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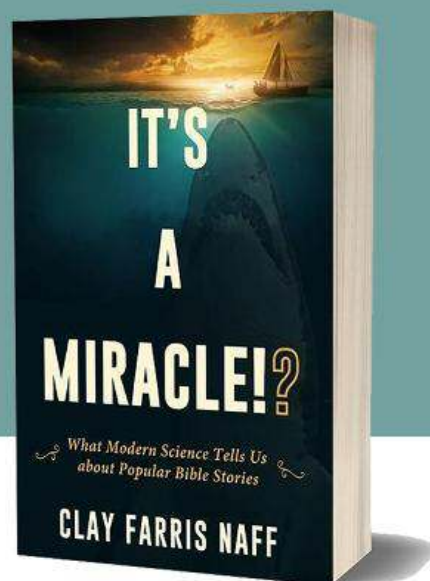
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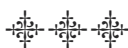
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The SkepDoc

Health Freedom, Right to Try, and Informed Consent

BY HARRIET HALL, M.D.



STARTING WITH THE TERRIBLE TWOS, when toddlers hear the word “No” on a regular basis, people don’t like to be told they can’t do something. They often believe government regulations interfere with their rights. The government requires vaccinations for school attendance; parents complain that they should be able to make their own decisions about whether to vaccinate their children. The government requires that drugs be approved by the FDA before marketing; desperate patients dying of cancer complain that regulations are preventing them from getting the one new treatment that just might save their life.

Health Freedom

The “health freedom” argument is that everyone has the right to use whatever treatments they want, to control what goes into their bodies, and that it’s none of the government’s business. But as Stephen Barrett and William Jarvis explained on Quackwatch:¹

Quacks use the concept of “health freedom” to divert attention away from themselves and toward victims of disease with whom we are naturally sympathetic. “These poor folks should have the freedom to choose whatever treatments they want,” cry the quacks—with crocodile tears. They want us to overlook two things. First, no one wants to be cheated, especially in matters of life and health. Victims of disease do not demand quack treatments because they want to exercise their “rights,” but because they have been deceived into thinking that they offer hope. Second, the laws against worthless nostrums are not directed against the victims of disease but at the promoters who attempt to exploit them.

Vaccine refusers don’t recognize that the government has a duty to protect the welfare of children and to protect the population from vaccine-preventable diseases. They tend to think parental rights and personal preference should trump everything else.

People go to other countries to get stem cell treatments that have not been tested, and cancer treatments like Laetrile and the Gonzalez protocol that have been tested and shown not to work. In a trial of pancreatic cancer, patients treated with the Gonzalez regime survived on average for 4.3 months; those using standard chemotherapy survived on average for 14 months and reported a better quality of life. But desperate patients still want to believe in these treatments and they insist it was wrong of the government to prohibit them in the U.S.

Right-to-Try Legislation

As of May 30, 2018, 38 states already had right-to-try laws and there is now a federal right-to-try law. It gives terminally ill patients the right to get experimental drug treatments that have not been approved by the FDA, that are still in clinical trials, as long as they have passed a Phase 1 trial, the first step in the Food and Drug Administration’s approval process. At first glance, it sounds like a good idea; but the devil is in the details. The FDA already has an Expanded Use or Compassionate Use policy.² It can be used when:

- Patient has a serious disease or condition, or whose life is immediately threatened by their disease or condition.
- There is no comparable or satisfactory alternative therapy to diagnose, monitor, or treat the disease or condition.

- Patient enrollment in a clinical trial is not possible.
- Potential patient benefit justifies the potential risks of treatment.
- Providing the investigational medical product will not interfere with investigational trials that could support a medical product’s development, or marketing approval for the treatment indication.

Over a ten-year period from 2005 to 2014, there were 9,000 applications to use investigational drugs; 99% of these were approved. Emergency requests are usually granted immediately over the phone, and non-emergency requests are generally processed within a few days.

My colleagues on the Science-Based Medicine blog, cancer researcher/surgeon David Gorski and lawyer Jann Bellamy, have covered this legislation extensively and have pointed out a number of problems:

- It cuts the FDA out of the loop, so it doesn’t have the opportunity to offer other options that might be safer or to give the patient what information it has about possible side effects.
- It removes the right to sue: doctors and drug companies are not liable for any harm that might occur to patients under this program.
- There is no oversight by an Institutional Review Board (IRB).
- It assumes that it is safe to try drugs that have passed phase I trials; these trials only involve a few patients and can’t establish drug safety. After drugs pass phase I testing, there are still high odds that they don’t work and aren’t safe.
- It forbids the FDA from using any information about deaths or other harms to

patients under this program from being considered in its deliberations on approving the drug.

- It exposes patients to exploitation.
- It is a foot in the door to furthering undermining the authority of the FDA.
- The drug companies are not obligated to provide the drug, but they have no incentive not to. They can charge the patient whatever they want, they incur no liability, and if the drug kills the patient, the FDA can't use that information to delay or stop approval of the drug.
- Insurance companies don't pay for experimental treatments; drug manufacturers can charge patients whatever they choose. Less well-to-do patients will either forgo treatment or deplete their finances, depriving their survivors of an inheritance.
- Terminal patients who have "nothing to lose" actually do have something to lose: money, quality of life, time with loved ones.

The Origin of Right-to-Try

David Gorski calls right-to-try laws "a cruel sham and scam." He says they were concocted by "the quackery-friendly for-profit hospital chain the Cancer Treatment Centers of America and foisted on gullible legislators by the Goldwater Institute, a libertarian propaganda group disguised as a think tank."³ It was the Goldwater Institute that came up with the name "right-to-try," wrote model legislation, and promoted it to state legislatures.

The Profiteering Begins

The new law allows drug companies to make money by selling unproven therapies to desperate patients. Unscrupulous drug companies will be incentivized to skip the traditional clinical trial and FDA review process altogether.⁴ BrainStorm Cell Therapeutics, for example, is already planning to take advantage, offering stem cell treatments to patients with amyotrophic lateral sclerosis (ALS, or Lou Gehrig's disease). It plans to charge \$300,000 for each NurOwn treatment. In the company's own phase 2 trial, NurOwn failed to

slow the progression of ALS compared to a placebo. They nevertheless embarked on a Phase 3 trial. Without waiting for trial results, they decided to offer the treatment to patients under right-to-try because of "intense demand from patients who have no other options."

Informed Consent

One of the major principles of medical ethics is autonomy, the right of the patient to self-determination. In earlier days, doctors were paternalistic. They decided what was best and ordered whatever treatment they chose. They were like parents saying, "You will eat your broccoli because I say so. Mommy knows best." Those days are long gone. Today, patients have the right to make decisions about their own health and to refuse treatment, even essential lifesaving treatment, as long as they are of sound mind. Consent to treatment is meaningless unless it is informed consent. Patients must be given adequate information and must be able to understand the diagnosis, what the proposed treatment will entail, the risks and benefits of the treatment, the consequences of not treating, and whether any other treatment options are available.

Informed consent is mandated by both ethics and law. No one has the right to even touch, much less treat, another person without consent; such actions can be prosecuted as physical assault or battery. Obtaining consent is considered a must for anything other than a routine physical examination.⁵ Entering the doctor's office and expressing a problem can be considered implied consent for a physical examination. Intimate examination (especially of a female), photography, and any invasive test or risky procedure requires specific expressed consent, which can be either oral or written. Written consent is preferable. Doctors are expected to document in the patient's chart that they have discussed all the pertinent facts with the patient; and for surgery, the patient is required to sign an informed consent form.

In everyday practice, informed consent is not always honored. Doctors may not take the time to explain everything in detail. They may influence the patient's decision by their language or by the way they present the facts or omit some information. Patients regularly sign surgical consent forms without reading them.

I worry that under the right-to-try law, patients may not fully understand the risks and the low probability of success, and drug companies may take advantage to sell their products to desperate individuals at inflated prices. I worry that since these patients weren't able to qualify for clinical trials, they may be less healthy and more likely to suffer problems with the experimental treatments than those who enroll in the trials; they may have other medical conditions or factors that make them more susceptible to complications.

Conclusion

No reasonable person wants health freedom without information. Imagine a world without laws, where patients are free to use any treatment any quack or snake oil salesman might invent, where patients can't give informed consent and have no way of knowing what they are getting into. We rely on laws to protect us from contaminated and adulterated foods. We rely on the FDA to protect us from dangerous drugs and disasters like Thalidomide. As Jann Bellamy summarized:

The claims that "potentially lifesaving" drugs will actually benefit terminal patients are overblown, the risks underappreciated, and the procedures for obtaining unapproved drugs inadequate to protect patients from adverse consequences, both medical and financial. **S**

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The Gadfly

Do You Have Traits or Are You a Type?

