response" to the donations. Unfortunately, the whole area of pop psychology, of which *Dianetics* is a part, tends to be glossed over by writers on psychology. The response I hope for is that those writing on psychology and psychotherapy take a firmer stand on such "therapies" and not be afraid to comment on them. The psychologists who have actually become

involved in these issues crucial to their profession are few. These issues need to be dealt with, and that means allowing *everyone* to voice an opinion. Those concerned must be more willing to voice their opinions, however.

Bobby Newman
Rockaway Beach, N.Y.

Outreach to children?

My wife and I recently watched the enlightening and entertaining television program "Exploring Psychic Powers," with James Randi, Bill Bixby, and Penn and Teller (*SI*, Fall 1989). My 12-year-old daughter watched with us, and I was surprised (and pleased) at her natural skepticism regarding the phenomena that were explored and debunked on the program. My surprise was due to the fact that she had exhibited an uncomfortable level of credulity in the past about various things she had heard from other children.

My question to CSICOP is this: What can I, as a parent, do to nurture a skeptical and rational viewpoint in my daughter as she grows older? She will undoubtedly be subjected to incredible and irrational claims from her friends and peers as she grows into adulthood. CSICOP and the SKEPTICAL INQUIRER are aimed primarily at mature adults. Shouldn't there be an outreach to children as well? Surely it is easier to teach skepticism to children than to try to change minds that have grown into adulthood never having been exposed to a rational, skeptical viewpoint.

T. M. Hennig
El Paso, Tex.

'Psychic sleuth' materials?

We are in the process of collecting *all* available materials on the uses of alleged psychics by law-enforcement and government agencies. We have thus far amassed over 300 reference articles and books dealing with 96 such purported "psychic sleuths." This, of course, includes many critical as well as supportive sources. We would like to invite CSICOP, other skeptics' organizations, and interested readers of the SKEPTICAL INQUIRER who might have information on this subject to share such facts or references with us. We are especially anxious not to exclude any significant materials critical of such claims from the book we are now preparing on this subject.

Skeptics (or others) with information they would like to share with us should write to: Psychic Sleuths Project, Center for Scientific Anomalies Research, P.O. Box 1052, Ann Arbor, MI 48106.

Marcello Truzzi
CSAR
Ann Arbor, Mich.

Double Nobel Prizes

Phillips Stevens is in error in writing that the only other person besides Linus Pauling to win two Nobel prizes was Madame Curie (Letters, Summer 1989). John Bardeen won the Nobel Prize in Physics in 1956 and again in 1972. Unlike Bardeen and Marie Curie (whose prizes were in Chemistry and Physics), Pauling was awarded only one Nobel prize in science; his other was the Nobel Peace Prize, in 1962.

Henry E. Heatherly
Lafayette, La.

The letters column is a forum for views on matters raised in previous issues. Please try to keep letters to 300 words or less. They should be typed, preferably double-spaced. Due to the volume of letters, not all can be published. We reserve the right to edit for space and clarity. Address them to Letters to the Editor, SKEPTICAL INQUIRER, 3025 Palo Alto Dr. NE, Albuquerque, NM 87111.

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The organizations listed below have aims similar to those of CSICOP and work in cooperation with CSICOP but are independent and autonomous. They are not affiliated with CSICOP, and representatives of these organizations cannot speak on behalf of CSICOP.

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Arizona. Tucson Skeptical Society (TUSKS), James McGaha, Chairman, 2509 N. Campbell Ave., Suite #16, Tucson, AZ 85719. Phoenix Skeptics, Michael Stackpole, Chairman, P.O. Box 62792, Phoenix, AZ 85082-2792.

California. Bay Area Skeptics, Rick Moen, Secretary, 4030 Moraga, San Francisco, CA 94122-3928. East Bay Skeptics, James Miller, Secretary, P.O. Box 20989, Oakland, CA 94620. Society for Rational Inquiry, Bob Lee, President, 1457 57th St., Sacramento, CA 95819. Southern California Skeptics, Susan Shaw, Secretary, P.O. Box 7112, Burbank, CA 91505; San Diego Coordinator, Ernie Ernissee, 5025 Mount Hay Drive, San Diego, CA 92117.

Colorado and Wyoming. Rocky Mountain Skeptics, Béla Scheiber, President, P.O. Box 7277, Boulder, CO 80306.

District of Columbia, Delaware, Maryland, and Virginia. National Capital Area Skeptics, c/o D. W. "Chip" Denman, 8006 Valley Street, Silver Spring, MD 20910.

Florida. Tampa Bay Skeptics, Gary Posner, 6219 Palma Blvd., #210, St. Petersburg, FL 33715.

Georgia. Georgia Skeptics, Keith Blanton, Vice Pres., 150 South Falcon Bluff, Alpharetta, GA 30201.

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Iowa. ISRAP, Co-chairman, Randy Brown, P.O. Box 792, Ames, IA 50010-0792.

