



Michael Shermer Given First Klass Award

On October 12, 2006, Skeptics Society founder and *Skeptic* magazine publisher Michael Shermer, Ph.D., gave an informative and entertaining talk about his latest book, *Why Darwin Matters: The Case Against Intelligent Design*, to an NCAS-sponsored joint gathering with the Alliance for Science at Oakton High School in Vienna, VA.

At that event, Dr. Shermer became the first recipient of the NCAS Philip J. Klass Award, "For outstanding contributions in promoting critical thinking and scientific understanding."

About Philip J. Klass (1919-2005)

Philip J. Klass was one of the original conveners of NCAS in 1987 and was an important long-time mentor to our organization. In 1976 he, along with Carl Sagan, Isaac Asimov, James Randi, Ray Hyman, Martin Gardner, Paul Kurtz, Sidney Hook, and others was a founding member of the Committee for the Scientific Investigation of Claims of the Paranormal (CSICOP). He was one of the world's foremost experts on UFOs.

Trained as an electrical engineer, Klass was senior avionics editor of *Aviation Week & Space Technology* for over 30 years. He received numerous awards for his work as a technical journalist, from such organizations as the Aviation/space Writers Association and the Royal Aeronautical Society, and was named a Fellow of the Institute of Electrical and Electronics Engineers. He wrote one of the first books about spy satellites, *Secret Sentries in Space* (1971).

Klass was known for explaining UFO sightings with pragmatic explanations.

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Dr. Michael Shermer: First NCAS Philip J. Klass Award Recipient

Dr. Michael Shermer is the founding publisher of *Skeptic* magazine and the Executive Director of the Skeptics Society. He is an author, speaker, and producer, about whom Stephen Jay Gould said the following:

"Michael Shermer, as head of one of America's leading skeptic organizations, and as a powerful activist and essayist in the service of this operational form of reason, is an important figure in American public life."

Shermer is a contributing editor and monthly columnist for *Scientific American*, and is the host of the Skeptics Distinguished Lecture Series at Caltech. He is also the co-host and producer of the Fox Family television series, *Exploring the Unknown*, and is the science correspondent for KPCC radio,

an NPR affiliate for Southern California.

His most recent book is *Why Darwin Matters: The Case Against Intelligent Design*.

Shermer is the author of *Science Fric-*



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coming events

NCAS 20th Anniversary

As we approach the 20th birthday of the National Capital Area Skeptics (NCAS) on March 29, 2007, we invite you to join us in celebration and in looking back at our experiences and achievements, as well as looking forward to more effectively advance critical thinking and scientific understanding among NCAS members and in society.

The Birth of NCAS

NCAS was formed at an outdoor meeting in Washington, DC, on a sunny Sunday, March 29, 1987. The event was described in our first issue of the NCAS *Skeptical Eye* newsletter (vol. 1, No. 1).

Anniversary Year Events

Each NCAS event through June 2007 will have some aspect celebrating our 20th anniversary.

Beware: Skeptic on the Loose!

On Sunday March 18, 2007, James Randi, skeptic extraordinaire, will present "Beware: Skeptic on the Loose!" at the NCAS 20th Anniversary Celebration 1:00 to 4:00 p.m. at the Aiton Auditorium, National Conference Center, 7100 Connecticut Ave., Chevy Chase, MD. Attendance is **FREE** for members and

non-members alike. This is not a magic show. Watch www.ncas.org for forthcoming details.


After Randi's talk and audience questions, NCAS members and non-members are invited to participate in an open discussion focused on the future of NCAS and how best to accomplish our mission of promoting critical thinking and scientific understanding.

NCAS Members "Memory Lane" and "Future of NCAS" Email Discussions

Throughout this anniversary year, NCAS members are invited to participate in casual discussions on the NCAS SHARE email list about past personal experiences as a skeptic and as a member of NCAS, as well as focused discussions suggesting how NCAS can become ever more relevant and effective in the future. NCAS members (only) may subscribe to NCAS SHARE at <http://ncas.org/emails/subscribe.html>.

NCAS 20th Anniversary Souvenirs

The following items will be available **FREE** at our events through June 2007:

- Reprints of classic NCAS *Skeptical Eye* newsletters (**FREE**)
- NCAS "That's nice . . . Prove it!" buttons 

Monthly Meeting Times and Places

In the coming 2007 lecture season, talks will be held at the Tysons-Pimmit Library in Tysons Corner, VA, on February 10 from 2:30 to 4:30 p.m.; on Sunday, March 18 at the Aiton Auditorium, National Confer-

ence Center, 7100 Connecticut Ave., Chevy Chase, MD, from 1:00 to 4:00 p.m. with James Randi; and at the Bethesda Library on April 14 and May 12 from 2:00 to 4:00 p.m.

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recycled paper

Dear NCAS Members:

In March 2007 NCAS will be 20 years old. So, on October 1, 2006, the NCAS board conducted a day-long strategy session to review the past 20 years and to plan for the future—taking into consideration the recent *NCAS Members Survey*. We will be seeking further NCAS member input and participation in ongoing NCAS planning and activities.

Here is a summary of the Board's work that day, to begin to establish and implement a coherent, purposeful framework within which we (the NCAS board and NCAS members) can work together most productively on new and existing NCAS projects.

The board reaffirmed NCAS's original, chartered purpose and the importance of that purpose:

Purpose:

- Promote critical thinking and scientific understanding
 - Serve as an information resource on extraordinary claims
 - Provide extraordinary evidence that skeptics are cool

Importance:

Properly and broadly applied, critical thinking and scientific understanding are essential to reduce suffering and to improve the human condition. (Else, we all would be doing something more important.)

We then established four main goals, which, as they are achieved, will demonstrably accomplish NCAS's purpose. Those goals were assigned a relative priority (weight) according to their relative effect on achieving the NCAS purpose.

We established one or more objective and subjective criteria for assessing progress toward each goal. These criteria will be refined with experience. For practical reasons, criteria data will be estimated, not rigorously measured, as very rough but useful guides, not as ends unto themselves.

Goals by Priority

Goal 1: Expand & prioritize the demographic groups reached by NCAS (weight 37%)

Criteria: Estimated percent of targeted

demographic groups actually reached
Create a prioritized list of demographic groups to be reached by NCAS (such as students, teachers, media, press, business, policy makers, *etc.*)

Goal 2: Increase community and networking among NCAS members (weight 33%)

Criteria: Estimated number of hours:

- NCAS Members network together
- NCAS projects and social events
- NCAS SHARE
- More NCAS Member-to-Member networking activities to be identified.

Goal 3: Increase collaboration between NCAS and external organizations (weight 22%)

Criteria: Estimated number of two-way relationships with other organizations

Criteria: Estimated quality of those organizational relationships (subjective)

Goal 4: Expand and prioritize the relevant topics addressed by NCAS (weight 8%)

Criteria: Percent of prioritized topics addressed by NCAS

- Create a prioritized list of topics for lectures and other communications
- Topics will be selected based on how well they support the other goals

Our investment of time, resources, and people effort for each NCAS project (event, activity, *etc.*) should be based on how well that project helps to achieve one or more of the four prioritized NCAS goals.

So, we objectively ranked current and prospective NCAS projects according to their relevance to all the NCAS goals, as prioritized previously. New projects will also be ranked. When launching or managing projects, their ranking will be a very rough guide among many other factors—but it will help keep us focused on projects that are most relevant and effective for achieving NCAS's purpose with finite time, resources, and people. All projects on the list can have merit, even if they don't have the highest relevance to the highest priority goals.

Current NCAS president, Gary Stone, has served in many capacities in NCAS over the years, most recently as vice president of the board of directors. Gary often will be seen videotaping the monthly NCAS presentations for posterity.