BY CAROL TAVRIS



EVERY FEW YEARS, ANOTHER INTREPID, well-informed journalist writes an exposé of the Myers-Briggs Personality Indicator (MBPI). Malcolm Gladwell took a shot at it in 2004 in the *New Yorker*.¹ Eleven years later, Vox ran its incarnation of this eternal story, by Joseph Stromberg and Estelle Caswell, with a headline that could not have been clearer: “Why the Myers-Briggs Test is Totally Meaningless.”² In case anyone missed the headline, pull-outs in the story emphasized the point:

- “Analysis shows the test is totally ineffective at predicting people’s success at various jobs”
- “The Myers-Briggs rests on wholly unproved theories”
- “About 200 Federal agencies reportedly waste money on this test”

And now Louis Menand of the *New Yorker* has taken a shot: “Are assessments like the Myers-Briggs more self-help than science?”³ You can guess his answer. You can also guess the answer to this one: How many of the more than two million people a year who fill out the MBPI—in businesses, colleges, churches, couples’ retreats, motivational seminars, and matchmaking programs—read those articles and said, “Aha! I always suspected it was ‘totally meaningless’! Give me my money back”?

The MBPI, like the Rorschach or palm reading, floats above criticism, parody, and evidence. At a conference on science and skepticism, at which I spoke about why people hold on to outdated or incorrect beliefs, a young man asked for my views on the MBPI. When I asked why he cared, he told me he’d been using it for years with his colleagues and students and swore by its accuracy. I admit that I did not give him an honest reply.

People have been fitting themselves and their friends into “types” since the

days of Hippocrates, who posited that personalities fell into four categories depending on mixes of body fluids. If you were an angry, irritable sort of person, you supposedly had an excess of choler, and even now the word *choleric* describes a hot-head. And if you were sluggish and unemotional, you supposedly had an excess of phlegm, making you a “phlegmatic” type. The Four Humors theory lives today only in those adjectives, but unscientific tests of personality types still exist, aimed at predicting how people will do at work, whether they will get along with others, whether they will cheat their employers, or whether they will succeed or fail as leaders. You can see how appealing such tests would be to employers: “We don’t have to think about working conditions for our employees or whether we are exploiting or underpaying them; we just have to avoid hiring ‘cheaters.’” And you can see how appealing such tests are to those who take them: “This test will tell me at last what I could do, should do, and would do if only I had the money, education, social support, and motivation.”

Of all the type approaches, the MBIT is the longest-lived, most lucrative, and most successful. A big part of its genius lay in its name, because by calling it an “indicator” of the “type” of person you are, rather than a “test” of your qualities or abilities, its originators removed the anxiety of being evaluated and found wanting, or of possibly being less smart or talented than everyone else. There is no one right way to be, the Indicator assures you. All types are equal; they simply differ in reflecting your true self. To find what type you are, you first find where you lie on each of four dimensions:

- E/I (extravert/introvert)
- S/N (sensing/intuition)
- T/F (thinking/feeling)
- J/P (judging/perceiving)

Combining results on each dimension yields 16 possible types: You could be an extravert-intuitive-feeling-judging kind of person, or an introverted-sensing-thinking-judging sort. How easy and fun! People who have been through MBPI programs define themselves by their particular combination of initials: “I’m an ISFP,” one might say; “no wonder we broke up; he’s an ESTP. Completely unmatched.” A friend told me that when her church had all of its members take the Myers-Briggs, she was told she was “an ENTJ—a ‘natural leader.’” Then, being a true skeptic, she added “...which I already knew.” Each of the four dimensions reflects two modes corresponding to the supposedly opposite traits on that dimension—you are a judger or a perceiver, but not both. Yet responses from thousands of people find no evidence of bimodality; on the contrary, their scores end up in the middle ground of every dimension. Unfortunately for the Indicator’s fundamental assumption, therefore, the qualities that describe us don’t divide up in neat binaries; people don’t think or feel when they make a decision, they do both. Some of our decisions are based more on rational calculation than on acting on gut impulse (or we hope they are), but sometimes, as we all know, we do the reverse. We know what we think that a “thinking” decision should be but we override it because, well, we wanna. We *feel* that we wanna.

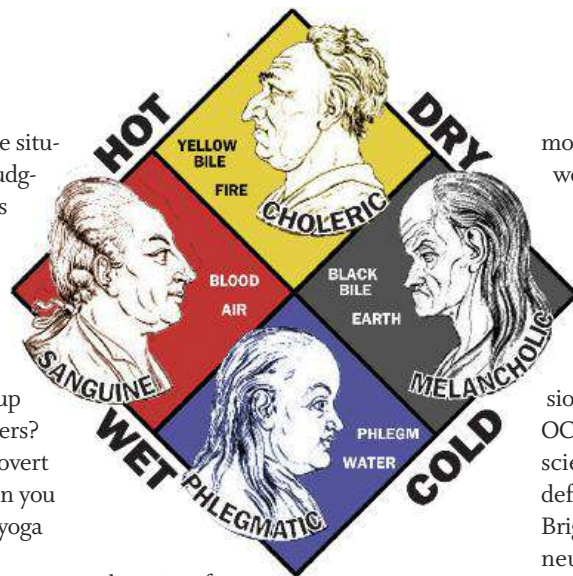
The MBPI’s binaries appeal to people’s subjective experience, but they are arbitrary. Why not type people—or try to match couples—on, say, being morning or night people, on time or late, neat or messy, slow or speedy, loves spicy food or hates it? But whatever the binary you choose, people’s behavior typically falls at different points along a spectrum, and where they fall often has less to do with

their personality type than with the situation and circumstance. Are you judgmental? The answer often depends on whom or what you are judging—everyone? nonskeptics? members of a political party you detest? that SOB at work? Are you always an introvert or mainly when you are new to a group and uncomfortable with its members? Do you think of yourself as an introvert and thereby fail to notice how often you chat with people in ticket lines or yoga class?

But what should have killed the MBPI is the evidence that it is not much more reliable than measuring body fluids—it isn't consistent over time. One study found that fewer than half of the respondents scored as the same type a mere five weeks later. Even worse for the Indicator's purveyors, knowledge of a person's type does not reliably predict that person's behavior on the job or in relationships.

In her important new book *The Personality Brokers*, Merve Emre, a professor of English at Oxford University, gives us not only the MBPI's history but biographies of the two women who created it and became its indefatigable promoters.⁴ It was designed in the 1940s by Katharine Cook Briggs, who was rather pathologically infatuated with Carl Jung, and who eventually collaborated with her daughter, Isabel Briggs Myers. Emre explains that the MBPI was originally named for mother first, then daughter—the Briggs-Myers. But by 1960, when the Educational Testing Service had taken it on as part of their larger effort to study personality tests of all kinds, a squeamish staff member noted that calling it the "BM" type indicator would not do, and the order of their initials was changed. (In the 1960s, the ETS severed its relationship with the MBPI and its creators, realizing, as some of their scientists noted, that it wasn't much different from horoscopes.)

In the true spirit of pseudoscientists everywhere, Katharine and Isabel were impervious to any evidence that their Indicator didn't indicate anything reliable or valid about personality. Having neither interest nor training in statistics and



the scientific method, they could blithely claim that the MBPI explained why some marriages struggle or fail: If you are an ISFP, it's no wonder you can't get along with an ENTJ; you are hopelessly mismatched by type. Never mind that randomly, all couples will differ on at least two dimensions just by chance. And what about that research showing that when people are retested, they often change type? How could that be, since types were supposedly innate and unchanging? Such individuals are simply showing signs of "enantiodromia," said Isabel—Jung's word for "going over to the opposite." So if types don't change, she's right, and if they do change, she's still right.

Quibble, quibble. "Scientific or not," Emre writes, "the indicator had always managed to spark a sudden and ecstatic perception of self-knowledge in its subjects, no matter their age, sex, education, occupation, or political leanings, no matter their initial skepticism toward its operations." I think she nailed it. The "ecstatic perception of self-knowledge" is the key to the MBPI's success—even when, as with my friend, people learn something about themselves they always knew.