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Louisiana. Baton Rouge Proponents of Rational Inquiry and Scientific Methods (BR-PRISM), Henry Murry, Chairman, P.O. Box 15594, Baton Rouge, LA 70895.

Massachusetts. Skeptical Inquirers of New England, Laurence Moss, Chairman, c/o Ho & Moss, Attorneys, 72 Kneeland St., Boston, MA 02111.

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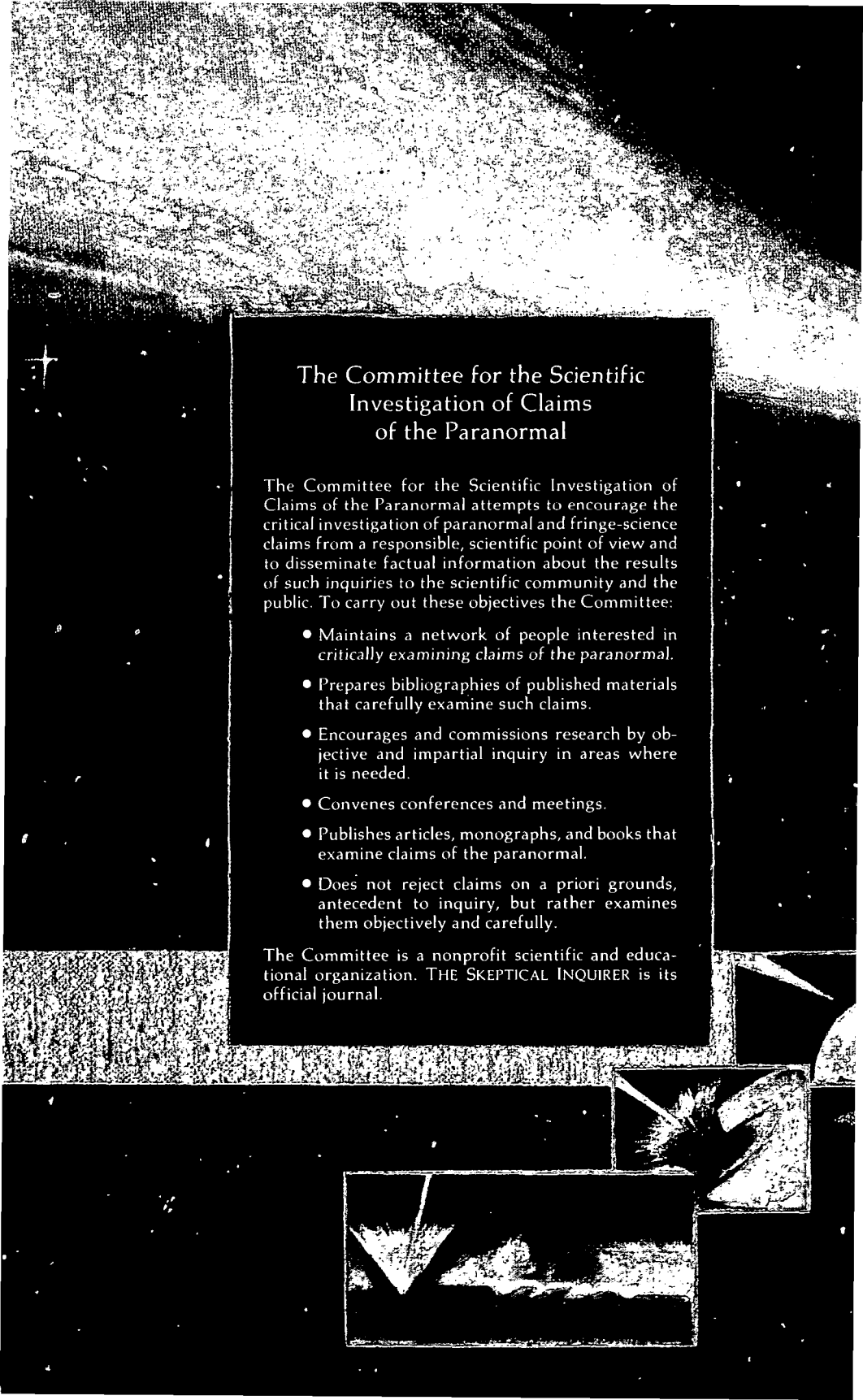

The Committee for the Scientific Investigation of Claims of the Paranormal

The Committee for the Scientific Investigation of Claims of the Paranormal attempts to encourage the critical investigation of paranormal and fringe-science claims from a responsible, scientific point of view and to disseminate factual information about the results of such inquiries to the scientific community and the public. To carry out these objectives the Committee:

- Maintains a network of people interested in critically examining claims of the paranormal.
- Prepares bibliographies of published materials that carefully examine such claims.
- Encourages and commissions research by objective and impartial inquiry in areas where it is needed.
- Convenes conferences and meetings.
- Publishes articles, monographs, and books that examine claims of the paranormal.
- Does not reject claims on a priori grounds, antecedent to inquiry, but rather examines them objectively and carefully.

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