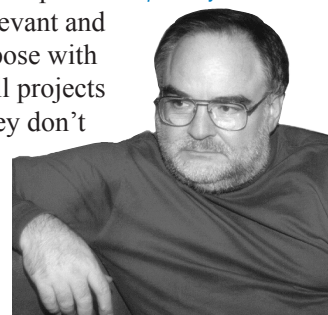


photo by Helen Hester-Ossa

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Project Ranking by Weighted Relevance to All Goals

Project Relevance to Each Goal (None= 0; Low=2; Med=3; High=4)
(Relevance to Goal times Goal Weight)

GOAL 1: Demog- raphy (37%)	GOAL 2: Member Net- working (33%)	GOAL 3: External Net- working (22%)	GOAL 4: Topics (8%)	
4	4	4	4	www.ncas.org
4	3	4	3	Support school science programs
4	3	4	3	Connect better with CFI, CSICOP, JREF, etc.
4	4	2	4	Annual NCAS event
4	3	3	4	Monthly speaker events
3	4	3	4	Bibliographies on www.ncas.org
4	4	2	2	Increase NCAS membership
4	3	4	0	Connect with SkepChicks
4	3	3	0	Support local science fairs
4	4	0	4	NCAS and Member letters to editors
4	4	0	4	Write <i>Wikipedia</i> articles on skeptical topics
3	4	2	3	<i>Skeptical Eye</i> (electronic) for members and www.ncas.org
4	2	3	2	Appleseeds (people who post and distribute NCAS event flyers, etc. at work or community)
3	3	3	2	<i>Shadow of a Doubt</i> (electronic) for members and www.ncas.org
2	4	2	4	www.ncas.org rare documents library (Condon, etc.)
3	4	0	4	NCAS video on Youtube.com, etc.
2	4	2	2	Friday 13th events
2	4	2	0	Shameless commerce: Sell NCAS videos, buttons, etc.
4	3	0	0	<i>Wikipedia</i> articles about NCAS; NCAS presence on <i>myspace</i> linking to www.ncas.org
2	4	0	4	NCAS SHARE members-only email list
2	4	0	4	Special Interest Groups (SIGs) to discuss topics or work on projects
2	3	2	2	Hard copy <i>Shadow of a Doubt</i> mailings
4	0	2	4	NCAS press releases (reactionary and proactive)
4	0	2	4	Promote <i>Skeptical Inquirer</i> , <i>Skeptic</i> magazine, skeptical books, etc. in libraries
2	2	2	3	Hard copy <i>Skeptical Eye</i>
2	0	4	4	NCAS presence at 2009 AAAS DC session (?)
2	0	0	3	NCAS video library
2	0	0	3	NCAS cable TV segments (Arlington, other)
?	?	?	?	Other new projects to be determined

Each NCAS project will have an NCAS board member as a mentor and one or more NCAS members as project leaders and participants.

I look forward to working with you as, together we envision, plan, and implement new

and improved NCAS projects to more effectively promote critical thinking and scientific understanding in the national capital area and beyond.

Gary Stone, NCAS president 

Although his detractors styled him a “debunker,” in fact, debunking was the consequence, not the purpose, of his efforts. He sought to investigate “flying-saucer” reports and thus convert UFOs (unidentified flying objects) to IFOs (identified flying objects) such as celestial bodies, research balloons, advertising

planes, and even secret aircraft. His books on UFOs include *UFOs Explained* (1974), *The Real Roswell Crashed-Saucer Coverup* (1997), and *UFO Abductions: A Dangerous Game* (1989).

In 1999, the International Astronomical Union named Minor Planet (asteroid) 7277 “Klass” in his honor. ☒

Shermer continued from page 1

tion: *Where the Known Meets the Unknown*, about how the mind works and how thinking goes wrong. His book *The Science of Good and Evil: Why People Cheat, Gossip, Care, Share, and Follow the Golden Rule*, discusses the evolutionary origins of morality and how to be good without God. He also wrote *Why People Believe Weird Things*, a book that was widely and positively reviewed, and landed on the *Los Angeles Times* bestseller list, as well as the *New Scientist* science books bestseller list. *How We Believe: Science, Skepticism, and the Search for God* presents his theory on the origins of religion and why people believe in God. Shermer’s books also include *In Darwin’s Shadow*, a biography of Alfred Russel Wallace, the co-discoverer of natural selection; *The Borderlands of Science*, which explores the fuzzy boundary between science and pseudoscience; and *Denying History*, which takes on Holocaust denial and other forms of historical distortion. Shermer is also the author of *Teach Your Child Science* and co-author of *Teach Your Child Math* and *Mathemagics*.

Shermer received his B.A. in psychology from Pepperdine University; his M.A. in ex-

perimental psychology from California State University, Fullerton; and his Ph.D. in the history of science from Claremont Graduate School. He worked as a college professor for 20 years (1979-1998), teaching psychology, evolution, and the history of science at Occidental College, California State University Los Angeles, and Glendale College. Since his creation of the Skeptics Society, *Skeptic* magazine, and the Skeptics Distinguished Lecture Series at Caltech, he has appeared on such shows as *20/20*, *Dateline*, *Charlie Rose*, *Tom Snyder*, *Donahue*, *Oprah*, *Sally*, *Leeza*, *Unsolved Mysteries*, and more as a skeptic of weird and extraordinary claims. Shermer has also appeared in documentaries aired on A&E, Discovery, PBS, The History Channel, The Science Channel, and The Learning Channel. ☒



photo by Nelson Davis Jr.

Thank You from Michael Shermer

On November 17, 2006, Michael Shermer wrote the following note to NCAS board members Scott Snell and Chip Denman:

Scott and Chip,

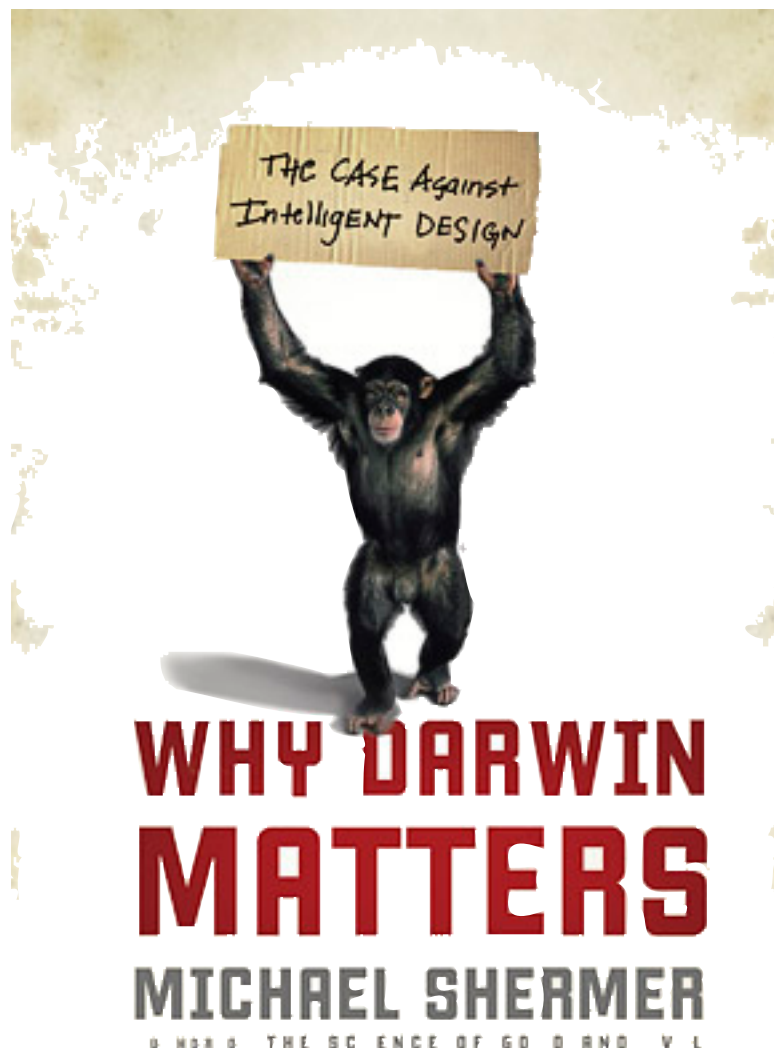
My award arrived today! I proudly displayed it for everyone to see. It is absolutely the coolest thing I’ve ever received, and is definitely going in a prominent place in the

office, hopefully to become backdrop for the talking-heads TV appearances I often make, since it is kinda science and UFO looking in its design. Anyway, thanks again for the award. It is deeply meaningful to me. We will be posting it, along with the photo you sent me, on eSkeptic soon.

Michael ☒

Why Darwin Matters: The Case Against Intelligent Design

a review by Neil L. Inglis



1 987 was a watershed year for me as a skeptic. I joined NCAS and became a *Skeptical Eye* subscriber. In preparation for the Supreme Court's decision in the Louisiana "equal time" Creationism case, I ordered *Scientists Confront Creationism* (Laurie R. Godfrey, ed.) from Prometheus Books. After I ordered a copy of the Supreme Court's landmark 7-2 decision and the *amicus curiae* briefs directly from SCOTUS, I said to myself, "Ah, thank goodness this Creationist nonsense is over!" But it wasn't over—it's never over.

The other side has undergone cosmetic surgery. They have different language now, crafty new talking points—teach the controversy!—while scientists drone on about the separation of church and state.

What we need is fresh weaponry; fortunately, new publications are filling the bill. One recent title—*Intelligent Thought* (John Brockman, ed.)—acknowledges the opposing side's gussied-up rhetoric. Intelligent Design (ID), in turn, leads us to the subject of today's review, the latest book by Michael Shermer, public intellectual and NCAS Philip J. Klass award winner.