How do type theories of personality differ from the empirical study of traits? Clearly, human beings have "personalities"—characteristic ways of behaving, feeling, thinking, responding—and the task of scientists is to describe those differences and their origins in ways that reflect the complexity but also the consistency of individual differences. No one says "she's extrovert-ish" or "he's

moderately shy except on vacation," but we recognize that people differ, on average, in how outgoing they are in a given situation. Unlike the "I am/am not this way" oversimplification of the Myers-Briggs types, the Big Five personality factors are measured along five dimensions (with the memorable acronym OCEAN): openness to experience, conscientiousness, extroversion (though defined differently from what Jung or Briggs said it meant), agreeableness, and neuroticism (negative emotionality). Research on the Big Five has been replicated not only with human beings around the world but also with dozens of nonhuman species, including the hyena and the octopus. When Inky the adventurous octopus escaped from his tank in the National Aquarium of New Zealand and found his way into the sea, the public was thrilled—and most failed to notice his shy companion, who preferred to remain safely at home. Evolutionary psychologists recognize that just about every species needs some of its members to be risk-takers and others to be risk-averse in order to survive what dangers the environment might throw at them.

Although it may be much easier to see ourselves as one of 16 types, our behavior varies with the situation, with age, with our partners and colleagues, with maturity, with job requirements and social demands. How can we reconcile our inner sense of self with our often inconsistent behavior across situations? It is much easier to focus on the inner self. We can be tough, mean, and disagreeable at times, and make an effort to be kind, thoughtful, and tender at other times. Which is the real "us"? The Myers-Briggs won't admit it, but we are both. **S**

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The Grandest of Questions

Why is There Something Rather Than Nothing?

BY MICHAEL SHERMER

IN MY MANY DEBATES WITH THEISTS OVER THE DECADES a handful of arguments for God's existence are routinely articulated as "proofs" of divine providence. These include the cosmological argument (that all natural things are contingent on something else for their existence so there necessarily exists a being independent of nature), the ontological argument (that we can conceive of an absolutely perfect being means it must exist because existence is a necessary feature of perfection), the design argument (the universe is fine-tuned for life, and life contains design features, therefore God is the fine-tuner and intelligent designer of life), the moral argument (without God anything goes, with God there is objective morality), the consciousness argument (the qualitative experience—qualia—of consciousness cannot be explained by the activity of neurons, and abstract concepts like logic and mathematics exist separate from brains, therefore God must be the source), and others.

All of these arguments (they are certainly not proofs in the mathematical sense) have counter-arguments made by philosophers over the centuries, but there is one that seems to trouble a great many thinkers of all persuasions, and that is why there should be anything at all. That is, all of the other arguments for God's existence presume that something exists that needs explaining. The argument that asks why there is something rather than nothing underlies all the other arguments, and is cognitively challenging because it is simply not possible for existing beings to imagine not existing, not just themselves (which forms the cognitive foundation of afterlife beliefs), but to imagine nothing existing at all. Go ahead and try it. Picture nothing. When I ask myself this question I start by visualizing dark empty space bereft of galaxies, stars, and planets, along with molecules and atoms. But this picture is incorrect because if there were no universe there would not only be no matter, but there would be no space or time (or space-time) either. There would be absolutely nothing, including

no conscious being to observe the nothingness. Just... nothing. Whatever that is.

This presents us with what is arguably the deepest of deep questions: *why is there something rather than nothing?* In his 1988 blockbuster book *A Brief History of Time*, the late Cambridge theoretical physicist Stephen Hawking put it this way:

What is it that breathes fire into the equations and makes a universe for them to describe? The usual approach of science of constructing a mathematical model cannot answer the questions of why there should be a universe for the model to describe. Why does the universe go to all the bother of existing?¹

Even if it could be established that something must exist, this does not necessarily mean that the something must be our universe with our particular laws of nature that give rise to atoms, stars, planets, and people. There could be universes whose laws of nature permit time and space but no matter or light; such universes could not be perceived because there would be no one to perceive the darkness. Our universe has particular properties suited to planets and people. According to England's Astronomer Royal Sir Martin Rees, there are at least six constituents that are necessary for "our emergence from a simple Big Bang," including (1) Ω (omega), the amount of matter in the universe = 1: if Ω was greater than 1 it would have collapsed long ago and if Ω was less than 1 no galaxies would have formed. (2) ϵ (epsilon), how firmly atomic nuclei bind together = .007: if ϵ were even fractionally different matter could not exist. (3) D , the number of dimensions in which we live = 3. (4) N , the ratio of the strength of electromagnetism to that of gravity = 10^{39} : if N were smaller the universe would be either too young or too small for life to form. (5) Q , the fabric of the universe = $1/100,000$: if Q were smaller the universe would be featureless and if Q were larger the universe would be dominated by giant black holes. (6) λ (lambda), the cosmological constant, or "antigravity"

force that is causing the universe to expand at an accelerating rate = 0.7: if λ were larger it would have prevented stars and galaxies from forming.²

The most common reason invoked for our universe's "fine-tuning" is the "anthropic principle," most forcefully argued by the physicists John Barrow and Frank Tipler in their 1986 book *The Anthropic Cosmological Principle*: "It is not only man that is adapted to the universe. The universe is adapted to man. Imagine a universe in which one or another of the fundamental dimensionless constants of physics is altered by a few percent one way or the other? Man could never come into being in such a universe. That is the central point of the anthropic principle. According to the principle, a life-giving factor lies at the center of the whole machinery and design of the world."³

So we really have two questions to answer: *Why there is something rather than nothing*, and *Why this universe?* Here are a number of responses, ranging from the philosophical to the scientific, that I have compiled from a number of sources, including a comprehensive taxonomic work by John Leslie and Robert Lawrence Kuhn titled *The Mystery of Existence: Why is There Anything at All?* that catalogues all extant explanations without religious, scientific, or philosophical prejudice.⁴

Explanations for Nothing

- *Nothing is Inconceivable.*

First, as I suggested above, just as it is not possible to conceive of what it is like to be dead, it is impossible to conceptualize nothing—no space, time, matter, light, darkness, or even any conscious beings to perceive the nothingness. As Robert Kuhn conceives it: "Not just emptiness, not just blankness, and not just emptiness and blankness forever, but not even the existence of emptiness, not even the meaning of blankness, and no forever."⁵ Inconceivable.

- *Nothing is Something.*

The analytical philosopher Quentin Smith pointed out to Kuhn that it is a logical fallacy to talk about "nothing" as if it were "something"; that is, to suggest that "there might have been nothing" implies "it is possible that there is nothing." As Kuhn articulates Smith's argument: "'There is' means 'something is.' So 'there is nothing' means 'something is nothing,' which is a logical contradiction. His suggestion is to remove 'nothing' and replace it by 'not something' or 'not anything,' since one can talk about what we mean by 'nothing' by referring to *something* or *anything* of which there are no instances (i.e., the concept of 'something' has the



property of not being instantiated). The common sense way to talk about Nothing is to talk about something and negate it, to deny that there is something.”⁶ Here we are bumping up against the problem of defining what we mean by “nothing” and the restrictions that language imposes on the problem. The very act of talking about “nothing” makes it a “something,” or else what are we talking about?

• *Nothing Would Include God’s Nonexistence.*

In Kuhn’s taxonomy of “nothings” he lists what categories of things might be included in “something” that would be negated by “nothing”: physical, mental, platonic, spiritual, and God. *Physical*: all matter, energy, space and time, and all the laws and principles that govern them (known and unknown). *Mental*: all kinds of consciousness and awareness (known and unknown). *Platonic*: all forms of abstract objects (numbers, logic, forms, propositions, possibilities—known and unknown). *Spiritual and God*: anything that could possibly fit this nonphysical category (all forms of religious and spiritual belief).⁷ If by “nothing” is meant no physical objects or matter of any kind, for example, there can still be energy from which matter may arise by natural forces guided by the laws of nature. Physicists, for example, talk about empty space as seething with virtual particles, from which particle-antiparticle pairs come into existence as a consequence of the Uncertainty Principle of quantum physics. From this “nothingness” universes may “pop” into existence.⁸

But if by “nothing” is meant that there is no physical, mental, platonic, or nonphysical entity of any kind, then there can be no God or gods, which means that there cannot be anything outside of nothing out of which to create something. If God is proposed to be outside of or preexisting the “nothing” from which the “something” was created, then why can’t the laws of nature that give rise to “somethings” (like universes) be outside of or preexisting nothing?