Why Darwin Matters is brief by the standards of polemical writing, and provides crisp rebuttals to widespread misconceptions about evolution. Appendices on the various categories of Creationists, and creation myths from around the world, portray a madcap jumble of silliness, surely distasteful to Intelligent Designers who claim to perceive an orderly and unified guiding hand behind the Universe.

As an example of how Shermer challenges specific ID fallacies, consider the following quote discussing whether evolution is testable. It is a good illustration of the author's polite yet devastating style.

"A paleontological dig is a good example of how hypothetico-deductive reasoning and historical sciences can make predictions based on initial data that are then verified or rejected by later historical evidence. Evolutionary theory is rooted in a rich array of data from the past that, while nonreplicable in a laboratory, are nevertheless valid sources of information that can be used to piece together specific events and test general hypotheses. While the specifics of evolution—how quickly it happens, what triggers species change, at which level of the organism it occurs—are still being studied and unraveled, the general theory of evolution is the most tested in science over the past century and a half. Scientists agree: Evolution happened."

Shermer's writing is infused with a reverence for science and the natural world. And

yet, where ID-ers spot perfection, he notes the imperfections, the false starts, the blind alleys (modern whales retain a tiny pelvis for hind legs; cormorants' wings "have evolved from flight *tools* to thermoregulation devices").

No transitional forms? No fossil links? That's so 1987! The fossil record from dogs to wolves is sparse, yet we may be confident it happened thanks to mitochondrial DNA research.

Here, then, are arguments that should sweep away ID slogans and sway newcomers, who, with any luck, should see ID for what it really is: a Creationist wolf in sheep's clothing that has not evolved in the slightest. As Shermer notes with a touch of exasperation, "That's the best science the Intelligent Design movement has to offer—lots of miracles, a handful of equations, and ten straw examples against thousands of compelling lines of inquiry."

But that's about as harsh as Shermer gets. Because I started the book half-way through (I'm giving away my trade secrets here), I was slow to discover that Shermer himself had been a Creationist in the 1970s. Some recovering believers spit vitriol—not Shermer. For example, he treats William Jennings Bryan with some understanding. A contemporary insult from H.L. Mencken shows the sort of technique that Shermer avoids: "Once [Bryan] had one leg in the White House and the nation trembled under his roars. Now he is a tinpot pope in the Coca-Cola belt and a brother to the forlorn pastors who belabor half-wits in galvanized iron tabernacles behind the railroad yards..."

Shermer's restrained handling of Red-State values shows in other areas. Exploring a topic covered in his other writings (including *The Science of Good and Evil*), Shermer attempts to argue that Old Testament commandments ("Love thy neighbor" *etc.*) may have an evolutionary basis. His acknowledgment that his former fellow worshipers might be right about adultery and other sins could dampen the common criticism of skeptics and secular humanists that they have an "anything-goes" attitude toward sexual license. (So much for the *Old Testament*; it's not clear what Darwinian basis Jesus Christ's parables would have).

This is all very well in theory, but I doubt these debating gambits will win many con-

... newcomers ... should see ID for what it really is: a Creationist wolf in sheep's clothing that has not evolved in the slightest.

verts. Shermer anticipates my objections and gives sound reasons for entering the fray regardless (debate forces the other side to lay their cards on the table, and if there is to be a debate at all, best that an expert be present). Besides, if Shermer could change his mind over time, others can too.

Nagging doubts remain. Science is discovered in the laboratory, not in public disputations with Discovery Institute spokesmen. It doesn't matter how many jars Shermer has with his ID sparring partners at the hotel bar after a debate. His enemies are out for blood (one debater laid it on the line: "I'm here to win Michael Shermer over to Christ.")

Our adversaries see this in apocalyptic terms as a fight between Good and Evil. Darwin himself said that acknowledging the mutability of species was "like confessing a murder;" and to quote from Shermer, "Charles Darwin's first impression of [the Galapagos] was 'what we might imagine the cultivated parts of the Infernal regions to be.'" A Creationist wag might say that Darwin began and ended his career in Hell. That is the mentality we face. As Darwin feared, attempts to change such a mindset may be fruitless.

Shermer and the rest of us in the rationalist movement have long assumed that getting the facts out about Darwin is the right way to go. But if that's not working—and it's been a muted success at best—it calls our entire skeptical strategy into question. What, then, is our Plan B?

Shermer's backup strategy is to remind us that science is cool! Just as he is unwilling to accept that Darwinism leads to depravity, he makes a bold attempt to reclaim Darwin's mantle of spirituality for skeptics. A dirty little secret is that New Agers—and above all Creationists—can be stolid and unspiritual people. Michael Shermer goes all out to reclaim the mantle of spiritual awe for Darwinists and scientists—not just admiration, but real wonder.

Neil Inglis is a long-standing member of NCAS—not one of the founders, but close (since 1988). Over the years he has been a regular correspondent for *Skeptical Eye*, focusing mainly on CSICOP conference reporting, and is a frequent contributor to NCAS-SHARE. He brings an unusual perspective to the skeptical world, having been raised in the home of a hard-core, militant psi proselytizer. In January 2005 he gave his first presentation at an NCAS Saturday afternoon session (on Michael Servetus, medical pioneer).

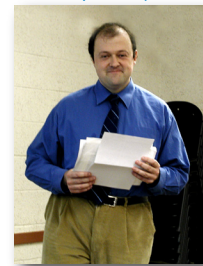



photo by Helen Hester-Ossa

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“Does a scientific explanation for the world diminish its spiritual beauty? I think not. Science and spirituality are complementary, not conflicting. . . I am deeply moved, for example, when I observe through my Meade 8-inch reflecting telescope in my backyard the fuzzy little patch of light that is the Andromeda galaxy. It is not just because it is lovely, but because I also understand that the photons of light landing on my retina left Andromeda

2.9 million years ago, when our ancestors were tiny-brained hominids roaming the plains of Africa.”

Cordial, but devastating.

Why Darwin Matters: The Case Against Intelligent Design, Michael Shermer, Times Books Henry Holt and Company, LLC, 2006
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A Neurobiology of Sensitivity?

Study Suggests a Link Between Environmental Sensitivity and Psi Perceptions

by Michael Jawer



Michael Jawer is an independent researcher who has been examining the issue of sensitivity for the past 10 years. While always fascinated by psi, his interest in environmental sensitivity was kindled by his investigation of indoor air quality and sick building issues in the 1990s. Jawer's current "day job" is unrelated to this project; he works for the Federal government and lives with his wife and two children in Northern Virginia.

People with a “sensitive” personality type are far more likely to report apparitional experience, according to speaker Michael Jawer, an independent researcher who presented the NCAS monthly lecture on April 8, 2006. Jawer discussed the findings of his survey project, published earlier this year in *the Journal of the Society for Psychical Research*.

Self-described “sensitives” commonly report longstanding allergies, chronic pain and fatigue, depression, migraine headaches, and sensitivity to light, sound, and smell. These people are also much more likely to report that immediate family members suffered from the same conditions. Jawer’s study raises the question of whether a “neurobiology of sensitivity” could underlie reports of apparitional experience.

The survey questioned 62 such individuals along with 50 people serving as controls who did not profess any outstanding forms of sensitivity. People in the former group were from 2.5 to 4.5 times as likely as the latter to assert that they’d had an apparitional experience. (The range owes to the relatively large number of controls who said they were “unsure” if they’d ever perceived something that could not be verified as being physically present through normal means.) Sensitives were also 2.5 times as likely to indicate that an immediate fam-

ily member was affected by similar physical, mental or emotional conditions.

Overall, 8 of the 54 factors in the survey instrument were found to be significant in the makeup of a sensitive personality:

- Being female
- Being a first-born or only child
- Being single
- Being ambidextrous
- Appraising oneself as imaginative
- Appraising oneself as introverted
- Recalling a plainly traumatic event (or events) in childhood
- Maintaining that one affects—or is affected by—lights, computers, and other electrical appliances in an unusual way.

Additionally, synesthesia—the scientifically recognized condition of overlapping senses, such as hearing colors or tasting shapes—was reported by a portion of the sensitive group, but not at all among controls. This gives added weight to the possibility that apparitional perceptions stem from an underlying neurobiology of sensitivity.

The survey findings indicate that a person’s neurobiology could be shaped as easily by nurture as by nature. Recall of a traumatic event in childhood, for example, was indicated by a majority of sensitives (55%), as contrasted with controls (18%). Furthermore, a startling 14% of sensitives reported having

been struck by lightning or suffering an electrical shock, whereas none of the control group checked this item.

“Taken together,” Jawer suggests, “the evidence points to sensitivity as a bona fide neurobiological phenomenon. It seems quite possible that certain individuals are, from birth onward, disposed to a number of conditions, illnesses, and perceptions that, in novelty as well as intensity, distinguish them from the general population. If so, apparitional perceptions and other psi phenomena long resistant to explanation might involve commonalities that make them accessible to scientific inquiry.”

While always fascinated by psi, Jawer’s interest in environmental sensitivity was kindled by his investigation of indoor air quality and

sick building issues in the 1990s. His “day job” is unrelated to this project; he works for the Federal government and lives with his wife and two children in Northern Virginia.

Jawer wishes to thank NCAS for giving him the opportunity to speak—especially Paul Jaffe (who provided early feedback on the project) and Gary Stone. Anyone wishing to view or download the survey may go to the “Psi Surveys” page of the Parapsychological Association website at http://www.parapsych.org/psi_surveys.html. The two papers that Jawer has published thus far are online at <http://cogprints.org/> (search on author’s last name). He welcomes any and all comments on the project at mjawer@yahoo.com. ☞

Della Porta: Between Natural Magic and Science

by Richard Dengrove

I wrote in my last essay (*Skeptical Eye*, vol. 18, no. 1) that Natural Magic was the father of the Occult. It was also the father of Modern Science. The life of the Renaissance virtuoso Giambattista Della Porta illustrates this change.

William Eamon tells Della Porta’s story. However, Eamon entered the scene after Della Porta. A Venetian professional writer and a 16th century poligrafo, Girolamo Ruscelli published after Della Porta’s death an account of the world’s first experimental academy, the “Accademia Segreta,” or “Segriti” in Naples.

It was a secret society with an herb garden, bird cages, and a laboratory. Also, with apothecaries, herbalists, goldsmiths, and gardeners to help the academy’s members. Eamon suspects that this academy had to have had the patronage of a local prince, *i.e.*, Ferrante Sanseverino, Prince of Salerno.

The idea behind the Segreti was to test “secrets” found in old books and “secrets” passed by word of mouth. Three successful trials were

needed before the society would give a “secret” its stamp of approval. They did not test hypotheses, but evaluated the “secrets.”

The Segreti were disbanded in 1552 when Prince Sanseverino, allied with France, led an expedition to take Salerno from the Spanish. The expedition failed, and he was exiled to France, where he became a Protestant.

Eamon claims that Della Porta must have been a member of the Segreti and that he later started a similarly named society called Accademia dei Secreta. Also, Della Porta wrote *Magia Naturalis* (1558), a book of secrets, about six years after the Segreti disbanded. Also, because he was a young man in his twenties, Eamon wonders whether some of this knowledge didn’t come from the Segreti.

I do not know whether I am convinced; but I will assume his membership for the purposes of this article.

After the end of the Segreti, Giambattista Della Porta tested “secrets” much like the Segreti did, and had a great claim to achievements

Richard Dengrove is the librarian for the Food and Nutrition Service, Department of Agriculture. He lives with his wife, Heidi, in Alexandria, Virginia. His ambition is to write a history of occult magic one of these days.



photo by Helen Hester-Ossa

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Della Porta . . . believed implicitly in all the Ancient tales of human/beast intercourse and that they produced hybrids that were neither man nor beast.

in his own right. He was so well known, he was patronized by the nobles of Europe.

Both the 1558 and 1589 editions of *Magia Naturalis*, (or *Natural Magic*), show the results of testing, e.g., in his system for tempering steel. Depending on its use, the steel was to be heated to a particular color: yellow, red, blue, or ash. The color determined how many times the steel needed to be heated and quenched. According to Eamon, it did something else besides: it eliminated the organic baths smiths had been using. To see the color, the bath had to be clear.

When Della Porta revealed “secrets” like that, they added to the knowledge of his era. However, the other “secrets” he revealed definitely did not. Unlike the Segreti, he did not necessarily test everything three times before he believed it. A skeptic might object that both editions of *Magia Naturalis* are riddled with “secrets” that are obviously not the product of testing. In fact, they often look more the

product of rumor than of experience. A skeptic would say they do not add much to their era.

It is true. For instance, while Della Porta is often skeptical of the Ancients, sometimes he takes them at face value. He believed implicitly in all the Ancient tales of human/beast intercourse, and that they produced hybrids that were neither man nor beast. To the argument that asses have sex organs much too large for humans, he replied that it depends on the human, the ass, and the stars. The book is filled

with other examples. He retells in detail several tales from ancient times of horse/human hybrids, donkey/human hybrids, and goat/human hybrids. However, Della Porta was not that much different from other savants. A hundred years later, they were relating fantastic tales too. Robert Boyle, the “17th Century Sceptical Chymist,” believed in the efficacy of special prayers. I suspect that fantastic tales did not really go out of fashion until the 19th century.

However, I said that this story leads from Natural Magic to Modern Science, and not that it tells the story of superstition. It comes closer to modern science when, in 1604, the Marchese di Monticello came to Della Porta and told him of a society he wanted to found, the Accademia di Lincei (the Academy of Lynxes), inspired by the 1589 edition of Della Porta’s *Magia Naturalis* in which Della Porta said, “[He observed] with Lynx-like eyes those things which manifest themselves, so having observed them, he may zealously put them in operation.”

The Marchese succeeded in establishing the Lincei and kept it running for a time, until the Marchese’s father had him disband it. However, when the Marchese acceded to the Dukedom of Aquasparta, he reestablished the Lincei. This was a society where each illustrious member was supposed to make a discovery. Of course, Della Porta was the Duke’s favorite.

Then, in 1611, modern science entered the scene and displaced natural magic. That year the Duke tossed Della Porta aside for a new member, Galileo Galilei, because of the discoveries Galileo had made with a telescope and announced in his *Sidereus Nuncius*. More important to us, Galileo made discoveries by testing hypotheses rather than evaluating “secrets” like Della Porta.

Della Porta believed that the Duke had been smitten by a Johnny-come-lately. Della Porta believed more than ever in his ability to make discoveries, and he dismissed the telescope as being unimportant. He would show both Galileo and the Duke who was the better discoverer. In fact, he had an idea in mind: experiments in telepathy where he would prick one person and, he hoped, another would feel it some distance away.

However, those experiments did not work ►



out. A year later Della Porta lamented that he should have invented the telescope rather than pricked people. Of course, he may not have realized that Galileo's main advantage was not the telescope, but that he tested hypotheses.

In any event, you can see here where natural magic produced the fertile ground—societies for experiment—from which science could grow. ☞

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- Giambattista Della Porta, *Magia Naturalis*, 1558, Book 13, Chapter 3 and Book 2, Chapter 12. Table of contents at <http://homepages.tscnet.com/omard1/jportat2.html> as of 10/6/2006

Germ Frenzy—The Good, the Bad, and the Deadly

by Gary Stone

Karl J. Roberts, Ph.D, *edutained* an engaging audience of NCAS members and the public at the Tysons-Pimmit library, in Falls Church, Virginia, on Saturday, December 9, 2006. He is a Professor of Biology at Prince George's Community College, PGCC, but he had no difficulty at all, he said, making the trip along I-495 to the Route 7 exit for the Library just inside the beltway. Free NCAS 20th Anniversary "Prove It" buttons were handed out to all who attended.

As a nation, we have become obsessed with germs and cleanliness, sometimes to the point of paranoia. Every semester Dr. Robert's PGCC biology students face their fears, and go forth into their community, their businesses, and their homes, swabs in hand, collecting samples from surfaces like sink tops, toilets, door knobs—anywhere microscopic beasts might lurk. His students are part of an ongoing, multi-year study of microbes in our intimate environments. Those samples are "amplified" in Petri dishes containing various nutrients conducive to the growth of particular microbes of concern—some harmful, some helpful. But to keep it safe for the students, the work is all done under Bio Safety Level II protocols. The lab tables are sanitized 22 times a day—the PGCC microbiology labs are the cleanest places on campus to eat your lunch.

He then discussed the prospects of an Avian Flu pandemic, which is of genuine concern.

Dr. Roberts reviewed the history of Hygiene, such as Ignaz Semmelweise's 1847 discovery that instances of puerperal fever could be drastically cut by washing in obstetrical clinics, and Joseph Lister's introduction of carbolic acid to sterilize instruments, clean wounds, and sanitize the air around the surgery—gloves and masks and gowns were initially introduced more to protect the hands of the surgeons and nurses from the carbolic acid (Lister's fiancé was one of his surgical nurses). Only later did surgical garb become part of a more pervasive sterile zone strategy.

Roberts pointed out that most commercial anti-microbial soaps, *etc.*, do not substantially reduce environmental microbes in actual use. Moreover, according to an emerging Hygiene Hypotheses, he said the relative cleanliness of first-world urban life may be implicated in auto-immune disorders like asthma and certain allergies, which are less prevalent in rural communities. ☞

As a nation, we have become obsessed with germs and cleanliness, sometimes to the point of paranoia.