Some theologians argue that God is a “necessity,” by which they mean it is impossible for God *not* to exist. This is the famous Ontological Argument for the existence of God, first proposed by St. Anselm of Canterbury in 1078, which defines God as “that than which nothing greater can be conceived.” The argument is that God is necessary because necessity is a higher form of perfection that can be conceived than is contingency.⁹ The argument has been refuted time and again. In his *Dialogues Concerning Natural Religion*, for example, the great Scottish Enlightenment philosopher David Hume countered: “Nothing, that is distinctly conceivable, implies a contradiction. What-

ever we conceive as existent, we can also conceive as non-existent. There is no being, therefore, whose non-existence implies a contradiction. Consequently there is no being, whose existence is demonstrable.”¹⁰

To my ears this is all just word play, armchair speculation of what we can or cannot conceive of without once looking out the window to see what is actually in nature that may confirm or disconfirm our imaginary ideas.¹¹ I can just as easily argue that the laws of nature are a necessity for existence because they give rise to the universe, which makes them “that than which nothing greater can be conceived.” Or that abstract objects like circles, squares, and rectangles and the geometric principles that govern them, or mathematical principles like $3 + 2 = 5$, necessarily exist because the existence of a circle is a higher form of perfection than the nonexistence of a circle. If circles did not exist then what would the formula for the area of a circle, $A = \pi r^2$, describe? In any case, the conception of “perfection” is once again bound by the cognitive restrictions of thought and language we faced with consciousness and nothingness. How can an imperfect being conceive of what perfection even means? Who knows what an extra-terrestrial intelligence with a brain ten times the size of ours would be capable of conceiving, or a post-Singularity AI with an intelligence capacity a million times greater than humans would be able to conceptualize?

• *God Did It Ex Nihilo.*

For the many millennia that people have been asking these questions the most common answer given was some version of “God did it”: a creator existed before the universe and brought it into existence *ex nihilo*—out of nothing. Revealingly, Genesis does not actually say that God created the universe *ex nihilo*—that is a later inference made by theologians. Genesis 1:1 reads simply: “In the beginning God created the heavens and the earth.” It does not elaborate on what God made the heavens and the earth out of, which theologians have presumed to be nothing, but that it is not stated in the Bible. As *SKEPTIC* magazine’s religion editor Tim Callahan notes, the Hebrew word for creation in Genesis 1:1 is “bara,” which can mean create but can also mean “choose” or “divide.” Callahan cites the Old Testament scholar Ellen van Wolde, who argues that the most accurate translation of “bara” is “separate,” so Genesis 1:1 should read “In the beginning God *separated* the heavens and the earth.”¹² This, says Callahan, better fits the context of Genesis 1, “in which the creation is presented as a series of separations: light is created and separated from darkness, the firmament of heaven is created to separate

the waters above it from the waters below it, and the separation of land from water. This is followed by a series of creation events populating the separated realms—the land populated with plants, the firmament populated with heavenly bodies, the sea populated with fish and sea monsters, the air with birds, and the land, again, with animals—followed finally by the creation of humans in the image of God.²¹³

Even if one rejects this interpretation of Genesis 1:1 and opts for creation *ex nihilo*, this just begs the question of who or what created the creator? Theists retort that God is that which does not need to be created. But why can't the universe be in the same ontological and epistemological category as God, wherein we could simply say that the universe is that which does not need to be created? Theists counter that the universe had a Big Bang beginning and everything that begins to exist has a cause. But not everything in the universe is strictly causal, such as some quantum effects, and even though our universe in its current state can be traced back to a Big Bang beginning that doesn't mean there was not a previous universe that gave birth to our universe through the Big Bang.

Theists also note that that the universe is a thing, whereas God is an agent or being. But don't things and beings all need a causal explanation? Why should God be exempt from such causal reasoning? Because, rejoins the theist, God is *supernatural*—outside of space, time, and matter—whereas everything in the universe, and the universe itself, is *natural*—made up of space, time, and matter, so God and the universe are ontologically different. But if that is so, then how would we detect God with our instruments? If a *supernatural* deity used *natural* forces to, say, cure someone's cancer by reprogramming the cancerous cells' DNA, wouldn't that make God nothing more than a skilled genetic engineer, along the lines of a sufficiently advanced ETI or far-future human in my earlier thought experiment? And if God used unknown *supernatural* forces to effect change in our *natural* world, how do they interact with the known forces of our universe? And if such supernatural forces could somehow stir the particles in our universe, shouldn't we be able to detect them and thereby incorporate them into our theories about the natural world? If so, wouldn't that bring God into the universe as a natural being and thus subject him to the search for a natural causal explanation for his existence? Finally, if God made the universe *ex nihilo*—literally out of *nothing*—then apparently it is possible for something to come from nothing, so this brings us back to searching for the best causal explanation for anything—natural or supernatural?



• *Natural vs. Supernatural Explanations of Something.* The history of science has been one long and steady replacement of the supernatural with the natural. Weather events once attributed to the supernatural scheming of deities are now understood to be the product of natural forces of temperature and pressure. Plagues formerly ascribed to women cavorting with the devil are today known to be caused by bacteria and viruses. Mental illnesses previously imputed to demonic possession are currently sought in genes and neurochemistry. Accidents heretofore explained by fate, karma, or providence are nowadays accredited to probabilities, statistics, and risk. If we follow this trend to encompass all phenomena, what place is there for supernatural agents like gods and demons? Do we know enough to know that they cannot exist? Or is it possible there are unknown forces within our universe, or intentional agents outside of it that we have yet to discover? According to the physicist Sean Carroll, in his examination of *The Big Picture: On the Origins of Life, Meaning, and the Universe Itself*, “All of the things you’ve ever seen or experienced in your life—objects, plants, animals, people—are made of a small number of particles, interacting with one another through a small number of forces.”¹⁴ Once you understand the fundamental laws of nature, such as the thermodynamic arrow of time and the Core Theory of particles and forces, you can scale up to planets and people, and even assess the likelihood that God, the soul, and the afterlife exist, which Carroll concludes is very low.

But isn’t the history of science also strewn with the remains of failed theories like geocentrism (the Earth is the center of the solar system), phlogiston (a fire-like element that causes objects to burn), miasma (the “bad air” source of disease), spontaneous generation (fully formed living organisms can abruptly arise out of inanimate matter), and the luminiferous aether (the medium filling outer space for the propagation of light)? Yes, and that’s how we know we’re making progress. The postmodern belief that the very existence of such discarded ideas means that there is no objective reality and that all theories are equal is wronger than all of the wrong theories combined. I have called this Asimov’s Axiom, after an observation by the science writer Isaac Asimov:

When people thought the earth was flat, they were wrong. When people thought the earth was spherical, they were wrong. But if you think that thinking the earth is spherical is just as wrong as thinking

the earth is flat, then your view is wronger than both of them put together.¹⁵

There is real progress in science. Think of it as an expanding sphere of knowledge. As the sphere of the known expands into the aether of the unknown, the proportion of ignorance seems to grow—the more you know, the more you know how much you don’t know. But in this mathematical analogy note what happens when the radius of a sphere increases: the expansion of the surface area is squared while the increase in the volume is cubed. So as the sphere of scientific knowledge expands the volume of the known increases by a ratio of 3:2 over the surface area of the unknown. The more you know the more of the unknown becomes known. It is at this boundary where we can stake a claim of true progress in the history of science.

Take the Core Theory of the forces and particles that make up the universe. This includes the four forces of gravity, electromagnetism, and the strong and weak nuclear forces, along with the Standard Model of elementary particles making up the nucleus of the atom: quarks, leptons, and bosons, plus the underlying Higgs boson. Carroll says this Core Theory is “indisputably accurate within a very wide domain of applicability,” such that “a thousand or a million years from now, whatever amazing discoveries science will have made, our descendants are not going to be saying ‘Ha-ha, those silly twenty-first-century scientists, believing in ‘neutrons’ and ‘electromagnetism.’” Thus, Carroll concludes that the laws of physics rule out supernatural and paranormal claims. Why? Because the particles and forces of nature don’t allow us to bend spoons, levitate, read minds, or perform miracles, and “we know that there aren’t new particles or forces out there yet to be discovered that would support them. Not simply because we haven’t found them yet, but because we definitely would have found them if they had the right characteristics to give us the requisite powers.”¹⁶

It is at the horizon where the known meets the unknown that we are tempted to inject supernatural forces to explain hitherto unsolved mysteries, but we must resist the temptation, for such efforts can never succeed, not even in principle. Humans have always filled in such gaps in our knowledge with gods, and it never leads to any useful or productive theory. Let us try to overcome this psychological propensity to fill in the gaps with super-

natural forces and follow the path of science in searching for natural forces.