Where Is the Line Between Researchers and “Revolutionaries?”

by Ye. D. Eydel'man
translated by Gary Goldberg

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Saint Petersburg
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Society
<http://www.humanism.al.ru/en/articles.phtml?num=000018>



Ye. D. Eydel'man

1. A Few Words About Freedom

The freedom to create pseudoscientific propaganda is one of the downsides of freedom generally and freedom of speech in particular. While this statement is now a commonplace, at the same time, no one is paying attention to the fact that the struggle against pseudoscience has become easier. First, the effect of “forbidden fruit” has been lost. Those who analyzed pseudoscientific works 20-30 years ago remember how manually-typed copies of the lectures of Azhazha were passed from hand to hand, and they stood in line for the film *Vospominaniya o Budushchem* [Recollections of the Future]. Today no respectable person will pick up *NLO* [UFO] and similar newspapers.

Second, it has become psychologically easier to criticize and expose pseudoscience. While 20-30 years ago such activity signified support of the official position of the CPSU and the government, it really seemed like informing and participating in political persecutions, for the pseudoscientists being criticized could, at the least, encounter trouble at work. Of course, the supporters of pseudosciences also made use of the situation: they skillfully hid themselves behind a veil of secrecy. And having gained access to the government, they

used the resources of the KGB to the utmost (let's recall T. D. Lysenko and his “team”).

Under conditions of freedom of speech, they often seek to have real researchers “study” their nonsense and then criticize them. It is quite difficult to do this, and often it's unpleasant. The goal of this report is to show how to separate “revolutionaries” and real scientists without getting into the details and subject matter of their published materials.

2. Criteria to Distinguish Researchers From “Revolutionaries”

Following S. Zykov (Sergey Zykov, *Nauka i Tekhnologiya absurda* [Science and The Technology of the Absurd], *Zdravyy Smysl* [Common Sense], 2000, no. 17, pp. 21-26), the view of non-specialists that “science and nonsense can seem equally convincing” must be stated. Therefore, criteria have long been used that are not connected with the subject of the problem to demarcate the line between science and pseudoscience, between genuine researchers and crazy “pioneers” (see, e.g., the works of Academician Arkadiy Benediktovich Migdal). These criteria are: biographic (personal data), the formal criteria of publications, and also the criteria of falsifiability and observability.

The Criteria of Personal Data

Researchers	“Revolutionaries”
They have a physics and engineering physics education.	They do not have such an education; as a rule, they are mechanics, electronics technicians, radio engineers, etc.
They belong to a well-known scientific school (they have a graduate degree or they have worked [in this field]).	They do not belong to a scientific school in the field of science that they are “revolutionizing.”
They have publications in generally-recognized refereed journals that do not aspire to “revolutions”	They have works only of a “pioneering” nature.
They work among professionals of this science and are known to them.	They work, as a rule, in technical fields. They are unknown to professionals of the science being “revolutionized.”

If at least three of these criteria do not indicate that this is a researcher then, with a high degree of probability, this is a “revolutionary” and his works are unsubstantiated.



Translator Gary Goldberg is a long-time NCAS member

2.2. Publication Criteria

In reviewing a request for publication any non-specialist may, but when distributing

credit a supervisor must, pay attention to the following criteria:

Publication Criteria

Researchers	"Revolutionaries"
They study and cite other works in the field under investigation.	They cite practically no other scientific works, most often because they are unfamiliar with them.
They conduct experiments, calculations, and compare new and earlier known facts.	They spend time mainly on advertising and a quick "sale" of their fabrications.
They publish their results chiefly in refereed scientific journals and only then write monographs and articles in popular publications.	They publish their works right away in the form of monographs or articles in popular publications. In recent years the books (books right away!) of such authors have also begun to appear in science publishing houses.
The criterion of "serendipity" (see Garri Abelev. <i>"Realizatsiya individual'nosti v nauke v usloviyakh konkurentsii [The Marketing of Individuality in Science In Competitive Conditions]."</i> "Zdravyy Smysl", 1997, N 4, pp. 41-47), and in translation from Sanskrit "went for a flower, but found a princess." A pioneering result is acquired as the accidental byproduct of a search for an answer to a specific, particular problem.	Generally-accepted "pioneering," "revolutionary" ideas look for a result single-mindedly.

If at least 3 from this group indicate that this is a "revolutionary," then he is indeed!

"Only that theory is scientific which can be disproved."

Karl Popper

2.3. Criteria Of Falsifiability (Per Karl Popper)

This group of criteria is the same as the following; a familiarity with the description of the problem is required, but, as before, special knowledge is not needed.

In the works of the now universally-recognized philosopher Karl Popper [this] principle is formulated: "Only that theory is scientific which can be disproved." (See, e.g., "K. Popper. "Realism and the Aim of Science," a condensed translation from English in the col-

lection, *A Modern Philosophy of Science. A Reader*, 1996, 2nd edition, Logos, pp. 92-106). It is by that criterion that science and religious studies (Marxism) are distinguished. Applying the principle of falsifiability to the problem under investigation, one can point out the following criteria:

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Criteria of Falsifiability (per Karl Popper)

Researchers	"Revolutionaries"
They conscientiously search for arguments contradicting their explanations. They regard such arguments with respect and carefully analyze them. They indicate the limits of applicability to their results.	They look only for arguments favoring their results, but they supply the results themselves tendentiously, not analyzing them, and not comparing them with previously known [results].
They strive in every way to simplify explanations. They use well-defined terms.	They cannot explain the substance of their "discovery" simply, in generally-understood terms. After simplification of the language, the vacuousness of the work they present is often observed.

2.4. Criteria Of Observability

This group of criteria is well known to all educated people. The principle was formed by positivists (see, for example, R. Carnap, "The Philosophical Foundations of Physics," translated from English. Moscow, *Progress*, 1971, 382 pp.): "Everything which science deals with should be repeatable and observable when certain conditions are observed" has proliferated everywhere. This principle served as a structural element when forming

quantum theory. It has entered school textbooks throughout the entire world and was actually even described in dialectical materialism courses (it is true, after accusations of "idealism"). See, e.g., A. G. Spirkin. *Osnovy filosofskikh znaniy. Uchebnik dlya VUZov. Vse izdaniya [The Principles of Philosophical Knowledge. A Textbook for Higher Educational Institutions. All editions]*.

Thus:

Criteria of Observability

Researchers	"Revolutionaries"
Deal with questions that can be verified, although only in principle.	Introduce concepts and raise questions that cannot be verified in principle.
Rely on well-known tested theories like old tested friends and do not "betray" them without obtaining hard evidence that they are insufficient or contradictory.	Operating on the thesis of "But suddenly we don't know this any longer," they eagerly resort to examining issues that conflict with the fundamental laws of natural science (the Law of the Conservation of Energy, the Second Law of Thermodynamics, the Principle of Relativity, etc.)

The presence in a particular book, article, or proposal of criteria indicated in the last two parts (2.3 and 2.4) of this section can serve as an additional criterion for identifying genuine

[scientists] and pseudoscientists. Statements of the type: "Study our work and then disprove it," ought not to be accepted.



3. “Professors” Who Are Supporters Of Pseudoscience (PSP)

Openness and permissiveness permit attention to be given to the fact that often pseudoscientific ideas are supported by people who have scientific degrees and titles. We’ll call them “professors” for the sake of brevity. Often the conduct of such a “professor” is a sign of emotional illness, but there are also people who genuinely believe that they are “pioneers” and are making a “revolution” in science. In the recent past such people were safe from criticism.

“Professors” who are supporters of pseudoscience (PSP) are, as a rule, specialists in fields of applied technical sciences who had earlier obtained specific results in them, made inventions, have pupils, awards, scientific degrees and titles, and, in accordance with all this, authority. Often their achievements are associated with defense topics and corresponding secrecy. In their engineering and technical disciplines they do not offer any extravagant ideas and do not depart from classical physics (although there are exceptions). Their ideas that claim to be a “revolution” and a revision of “fundamental principles,” as a rule concern other fields of science that are new to them, in particular theoretical physics in general, the theory of relativity, or quantum physics. Not belonging to schools of science nor working in these fields of physics and not having [made] a personal contribution in solving specific problems in these fields, PSP get their knowledge only from general physics courses and popular science literature. As educated people, PSP are interested in philosophical problems. On the other hand, PSP have a psychological “orientation toward success.” Since they have already succeeded in their own scientific and technical disciplines, they therefore conceitedly state the ideas they have gotten in their heads without bothering to check them and not having sufficiently serious training in fields new to them.