- *Nothing is Unstable, Something is Stable.*

Asking why there is something rather than nothing presumes “nothing” is the natural state of things out of which “something” needs an explanation. Maybe “something” is the natural state of things and “nothing” would be the mystery to be solved. As the physicist Victor Stenger notes in his book, *The Fallacy of Fine Tuning*: “Current cosmology suggests that no laws of physics were violated in bringing the universe into existence. The laws of physics themselves are shown to correspond to what one would expect if the universe appeared from nothing. There is something rather than nothing because something is more stable.”¹⁷

In his 2012 book, *A Universe From Nothing*, the cosmologist Lawrence Krauss attempts to link quantum physics to Einstein’s gravitational theory of general relativity to explain the origin of something (including a universe) from nothing: “In quantum gravity, universes can, and indeed always will, spontaneously appear from nothing. Such universes need not be empty, but can have matter and [electromagnetic] radiation in them, as long as the total energy, including the negative energy associated with gravity [balancing the positive energy of matter], is zero.” And: “In order for the closed universes that might be created through such mechanisms to last for longer than infinitesimal times, something like inflation is necessary.” Observations have revealed that, in fact, the universe is flat (there is just enough matter to eventually halt its expansion), its energy is zero, and it underwent rapid inflation, or expansion, shortly after the Big Bang as described by inflationary cosmology. Thus, Krauss concludes, “quantum gravity not only appears to allow universes to be created from nothing—meaning...the absence of space and time—it may require them. ‘Nothing’—in this case no space, no time, no anything!—is unstable.”¹⁸

In his follow-up 2017 work, *The Greatest Story Ever Told—So Far*, Krauss notes that “Einstein was one of the first physicists to demonstrate that the classical notion of causation begins to break down at the quantum realm.” Although many physicists objected to the idea of something coming from nothing, Krauss adds that “this is precisely what happens with the light you are using to read this page. Electrons in hot atoms emit photons—photons that didn’t exist before they were emitted—which are emitted spontaneously and without

specific cause. Why is it that we have grown at least somewhat comfortable with the idea that photons can be created from nothing without cause, but not whole universes?”¹⁹

Explanations for Our Universe

The anthropic principle invoked to explain our universe troubles most scientists because of its antithesis known as the “Copernican principle,” which states that we are not special. The anthropic principle puts humans right back in the center of the cosmos, not geographically but anthropocentrically—it is all about us. There are a number of counter-explanations for our universe that continue in the scientific tradition of defenestrating humans from the Tower of Babel.

- *Inconstant Constants.*

The various numbers invoked in the “fine-tuning” argument for our universe as being special, such as the speed of light and Planck’s constant, are, in fact, arbitrary numbers that can be configured in different ways so that their relationship to the other constants do not appear to be so remarkable. As well, such constants may be *inconstant* over vast spans of time, varying from the Big Bang to the present, making the universe finely tuned only now but not earlier or later in its history. The physicists John Barrow and John Webb call these numbers the “inconstant constants,” and they have demonstrated how in particular the speed of light, gravitation, and the mass of the electron have in fact been inconstant over time.²⁰

- *Grand Unified Theory.*

In order to explain our universe we need a comprehensive theory of physics that connects the subatomic world described by quantum mechanics to the cosmic world described by general relativity. As the cosmologist Sean Carroll notes in his book *From Eternity to Here*: “Possibly general relativity is not the correct theory of gravity, at least in the context of the extremely early universe. Most physicists suspect that a quantum theory of gravity, reconciling the framework of quantum mechanics with Einstein’s ideas about curved spacetime, will ultimately be required to make sense of what happens at the very earliest times. So if someone asks you what really happened at the moment of the purported Big Bang, the only honest answer would be: ‘I don’t know.’”²¹ That grand unified theory of everything will itself need an explanation, but it may be explicable by some other theory we have yet to comprehend out of our sheer ignorance at this moment in history. And as I repeat

ad nauseum to audiences curious about unsolved mysteries and anxious to fill in scientific gaps with questionable pseudoscientific conjectures, it's always okay to say "I don't know" and leave it at that.

- *Boom-and-Bust Cycles.*

Perhaps our bubble universe is just one episode of an eternal boom-and-bust cycle of expansion and contractions of the universe, with the bubble's eventual collapse and re-expansion in an eternal cycle. Sean Carroll argues that "space and time did exist before the Big Bang; what we call the Bang is a kind of transition from one phase to another." As such, he says, "there is no such thing as an initial state, because time is eternal. In this case, we are imagining that the Big Bang isn't the beginning of the entire universe, although it's obviously an important event in the history of our local region."²² Although there does not appear to be enough matter in our universe to halt the expansion and bring it back into a big crunch that could launch it back into a new bubble out of another Big Bang, the relevant observation here is that something existed before the Big Bang, thereby obviating the need to invoke a supernatural creator.²³

- *Darwinian Universes.*

According to the cosmologist Lee Smolin, the evolution of the universe may include a Darwinian component in the form of a "natural selection" of differentially reproducing bubble universes. Like its biological counterpart, Smolin hypothesizes that there might be a selection from different "species" of universes, each containing different laws of nature. Universes like ours will have lots of stars, which means they will have lots of black holes that collapse into singularities, a point at which infinitely strong gravity causes matter to have infinite density and zero volume, which many cosmologists believe gave birth to our universe from the Big Bang singularity. Perhaps collapsing black holes create new baby universes out of these singularities, and those baby universes with laws of nature similar to ours will be fine-tuned to life, whereas universes with radically different laws of nature that disallow stars, planets, and people will go extinct. The result of this cosmic evolutionary process would be a preponderance of universes like ours, so we should not be surprised to find ourselves in a universe fine-tuned for life.²⁴

- *Multiple Creations Cosmology.*

In his 1997 book *The Inflationary Universe*, the cosmologist Alan Guth proposes that our universe sprang into existence from a bubble nucleation of

spacetime. If this process of universe creation is natural, then there may be multiple bubble nucleations that give rise to many universes that expand but remain separate from one another without any causal contact between them. Of course, if these universes were truly causally-disconnected then there is no way to get information from them, which would make this an untestable hypothesis.²⁵ But, again, there is much we still don't know about the cosmos, and I am encouraged by the startling discovery of gravitational waves, which could open up possibilities of obtaining information from other bubble universes, if they exist.

- *Many-Worlds Multiverse.*

According to the "many worlds" interpretation of quantum mechanics, there are an infinite number of universes in which every possible outcome of every possible choice that has ever been available, or will be available, has happened in one of those universes. This model is grounded in the bizarre findings of the famous "double-slit" experiment, in which light is passed through two slits and forms an interference pattern of waves on a black surface (like throwing two stones in a pond and watching the concentric wave patterns interact, with crests and troughs adding and subtracting from one another). The spooky part comes when you send single photons of light one at a time through the two slits—they still form an interference wave pattern even though they are not interacting with other photons. How can this be? One answer is that the photons are interacting with photons in other universes! In this type of *multiverse* you could meet your doppelganger, and depending on which universe you entered, your parallel self would be fairly similar or dissimilar to you, a theme that has become a staple of science fiction (see, for example, Michael Crichton's *Timeline*). I am skeptical that this version of the *multiverse* will pan out, however, because the idea of there being multiple versions of me and you out there—and in an infinite universe there would be an infinite number of me's and you's—seems to me to be even less likely than the theistic alternative "God did it." Still, as Richard Feynman famously quipped, "no one understands quantum mechanics,"²⁶ so who am I to write off this theory considered legitimate by many quantum physicists.

- *Brane and String Universes.*

Universes may be birthed when three-dimensional "branes" (a membrane-like structure on which our universe exists) moves through higher-dimensional space and collides with another brane, the result of which is the energized creation of another universe.²⁷

A related multiverse is derived through string theory, which by at least one calculation allows for 10^{500} possible worlds, all with different self-consistent laws and constants.²⁸ That's a 1 followed by 500 zeroes possible universes. The number is so large that it would be miraculous if there were not intelligent life in a number of them. In his book *God: The Failed Hypothesis*, the late physicist Victor Stenger created a computer model that analyzes what just 100 different universes would be like under constants different from our own, ranging from five orders of magnitude above to five orders of magnitude below their values in our universe. Stenger found that long-lived stars of at least one billion years—necessary for the production of life-giving heavy elements—would emerge within a wide range of parameters in at least half of the universes in his model.²⁹

• *Quantum Foam Universe Creations.*

In this model, universes are created out of nothing, but in the scientific version of *ex nihilo* the nothing of the vacuum of space actually contains quantum foam, which may fluctuate to create baby universes. In this configuration, any quantum object in any quantum state may generate a new universe, each one of which represents every possible state of every possible object.³⁰ This is Stephen Hawking's explanation for the fine-tuning problem that he himself famously presented in the 1990s:

Why is the universe so close to the dividing line between collapsing again and expanding indefinitely? In order to be as close as we are now, the rate of expansion early on had to be chosen fantastically accurately. If the rate of expansion one second after the Big Bang had been less by one part in 10^{10} , the universe would have collapsed after a few million years. If it had been greater by one part in 10^{10} , the universe would have been essentially empty after a few million years. In neither case would it have lasted long enough for life to develop. Thus one either has to appeal to the anthropic principle or find some physical explanation of why the universe is the way it is.³¹

Hawking's collaborator Roger Penrose layered on even more mystery when he noted that the "extraordinary degree of precision (or 'fine tuning') that seems to be required for the Big Bang of the nature that we appear to observe... is one part in $10^{10^{123}}$ at least." Penrose suggested two pathways to an answer, either it was an act of God, "or we might seek some scientific/mathematical theory."³² Hawking opted for the second with this explanation: "Quantum fluctuations lead to the spontaneous creation of tiny universes,

out of nothing. Most of the universes collapse to nothing, but a few that reach a critical size, will expand in an inflationary manner, and will form galaxies and stars, and maybe beings like us."³³

• *M-Theory Grand Design, or Auto-Ex-Nihilo.*

Stephen Hawking continued working on this question, and he and the physicist Leonard Mlodinow presented their answer in their 2010 book *The Grand Design*.³⁴ They approach the problem from what they call "model-dependent realism," based on the assumption that our brains form models of the world from sensory input, that we use the model most successful at explaining events, and that when more than one model makes accurate predictions "we are free to use whichever model is most convenient." Employing this method, they write, "it is pointless to ask whether a model is real, only whether it agrees with observation." The dual wave/particle models of light are an example of model-dependent realism, where each one agrees with certain observations but neither one is sufficient to explain all observations. To model the entire universe, Hawking and Mlodinow employ "M-Theory," an extension of string theory that includes 11 dimensions and incorporates all five current string theory models. "M-theory is the most general supersymmetric theory of gravity," Hawking and Mlodinow explain. "For these reasons M-theory is the only candidate for a complete theory of the universe. If it is finite—and this has yet to be proved—it will be a model of a universe that creates itself." Although they admit that the theory has yet to be confirmed by observation, if it is then no creator explanation is necessary because the universe creates itself. Call it *auto-ex-nihilo*.

A Sense of Awe

By no means does this list exhaust the possible explanations for why there is something rather than nothing and why our universe is the way it is, but perhaps it gives one a sense that the questions are answerable through science, through natural and testable hypotheses and theories, without resort to supernatural intercession. It is good to reflect on the fact that the history of science is relatively young compared to the history of religion—roughly 500 v. 5000 years—so it is premature to say that because science does not yet have a definitive explanatory theory accepted by most scientists it means that one is not forthcoming. Despite the optimism derived from my expanding sphere of knowledge metaphor in which the known expands into the unknown at a ratio of 3:2, there is still much we do not understand about the cosmos and everything in it. But given science's track record over the

past five centuries this only means there are remarkable and exciting new discoveries and theories yet to come. As Carl Sagan expressed it in his 1985 Gifford Lecture Series titled *The Search for Who We Are* (published in book form posthumously in 2007 as *The Varieties of Scientific Experience*):

By far the best way I know to engage the religious sensibility, the sense of awe, is to look up on a clear night. I believe that it is very difficult to know who we are until we understand where and when we are. I think everyone in every culture has felt a sense of awe and wonder looking at the sky. This is reflected throughout the world in both science and religion.³⁵ **S**

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Reports of Mysterious Attacks on U.S. Diplomats Continue

Separating Fact from Fiction

BY ROBERT E. BARTHOLOMEW

IT IS THE CASE THAT JUST WON'T GO AWAY. CONTROVERSY continues to swirl around the cause of several outbreaks of mysterious ailments among American diplomatic staff that are widely believed to be from an acoustical weapon. The story first broke in August 2017, when the State Department announced that since late 2016, 22 employees of the American Embassy in Havana, Cuba, had been stricken. Before long, two more victims came forward. Since we first reported on this episode (SKEPTIC, 2018, Vol. 23, No. 1), a 25th staffer has been added to the casualty list. Most victims reported hearing strange sounds accompanying their symptoms that were variously described as buzzing, humming, and grinding. Complaints included fatigue, dizziness and difficulty concentrating, confusion, headaches, nausea, and more alarming, changes to the white matter tracts of the brain and concussion-like symptoms.

Throughout 2017, dozens of American citizens have reported that over the past few years, they had experienced similar symptoms after hearing strange sounds while spending time in one of the two Cuban hotels where many of the attacks allegedly occurred. They claimed that in September 2017, an officer attached to the American embassy in Tashkent, Uzbekistan, reported that he and his wife had experienced similar symptoms after hearing strange noises. By mid-2018, the State Department dispatched a medical team to China

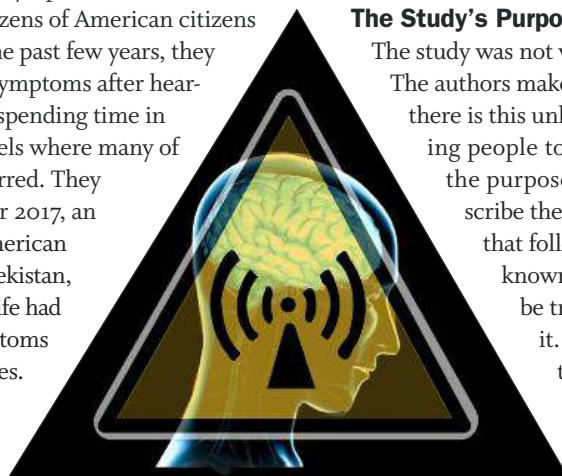
after announcing that several diplomatic staff there had fallen ill after hearing similar sounds.

The most significant development in the mystery took place on February 15th of this year when the prestigious *Journal of the American Medical Association (JAMA)* published a study from a team of neurologists who examined 21 of the Cuban victims. They concluded that embassy personnel were indeed suffering from concussion-like symptoms and white matter tract changes.¹ They also dismissed claims that it was a case of mass psychogenic illness. Their findings made global headlines. But here is where the story takes a surprising twist: for a study published in one of the world's leading medical journals, it was remarkably flawed. The authors made startling claims that were not supported by their own evidence. Let's examine these claims.

The Study's Purpose

The study was not written in a neutral manner.

The authors make it sound like it's a fact that there is this unknown energy source causing people to get sick. They wrote that the purpose of the study was "to describe the neurological manifestations that followed exposure to an unknown energy source." This may be true, but they did not prove it. They should have written that the study's purpose was to describe the neurological manifestations following the alleged



exposure to an unknown energy. This is Science 101: stay within the limitations of your data. Don't make claims you cannot support.

Brain Injuries

The authors claim that the patients were suffering from white matter tract changes and concussion-like symptoms. In an accompanying editorial in the same issue, neurologists Christopher Muth and Stephen Lewis urged caution, noting that brain imaging found “nonspecific white matter changes in some individuals, but was otherwise unrevealing.”² White matter tract changes are common in an array of conditions ranging from depression to normal aging. In the months leading up to the release of their study, media leaks by members of the study team claimed that there were significant changes to white matter in the brains of the patients. However, their data did not live up to the hype. As for the other dramatic finding that captured media headlines: concussion-like symptoms, Muth and Lewis were equally skeptical. They point out that many of the symptoms overlap with an array of medical and psychiatric conditions.³

Dismissing Mass Hysteria

According to the authors, mass psychogenic illness was ruled out because all of the patients were keen to return to work, and hence were not malingering—the faking of illness or injury to avoid work or some responsibility. This explanation has nothing to do with this case or mass hysteria. There is no debate about this—it's the wrong term. This reasoning shows an alarming lack of understanding of the literature on mass psychogenic illness. In a later interview, one of the study authors said that the team discounted the mass hysteria explanation because there was no collusion among patients. He said, to have mass hysteria you would have to have all of the patients “in collusion together to make sure all their symptoms match.”⁴ This assertion is as remarkable as it is untrue. Collusion and mass hysteria are unrelated. They are chalk and cheese. The authors of the JAMA study clearly do not understand the mass hysteria literature.

Another reason for dismissing the psychogenic explanation was the absence of a rapid onset and recovery. They also got this wrong. The second most common type of mass psychogenic illness—motor hysteria—begins slowly and persists for months or years. It appears when prolonged stress disrupts the nerves and neurons that send messages to the brain, resulting in symptoms such as twitch-

ing, shaking, and trance-like states. It occurs in individuals or groups who are experiencing prolonged anxiety, and most important, it is often characterized by neurological symptoms. The study team also claimed that some patients had not heard about the symptoms previously—essentially discounting mass suggestion as a possible cause. If they were unaware that others were falling ill, how could they be part of a mass hysteria? Yet, when you look at the data, this claim is not as straightforward as it might seem because it took an average of 203 days before the patients were interviewed. Memories fade with time and are easily distorted, especially over such a significant period.

Trust Us...

After a torrent of criticism of their conclusions appeared in a subsequent issue of the journal, key members of the study team defended their report with statements like: “we must continue to withhold certain sensitive information” and “despite the preliminary nature of the data...”⁵ These statements are red flags. They are essentially asking us to take their word for it and to trust their judgment. Science does not work this way. Scientists present evidence and draw conclusions based on that evidence, not information that is being kept hidden from the public. The fact remains that when you take away the dubious claims of white matter tract changes and concussion-like symptoms, we are left with a classic outbreak of mass psychogenic illness. On the weight of evidence, this is by far the most likely explanation.⁶

Earlier this year there were claims of a similar “acoustical attack” in China. The manner in which the State Department responded to the new attack claims was sensational and unnecessarily alarmist; it issued an alert based on vague symptoms (dizziness, headache) from just two diplomats in Guangzhou. Apart from ambiguous stomach pain, these two symptoms are among the most common medical complaints in the world. The State Department's mishandling this case is a recipe for what I call “The Sonic Attack Scare,” or if you like, “The Microwave Panic” to spread further. The United States has nearly 300 embassies, consulates and diplomatic missions across the globe with thousands of staff—employees who are now on the lookout for strange sounds and vague feelings of unwellness. This is a classic setup for an outbreak of mass hysteria. The groundwork has been laid for future “attacks” through mass suggestion. As a result, this saga seems destined to continue with no end in sight.

The Latest Claim: “It’s Microwaves!”

In early September 2018, one of the authors of the JAMA study, Dr. Douglas Smith, began making new claims that cannot be substantiated. On September 1st, the *New York Times* carried the headline: “Microwave Weapons are Prime Suspect in Ills of U.S. Embassy Workers.” Smith told the *Times* that microwave radiation could be the culprit. There was only one problem with his interview: he provided no corresponding evidence. According to Kenneth Foster, Professor of Bioengineering of the University of Pennsylvania, the microwave explanation is “a real stretch” as it would require “a major airport radar transmitter with the subject’s head close to the antenna in its direct beam.”⁷ While technically possible, it is highly unlikely. Those reporting symptoms were not even at the Embassy, but in their own homes or in one of two major Havana hotels. The microwave explanation was so unconvincing that it was never even considered in the JAMA study by Dr. Smith and his colleagues.

If one scours the internet, you will find many claims about the American military engaging in secret experiments with microwave weapons. However, earlier this decade, the prestigious science journal *Nature* published a review on the progress of the development of microwave weapons. It concluded: “Despite 50 years of research on high-powered microwaves, the U.S. military has yet to produce a usable weapon,” and referred to it as

“Wasted Energy.”⁸ The author of the review, Sharon Weinberger, is the Washington Bureau Chief for Yahoo News. She is an expert on the history of the U.S. military’s development of microwave weapons.⁹ She reports that the situation remains the same today. After publication of the *New York Times* article speculating on a possible link between microwaves and the sick diplomats, Weinberger Tweeted: “American work on U.S. microwave weapons intended to target humans has been an unmitigated disaster... Filled with secrecy, overblown claims, and ultimately weapons of questionable utility, like the Active Denial System, which was never deployed on the battlefield.”¹⁰ Even if such a weapon existed, it would be impossible to target individuals deep inside one of the two massive hotels in Havana, as has been claimed.

This “mystery” will be solved not through endless speculation, but by following the facts, adhering to mainstream science, and looking for patterns. When we do this, the most plausible explanation remains mass suggestion incubated in an atmosphere of Cold War paranoia, ever-present background noises, and mundane medical conditions such as tinnitus. In short, claims of a “sonic attack” are unsound, and talk of microwave radiation is unconvincing. For a series of events that have been under intense scrutiny since early 2017, to still be unable to present convincing evidence of these “attacks” is revealing. **S**

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The God Damners

The Now Not-so-New Atheism

BY MICHAEL COHEN

BETWEEN 2004 AND 2007, FIVE BOOKS WERE published in the United States attacking theism and theistic religion, and all ultimately became best-sellers: Sam Harris's *The End of Faith: Religion, Terror, and the Future of Reason* (Norton, 2004) and a follow-up book addressing that book's critics, *Letter to a Christian Nation* (Knopf, 2006); Richard Dawkins's *The God Delusion* (Bantam, 2006); Daniel C. Dennett's *Breaking the Spell: Religion as a Natural Phenomenon* (Viking/Penguin, 2006); and Christopher Hitchens's *God Is Not Great: How Religion Poisons Everything* (Twelve Books, 2007).

I read Sam Harris's *The End of Faith* in 2005 and agreed with much of his polemic against religion while being far less sanguine than he about change being possible. This book had an obvious genesis in the 2001 attack on the World Trade Center and the Pentagon, but when the other books appeared their motivation could not clearly be traced to those events. The books of Dennett, Hitchens, and Dawkins all make brief reference to 9/11, but all involved earlier research and in some cases parts or related works had been published that predated the events of 9/11. Hitchens insists in the acknowledgments in his book that he has been writing it all his life. There was more in the air than the dust of the World Trade Center that led to these books at this time. I decided to read them to determine what they have in common and what the unique approach of each was, as well as to explore the question: why these books and why now? The answer to the last question turned out to be a startling combination of forces beginning with the attack on the homeland but also including widespread attacks on public education and attempts to usurp political power by the forces of anti-reason.

Of course there have been books attacking organized religion and religious belief before. As several of these authors point out, the psalmist's "The fool hath said in his heart, There is no God" should make it clear that there have always been unbelievers. But many organized religions do a good job of systematically suppressing their dissidents, and links between religion and governments made dissent very

difficult—and in many cases dangerous—over many centuries, so that assaults on religion did not get much traction until the Enlightenment. One of the first books to openly critique organized religion was Thomas Paine's 1794 *The Age of Reason*, a defense of deism and "natural" religion. Voltaire fired a number of satiric salvos at the proponents of various religious theories. The 19th century's most profound attack on biblical inerrancy and its chronology, as well as on the argument from design, came in Darwin's *The Origin of Species* in 1859, though Darwin initially did not see these consequences, and he argued in his conclusion that there was no reason to see his work as inimical to religion. All of the New Atheist authors have much to say about Darwin.

Bertrand Russell's 1927 "Why I Am Not a Christian" systematically dismantles the traditional proofs for the existence of God while articulating a personal stand on one organized religion. H. L. Mencken treats religions—he thinks they're "pretty much alike"—with "amiable skepticism" in his 1930 *Treatise on the Gods*. "The case of religion is not proved," Mencken says in his understated way, but he is convinced "men simply credit to the gods whatever laws they evolve out of their own wisdom or lack of it" and that religion is an effort of humankind "to penetrate the unknowable, to put down the intolerable, to refashion the universe nearer to their heart's desire."

The one 20th-century treatment of the subject that should not be ignored by subsequent writers is Sigmund Freud's little book published in 1927 called *The Future of an Illusion*. Freud looks at religion as one of the psychical forces that keep civilization in order, controlling its "discontents"—a topic he would explore in detail three years later in *Civilization and Its Discontents*. Religious ideas have, according to Freud, two main sources. The idea that a superior intelligence promises a new existence beyond death and underwrites the moral law is an illusion that comes out of infantile wish fulfillment, but is still available to the grown-up, who retaining it can thereby remain a child forever. The other source he had described earlier in *Totem and Taboo* (1913): a prehistoric event resulting in the killing of the father (accidentally or as the result

of an ostracized band of brothers returning for revenge) was the origin of the murder taboo as well as the deification of the father figure. About the latter event, Freud almost seems to chortle as he writes, "Hence the religious explanation is right. God was actually concerned in the origin of that prohibition." Since he equates the transformation of the primal father into God and collective guilt at the killing of the father figure with a cultural neurosis (as well as with the formation of the original sin myth), religion is "the universal obsessional neurosis of humanity." Its abandonment will be a slow process, according to Freud, and we are in the middle of it. But anticipating one of Sam Harris's thought experiments, Freud says "I think it would be a very long time before a child who was not influenced [by religious teaching] began to trouble himself about God and the things beyond this world."