Earlier, in a totalitarian society, specialists of this sort were not shy about resorting to arguments beyond the bounds of the scientific field under examination, *e.g.*, arguments from the realm of ideology. In particular, there were attempts to present the theory of relativity,

quantum physics, *etc.* [which they] misunderstood as contradicting dialectical materialism. Now references to dialectical materialism are replaced by references to other teachings that contend for supremacy, chiefly religious ones. In a democratic society, such arguments should not be considered.

Without doubt, one of the reasons that facilitates the appearance of PSP is the arrogant attitude of theoretical physicists toward all physicists. As they say, “We are the brains and you—too bad!” Another reason is the weakness in the education of young people in fundamental disciplines.

4. An Example Of A Pseudoscientist: A. P. Smirnov

The leaders of the St. Petersburg branch of the Russian Humanist Society (G. G. Shevlev, B. N. Gavrilov) asked me to comment on the views of “professor” A. P. Smirnov. “Professor” Smirnov has a regular program on the NBN television channel. Professor A. N. Sinyakov was given an opportunity to speak on this program. P. A. Trevogin dedicated one of his articles to this professor (see P. A. Trevogin. “Nauchnaya gipoteza ili zaklinanie? [*Scientific Hypothesis or Incantation?*] “Zdravyy Smysl” 1999/2000, N14, pp. 46-50). This article illustrates quite clearly the general rules cited above. On the program that “professor” Smirnov presented, people spoke who declare that all the world’s problems could be solved if the dimensions of the pyramid of Cheops were correctly measured.

I also saw a program about the ideas of A. P. Smirnov himself. Two people very similar to one another, one of them A. P. Smirnov and the other interlocutor (I didn’t catch his name) literally performed a duet; reciting from an earlier prepared text, he proclaimed that the wise “doctor” Aleksey Smirnov would explain everything right immediately. It is obviously time to remove the quotes from the words “professor” and “doctor.” A. P. Smirnov—candidate of physicomathematical sciences.

I don’t know what education A. P. Smirnov has but he obviously does not belong to a

continued on page 16

scientific school in either the sphere of thermodynamics or mechanics which he “is revolutionizing.” This is what he states:

The most vital property of Nature is creation. It is manifested in the spontaneous transformation of low-potential energy into high-potential energy, that is, in the prevailing processes of self-organization and self-development, but not in the generally-accepted idea about the absolute degradation of the Earth into the heat death of the Universe.

Newton didn't create mechanics, but the dynamics of actual processes. In the consciousness of Mankind the generally-known formulation of his Third Law has been consolidated: “Every action has an equal and opposite reaction.” Alas, no one in the scientific community either glanced at the original or

It is interesting that the real researchers in a totalitarian society are always the hidden dissidents and the authorities know this. Actually, no regime manages to stop at the level of technology that has been achieved. External “enemies” are not content with this level.

the translation from the Latin. According to Newton, action is not evaluated as the value of a force but “a product of its force and velocity,” for force itself cannot accomplish anything without being given a certain velocity. Force with a velocity is an applied force by which the measure of action is determined from:

$$Fd * Vd = - Fp * Vp$$

And there are more than 30 such points (see G. Shevelev. Physics from the *Shaping Center*, “Zdravyy Smysl’,” 2001, no. 3, pp. 28-30).

Of course, A. P. Smirnov only has works of a “pioneering” nature. He works in a classified technical field and is unknown among professionals in thermodynamics and mechanics. Thus, in the first group, according to biographical criteria, he is an obvious pseudoscientist. Professor Smirnov is completely lacking in the criteria of the second group which are defined by the formal criteria of publication. He cites no other scientific works, advertises his works,

and publishes works in an unrefereed publication of conference materials, but not in *Nature* or even in letters to ZhEhTF [*The Journal of Experimental and Technical Physics*].

And, of course, A. P. Smirnov is single-mindedly looking for and studying “pioneering” results, and “overthrowing” generally-accepted ideas. What “serendipity” this is. It’s not being wasted.

The statements described are impossible to refute since A.P. Smirnov simply does not provide justifications for them. That’s all. Believe it! The professor also does not think about a conscientious search for arguments contradicting his explanations. There’s also nothing to say about the terminology. A. P. Smirnov gives all the customary terminology another meaning.

Here is his statement:

The new paradigm is another logic of analysis, another mathematics, another perception of the world as a given in movement, in development.

Where is “another logic?” Where is “another mathematics?” They are absent. But then there are plenty of promises: everything is promised. We cite:

A change in philosophy permits us not only to solve a broad range of problems in science and technology which were theoretically unsolved within the framework of contemporary ideas but also to start solving the vital functions of the living, to identify the conditions necessary for the Harmony of Man, Society, and Nature. A new mentality is opening an epoch of spiritual, physical, and intellectual renewal—the perfection of Mankind and society, creating conditions for the development of a new civilization.

Jesus Christ and Karl Marx right in one person.

It would seem, Mr. Smirnov, that you point out that there will be changes in the movements of planets if, as you imagine, Newton’s Third Law is changed. But no, this is quite trivial. Professor Smirnov easily tosses out proven working theories which produce correct, observable predictions. In HIS works neither the principle of falsifiability nor the principle of repeatability is fulfilled.

The conclusion is obvious: The hyperphysics of A. P. Smirnov is not science. ►

5. Another Approach: From The General To The Particular

Returning to a general formulation of the problem, it needs to be noted that the contradiction and contrast of “Researchers vs. Revolutionaries” is only one of the facets of comparing closed and open societies. As the experience of history shows, “revolutionaries” who have fought their way to power establish the most severe censorship, suppress dissidence, and in the final result [impose] a totalitarian dictatorship in the field in which they acquired power. Lenin, Stalin, Hitler, and other tyrants of the recent past are typical revolutionaries. Lysenko and Marr established dictatorships in their fields. If A. P. Smirnov fought his way to the administration of sci-

ence, it would be bad for both academicians and graduate students.

An analysis of the problems of comparing closed (totalitarian) and open (democratic) societies allows us to identify the common criteria by which we can distinguish researchers from revolutionaries. These common criteria of the ideology of those who are inclined to support revolutionaries and those who hold to the views characteristic of researchers are presented below in a table (*An Analysis of Closed and Open Societies*. See Aleksandr Etkind, “Iz izmov v demokratiyu [*From Isms to Democracy*].” Ayn Rand and Hanna Arendt, “Znamya,” no. 12, 2000, pp. 161-181).

From The General To The Particular

Researchers	“Revolutionaries”
Mysticism—faith in a bright future: yes, it’s bad for us now, but the present generation of Soviet people will live under Communism.	Efficiency—rationality is the main agent of survival and self-protection; it makes a person (“right now”) special, and unbending to and unreachable by authority.
Altruism—the readiness to sacrifice what one needs right now for another, which can be fully used (by “authority”) for its selfish ends.	Practicality—reason is the most selfish quality. Its product is truth. From this ensues the voluntary exchange (in the future) between individuals and societies.
Collectivism—subordination to the collective or society, personified by “the bosses.” Subordination and self-sacrifice are the foundation of happiness.	Morality—integrity, initiative, mutual aid, charity, and love are personifications of individualism. Success and prosperity are the foundation of happiness.
A social movement that began with the ponderous constructs of Hegel and Marx and ended with a horde of unwashed children, stamping their feet and whining: “I want it right now.”	Capitalism, which began as an epoch of initial accumulation, later based on a voluntary exchange between individuals who were concerned about their personal interest in the future.
Inflation. The realm of mythological designs.	A is A. Instrumental rationality.

It is interesting that the real researchers in a totalitarian society are always the hidden dissidents, and the authorities know this. Actually, no regime manages to stop at the level of technology that has been achieved. External “enemies” are not content with this level. Back in de Tocqueville’s book, *Democracy in America*, he raised the question, “Can a democracy withstand the military threat of a dictator-

ship?” and replied objectively and in detail: “Yes, in the long term a democracy is strong and viable.” Briefly put: “1) Control is based on technical progress, 2) Progress requires creativity, 3) Creativity requires freedom, and 4) Freedom undermines control.

For example, Sakharov was a technical genius who came to oppose the regime and undermined its foundations.

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Freedom is not a toy, but a necessary condition of technical progress. Researchers are necessary!

On the other hand: totalitarianism (revolutionaries) aspire to control of technical progress. Technical progress requires an educational system. Education is impossible without freedom. People deprived of freedom lose the ability to innovate and create. This is immediately followed by a degradation in technical progress.

Freedom is not a toy but a necessary condition of technical progress. Researchers are necessary!

There is nothing more moral than rationality and a good account and nothing more amoral than mystical calls for the common good reinforced by inflation. Right now, after the terrorist acts in New York one can say: the “revolutionaries” are the terrorists, and the researchers are the reasonable people.

6. Conclusion. The Presumption Of Guilt

The goal of this work is to help overcome or at least lessen the psychological causes that breed pseudoscience. To do this we need to demand compliance with the following conditions from “aspirants to a revolution:”

1) Submission of the results of experimental verification; 2) Confirmation they have sufficient verifiability; 3) Conformity with the principles of fundamental knowledge; 4) Explanations in generally-accepted terms; and 5) Indications of the limits of applicability. Everyone who is not indifferent to the fate of science—officials and deputies who make decisions about the financing of scientific work, editors and journalists who write about science—needs to adhere to the principle of “the presumption of guilt.”

In court, the presumption of innocence is observed: the burden of proof rests on the accuser and all doubts are resolved in favor of the accused. In science the situation is quite the opposite. The burden of proof rests on the author, and all doubts are resolved against the author. Arguments like “I believe in this; if

you don’t believe—prove me wrong” are not accepted. ☒

Selected Bibliography

Readers who want to familiarize themselves in more detail with the questions discussed can do this by making use of the literature listed below.

1. A. I. Kitaygorodsky. “Reniksa.” Moscow. “Molodaya Gvardiya” [Publishing House], 1973, 192 pp. with illustrations (and later editions).

The name of the book was taken from a humorous story by A. P. Chekhov. The teacher wrote on the work of a careless high school student: “nonsense,” but the Russian letters were taken as Latin letters, “renyxa.” In the book it pointed out how scientific knowledge struggles with gullibility, bombast, and pseudoscience and how disregard of the methods of the scientific approach opens the way to all sorts of “miracles.” Distinguished by the simplicity of exposition and its broad scope, this book is very useful to those who are just beginning to familiarize themselves with the subject.

- 2.2.1. A. B. Migdal (academician). “Poiski istiny [*Searches for Truth*] (Notes on scientific creativity).” Moscow, “Znaniye,” 1978, 80 pp. (*What’s New in Life, Science, and Technology*. The “Fizika [Physics]” series, no. 7, 1978).

The ideas of the book of Arkadiy Benediktovich Migdal, one of the most gifted students of Nobel Laureate L. D. Landau, are the closest to the topic of this publication.

A. B. Migdal limited himself to examples from the field of physics. Examples in the article were also taken from chemistry.

M. V. Vol’kenshteyn. “Traktak o lzhenauke [*Treatise on Pseudoscience*].” “Khimiya i Zhizn’ [*Chemistry and Life*],” no. 10, pp. 72–79, 1975.

The article was written by a Corresponding Member of the Academy of Sciences and published in one of the best popular science magazines.

Unfortunately, doctors and pharmacists rarely explain the consequences of resorting to



the means suggested by all sorts of “healers.” Thus the book is all the more valuable.

4.1. V. G. Kolesov, V. A. Marchenko, N. V. Syrovezhko. “Lekarstvennyye rasteniya: mify i real’nost.’ Traditionnaya (narodnaya) meditsina v ob’yektive nauki [*Medicinal Plants. Traditional (Folk) Medicine in the Lens of Science*].” St. Petersburg. Khimiko-Farmatsevticheskoy Akademii [The Publishing House of the Chemistry and Pharmaceutical Academy], 1999, unknown number of pages with illustrations. This book was written by a clinician, a medical theorist, and a pharmacist. Such a rare combination of authors permitted them to reliably separate the “wheat” from the “chaff” in such a difficult question as the choice of a means of treatment.

4.2. I. I. Sokolov, V. V. Stepanov. “Narodnaya meditsina - nauka i traditsionnoye znaniye [*Folk Medicine - Science and Traditional Knowledge*].” St. Petersburg, Gidrometeoizdat [Publishing House], 2001, 65 pp.

In each field in which the “pioneers” ordinarily work, there are fundamental monographs in which it has been shown that “the emperor has no clothes” on the basis of factual material.

5.1. Ch[arles] Hansel. *Parapsychology*. Translated from the English by F. V. Shirokov with an afterword by A. I. Kitaygorodsky. Moscow. Mir [Publishing House]. 1970, 320 pp. with illustrations (*In the World of Science and Technology*).

5.2. Lawrence D. Kusche, *The Bermuda Triangle: Myths and Reality!* Translated from the English by K. I. Telyatnikov. Afterword by Academician L. M. Brekhovskikh. Moscow, “Progress” [Publishers], 1978, 352 pp. With illustrations.

5.3. V. N. Soyfer. “Krasnyaya biologiya: Pseudonauka v SSSR [*Red Biology: Pseudoscience in the USSR*].” Moscow. “Flinta” [Publishing House], 1998, 264 pp.

5.4. V. N. Soyfer. “Vlast’ i nauka. Istoriya razgroma genetiki v SSSR [*Science and the Government. The History of the Destruction of Genetics in the USSR*].” “Ermitage” Publishing House, 1989, 706 pp. with illustrations.

After reading through these books the reader will be ready to argue with representatives of the pseudosciences.

Those who are interested in the current situation in the conflict between revolutionaries and researchers need to turn to the following sources:

6. 1. “Zdravyy smysl’.” A journal of skeptics, optimists, and humanists. It publishes materials about these problems from issue to issue.

6.2. Eh. P. Kruglyakov. “‘Uchenye s bol’shoy dorogi [‘*Swindlers Posing as ‘Scientists’*].” “Nauka” Publishing House, 2001, 320 pp. with illustrations. The author of the book is Chairman of the Russian Academy of Sciences’ Commission to Combat Pseudoscience and the Falsification of Scientific Research.

In court, the presumption of innocence is observed: the burden of proof rests on the accuser and all doubts are resolved in favor of the accused. In science the situation is quite the opposite. The burden of proof rests on the author, and all doubts are resolved against the author.

the write stuff

skeptical correspondence

The following is a letter written by Fred Kourmadas, Biology and AP Biology teacher at Freedom High School in Prince William County, Virginia, to Dr. Rick Dieccio, his geology professor at George Mason University

Hi Rick,

When last we spoke, you posed a question to the intrepid band of secondary school educators who were your students. You wanted to understand why some individuals seemed incapable of sorting fact from garbage, and would tend to “believe anything.” I filed your question away with the idea that I would write you when I had a chance to compose some thoughts on the matter. So, I suggest you print and save this until you can truly read it in the correct state, which is with a pint in hand and one or two on board already.

Anyway, it is a complex question, and in reality probably represents several different situations, all with superficially similar symptoms. Information and details about different individuals may help you to make a more accurate “diagnosis,” but it isn’t an exact science, and there is no reason why one person couldn’t have many different reasons for their incapacity for critical thought. Following are some ideas that come from my own experience, from psychologists, from educators, and maybe even a thing or two from philosophers. Only a little of this is my own original thought, and I regret that often I can’t recall the exact origins of ideas and concepts. Anyway . . .

It is documented that very early, babies start to construct rules for understanding the physical world. For example, babies see things drop to the ground when released, and are surprised the first time they see a helium balloon do the opposite.

You may recall that I am of the opinion that developmentally, certain things associated with the ability to think critically must happen in childhood. It is documented that very early, babies start to construct rules for understanding the physical world. For example, babies see things drop to the ground when released, and are surprised the first time they see a helium balloon do the opposite. After that, they understand that it is an exception to the rule.

Later on, they intuitively understand conservation of matter and energy, for example, that things don’t disappear when they are out of sight. Another example is that a 2-year-old will think that pouring the milk from a short, stout glass to a tall, thin one increases the amount. A 4-year-old knows that the amount doesn’t change. Piaget believed that it just sort of “happened” on its own. I find it more probable that maturation puts the hardware in place by a certain age, but that there must be appropriate stimuli that engage it.

When my youngest son was about 2, he had a toy locomotive that absolutely terrified him. It was run by a flywheel, so that a slow push provided the windup that made it continue to run, slowly, for a long distance. He acted like it was possessed. It didn’t behave in the way he understood, *i.e.*, it traveled much too far after being slowly pushed, and its velocity didn’t decay in the predictable way of his other little cars and trucks, giving it the appearance of the toy acting on its own. When, finally, I put both his hands on it, and got him to push it, he instantly understood, intuitively, that energy was in fact being conserved, that by pushing hard, he had provided the energy for it to travel a long distance.

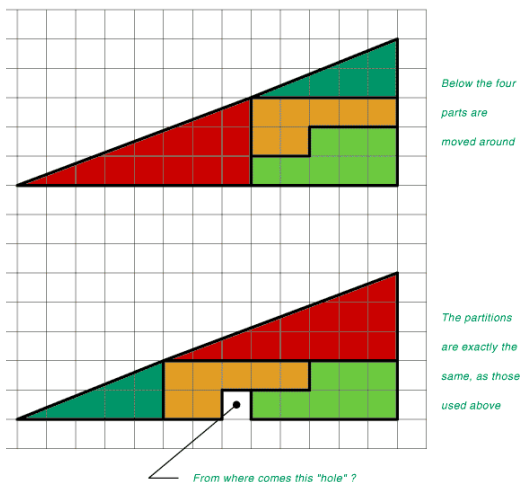
On to our students now. While looking on the Internet for puzzles and optical illusions (for a “nature of science” lesson, to point out how our biases and preconceptions affect us), I found the wonderful puzzle shown to the right.

This was deeply disturbing to me, and it took me maybe 45 minutes to finally figure it out. If the answer is obvious to you, please just humor me and tell me it was hard to figure it out (actually, one guy, a painfully bright physics teacher, figured it out almost instantly). Anyway, I did my lesson with my college students, and when I got to this image, one young

man, maybe about 22 years old, pondered for a minute, then announced that he figured it out. I was genuinely excited to have a student that bright (I thought), and asked him to explain it. He replied, "They just moved the pieces around so it makes that hole."

It didn't even occur to him that the same set of shapes can't have two **different** areas. It is fundamentally the same problem as pouring the milk into a different glass. So, what went wrong for him not to understand that a problem even exists? Who knows? Maybe faulty wiring (development), maybe the switches (stimuli) were not tripped early in life. Can he remediate? Almost certainly, but like learning to speak a language early versus late in life, he might never become a "native" critical thinker. As I told you, it is my observation that much of elementary school education is, in fact, geared toward promoting this kind of learning.

The second issue of relevance is what I call "deep ignorance." This is, from my experience, very common. Let me explain it this way: in ancient times, people returning from foreign lands told stories of strange animals they had seen, like elephants, giraffes, and crocodiles. They also told of animals that they hadn't seen, but were taught about by other people, like dragons, unicorns, and griffins. Now, in the days before our modern understanding of biology and zoology, a dragon or a unicorn seemed as likely a proposition as a crocodile or an elephant. People believed in dragons and unicorns, not because they were stupid, but because when you know almost nothing about how something works, anything seems possible.



A lot of kids manage to get through a K-12 education without learning much of anything, so when they land in college, the idea that the earth has a solid iron core in a molten mantle, OR the idea that the earth is hollow, with a race of aliens living inside, seem to be propositions of approximately equivalent validity.

I am reminded of a little neighborhood boy, Bruce, who was about 4 when I was maybe 7 or 8. Brucie, as he was called, was absolutely maddening, because, being 4, he knew almost nothing, and he assumed that nobody else knew any more than he did. Brucie's mantra was, "How do you know?" which he dispatched with a lilting, mocking defiance, over and over. He would ask a question, you would answer, and he would say, "How do you know?" (hereafter, "HDYK?"). You would explain the facts that allowed you to know, and regarding those facts, he would again pose, "HDYK?" Explain, "HDYK?" (cycle repeated *ad nauseum*). Eventually, you would give up, as there isn't enough time to rebuild the epistemology of the entire knowledge base of mankind to someone who is deeply ignorant. The deeply ignorant don't know enough to understand how much it is that they don't know.

Well, after these exchanges, Brucie always felt triumphant, "smarter" somehow than the older boys, which I suppose was the point of the exercise. But he had a good excuse. At age 4, one is genuinely deeply ignorant, but older students, people who should "know better," often simulate the same game, for exactly the reason that it gives them the self-esteem boost of "outsmarting" the professor, teacher, or "the scientists," whoever they happen to be.

Think about it, in a world where nothing is "known" and everybody's "position" is equivalently valid, that grown-up version of "Brucie" knows as much as you, and he didn't waste all that time getting a Ph.D. In my experience, people who historically haven't done well in school, and may be self-conscious about it, sometimes fall into the pattern of adopting contrary beliefs and attempting to boost their self-esteem by denying or devaluing real knowledge and education in this way.

This brings up the third issue, esthetics. What it boils down to is that very often, people make a decision to believe (or not to believe)

Fred Kourmadas is a biology and AP Biology teacher at Freedom High School, in Prince William County. A lifelong interest in plants and animals led him to major in biology in college. However, a weight training injury sidelined him with lower back pain. A friend suggested he see a chiropractor. Fred's pain responded well to manipulation, and he made an uninformed decision to pursue a career as a chiropractor.

Chiropractic was presented as a field in the "proto-science" stage, that is, that it was based on a sound theoretical foundation, and it was just a matter of time before the science caught up to the practice. Almost from the beginning, however, he noticed, and ignored, the warning signs that he was not in a legitimate field of study. In time, it became apparent to Fred that chiropractic was founded by quacks, for quacks, and he realized he needed to get out. That proved to be easier said than done, however. There are essentially no career options for someone with a chiropractic degree.

Fred went back to school, earning an MS in exercise science, and began adjunct teaching at Northern Virginia Community College: Bio 101, 102, and Human Biology. He began education classes at George Mason University, leading to teacher certification and endorsement in biology. In 2003, he was finally able to close his chiropractic office for good, after 19 years in that profession, and has been teaching secondary school full time since then. Recently, he completed endorsement requirements for earth science as well.

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The problem is that religions arose in a prescientific world. So, modern religions are saddled with the burden of prescientific (and obviously naïve and archaic) explanations of the origins and workings of the universe, life, and mankind, AND the imperative that these explanations are never to be questioned.

something based on esthetic reasons. People choose beliefs based on how they WANT the world to be, not on how it is. This is not news to Madison Avenue, by the way. Anyone involved in advertising or marketing knows that people identify with characters who they WANT to be like, and advertisers simply show us that buying that new soap, automobile, or barbeque grill set supposedly makes us more like that really cool person we want to be. I'm pretty sure, for example, that I will become a guy who attracts girls with gigantic breasts if only I choose the correct brand of beer (Miller Genuine Draft, I think).

The most common esthetic choice of belief systems, of course, is religion. The fear of one's own death, and fear of abandonment that comes with the death of loved ones, makes the propositions of God and an afterlife an easy sell to most people. Who wouldn't choose a world where you get eternal life after death, get reunited with your loved ones, and where all your enemies burn in a lake of fire for eternity?

In the marketplace of ideas, the religions that survived long term, of necessity, were those that included the proposition that THEY were the one and only true, absolute, and

literal word of God, and to question that proposition is to risk eternal damnation (and persecution, torture, or death and dismemberment).

The problem is that religions arose in a prescientific world. So, modern religions are saddled with the burden of prescientific (and obviously naïve and archaic) explanations of the origins and workings of the universe, life, and mankind, AND the imperative that these explanations are never to be questioned. Since most people have a healthy fear of their own death and the prospect of nonexistence, many will willingly accept the religious proposition, and forever after be incapable of integrating a scientific understanding of almost anything into their psyche.

If the student realizes the inherent paradox that accepting religious AND scientific propositions causes, (for example, the geologic timeline and various geologic processes versus the biblical timeline and the necessity to create the Grand Canyon and the Blue Ridge Mountains in 6,000 years), then they may have some ill-defined and unexplainable inability to remember geologic times, events, and processes. After all, if religion is wrong about the Grand Canyon, then maybe it's all just crap, and when I die, I just cease to exist, (which, because of my own pathological narcissism, I find to be an unthinkable option). And it may not be just the students wearing crucifixes, as even plenty of nonchurchgoers tend to maintain some personalized form of theism. Needless to say, we can go on about that topic.

This pretty well describes the world I left to enter teaching as well. For almost 20 years, I was a chiropractor. This is a very strange profession, consisting of people who should "know better," yet they essentially base beliefs, and practice, on esthetic concerns. The world they WANT is one where the price of health is constant spinal vigilance. They, too, are saddled with a naïve and archaic set of principles, and the imperative that any challenge to the validity of these principles comes only from *de facto* "enemies" of chiropractic. The whole system shares many parallels with religion. It's a fascinating topic for, well, for almost nobody, except those of us who managed to find our way out.

In general, . . . students . . . can't think their way out of a paper bag. . . . (T)eachers often can't figure out WHICH paper bag their students are stuck in, and can't think their way INTO the bag, to help the students out.

Anyway . . . In general, the problem with students is that they can't think their way out of a paper bag. The problem with teachers is that they often can't figure out WHICH paper bag their students are stuck in, and can't think their way INTO the bag, to help the students out. And in the case of esthetic blockages to learning, you may never be able to get in that bag, as the entrance is too well guarded, emotionally.

So there you have it:

1. Development/learning

2. Deep ignorance

3. Esthetic considerations

I'm sure there is plenty of ground I haven't covered here as to why some students "just don't get it," but at least it is a start. I'm willing to entertain other possibilities, including the possibility that I'm totally full of crap. So when you get a chance, let me know what you think.

Fred Kourmadas 

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