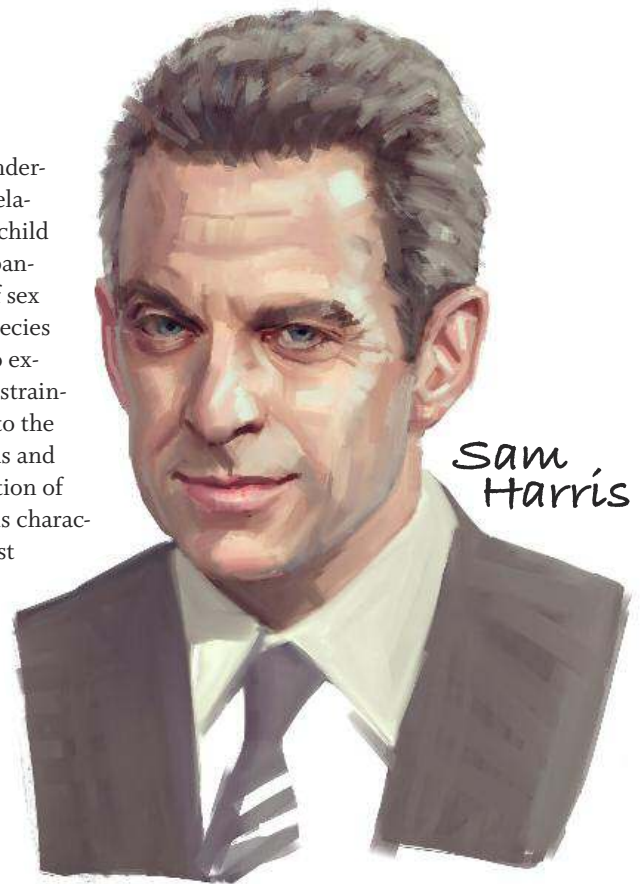
* * *

The books by Harris, Dennett, Dawkins, and Hitchens acknowledge Freud's contribution to their subject and sometimes also mention Paine, Russell and Mencken. These books share the insistence, often strident, that we must stop considering religion as a separate category of knowing that does not have to justify its beliefs. For too long, they all argue, religion has been considered a realm apart, whose assertions and ideas were not subject to even common sense, let alone examination by reason and the methods of science. Several of these authors mention Stephen Jay Gould's formulation of this idea that religion and science are incompatible realms—NOMA or Non-Overlapping Magisteria,"—each with its own questions, methods, and subjects of study. "What is it that religion studies?" Dawkins asks scornfully, and says that just because science cannot answer a question doesn't mean religion can. He calls NOMA "appeasement" and insists that "the God hypothesis" can be subjected to real-world tests. Harris and Hitchens go further. Harris says people who have beliefs with no rational justification are called *mad* or *delusional* unless the beliefs are common; then we call them *religious*: "The danger of religious faith is that it allows otherwise normal human beings to reap the fruits of madness and consider them *holy*." Hitchens lists dozens of instances where religion has acted in defiance of reasonable health practices, hygiene, and ordinary decency: getting in the way of vaccines and needed medical treatments such as transfusions, mutilating the genitals of young people, torturing children with sadistically imagined threats of eternal tor-

ment, marrying underage daughters to relatives, covering up child molestation, and banning every form of sex except one, in a species clearly designed to experiment, and constraining even that one to the right form of words and the right combination of genders. Dennett is characteristically the most gentle of these writers in his attempt throughout his book to convince believers that religion deserves study as "a natural phenomenon." For the most part, though, the gloves are off for these authors, who share the conviction that for too long believers and unbelievers alike have treated religion as if it were protected by an unbreachable barrier from real-world scrutiny.

Another common feature of these books is the dismissal, after examination, of the traditional "proofs" for the existence of God, although this examination is only implicit in Harris and is largely limited to his second book on this list, *Letter to a Christian Nation*. Dennett discusses the arguments and disposes of them briefly, for this is ground that he covered in detail in his 1995 *Darwin's Dangerous Idea*.

Dawkins, as fitting for a scientist, has the most systematic treatment of traditional arguments. After offering the opinion that God's two main attributes, omniscience and omnipotence, are mutually incompatible, Dawkins settles down to Thomas Aquinas's arguments. Several of these—the unmoved mover, the uncaused cause, and most important, the argument from design—he says are subject to the problem of infinite regress: who designed the designer, who made the unmoved mover and the uncaused cause? Of Anselm's ontological argument that a perfect being would have to exist because existence is more perfect than nonexistence, Dawkins quotes Bertrand Russell (who echoes Kant) "that there is no bridge between pure thought to things." He goes further to suggest that the *only* way God can be perfect,



omniscient, and omnipotent is by not existing. Dawkins applies Hume's test to the argument from testimony: what is more likely: that witnesses lied or were deceived on the one hand, or that the entire course of nature was altered on the other? The scriptural argument has been beset by internal inconsistencies, historical gaffes, Old Testament prophecies supposedly fulfilled in order to fill in gaps, and the various agendas of the writers—all identified by scholars since the 19th century. As to those who point to all those admired scientists who are fervid believers, there is often a problem with defining a scientist, defining who is admired, and sometimes just counting. Pascal's Wager—that humans gamble with their lives that God exists—Dawkins says was not really suggested seriously in the first place, and in any case it's an argument for *feigning* belief rather than believing. Wouldn't an omniscient God see through that?

Hitchens takes a position that the other authors implicitly affirm, namely that the argument from design is the only "proof" that has ever been taken seriously. Before Darwin and Einstein, many scientists and philosophers were "default deists," writes Hitchens, accepting that the universe seemed to imply a designer, but thinkers as early as Occam knew that the argument from design was flawed by infinite regress. Hitchens devotes a brief chapter to the argument, asking, "what about the faults in the design?" and using one of the creationists' examples of so-called irreducible design—the eye—to point out how it did in fact evolve in steps we can still see, and moreover, it has design flaws. Creationists often attack evolution by pointing to what they call "irreducible design"—the eye being a frequent example—and saying there is no evidence of steps along the way. And evolutionists frequently counter the design argument by asking how flawed design in organisms all over the natural world could count as evidence of an omnipotent and intelligent designer. Moreover, those religionists who think they can tuck evolution under the gown of their god and say how clever he was to have invented this mechanism, "make him out to be a tinkerer, an approximator, and a blunderer, who took eons of time to fashion a few serviceable figures and heaped up a junkyard of scrap and failure" in the process. And the other main force besides natural selection, contingency, makes no sense at all in a divine plan either: why arrange whole successfully selected groups and have them perish by mudslides in a microenvironment or asteroid collisions in a macro one?

Another common bent among our authors is speculation about when the world can be expected

to get over religion. As noted earlier, Freud thought we were in the middle of a slow process of abandoning religion. Harris thinks it might happen faster: while an end to religion may seem impossible, he says, "much of the developed world has nearly accomplished it." Dennett is not explicit on this point, but he clearly believes that evolution can alter the very conditions that in the past let religion flourish, that the need for spirituality can be satisfied in other ways, and that widespread, honest examination of religion is likely to hasten its demise. Dawkins, because he thinks religion represents a turning away from reason, believes that education is the way to address it, and not just training in reason and critical thinking, but instruction about world religions and their history. Hitchens is a wild card here. Religion, he thinks, though a feature of the infancy of humanity, will be with us "until we get over our fear of death, and of the dark." Moreover, he would not prohibit religion even if he had the power to do so, but he asks, in turn, a corresponding tolerance from religionists. Because they are incapable of providing it, since it is in the nature of religions to try to control both believers and nonbelievers, what he hopes for is a new Enlightenment that makes reason a guide for matters biological, psychological, and cosmological, and keeps religions confined.

All of these writers are in agreement that there is no God to "underwrite" the moral law that forms culture (as Freud put it). But what is the relation between organized religion and morality? Does religion make its followers better people? And is morality possible outside of religion? As usual the mildest answer is Dennett's: religion does good, no doubt, but something else might do as well or better. The other writers attack the questions historically. Hitchens and Dawkins examine the texts of the three major religions and can find in them only inconsistent and sometimes absurd or murderous moral maxims—and no model of moral behavior, even in the life of Jesus. Dawkins, on this last point, says the idea of atonement for original sin "is almost as morally obnoxious as Abraham setting out to barbecue Isaac.... What kind of morality condemns every child, even before it is born, to inherit the sin of a remote ancestor?" As to the atonement itself, Dawkins says it is "vicious, sadomasochistic, and repellent." We don't ground our morality in holy books, say these authors. Our real conception of morality outstrips them and changes, as it has in regard to slavery, female suffrage, treatment of children, and other topics. But a rational ethics without religion is not therefore a relativist one, argues

Harris. Hitchens points out that religionists impeded American slaves' emancipation and Indian independence (Gandhi's role was "weird" and equivocal), while the Hutu massacre of the Tutsi occurred in the most Christian country in Africa. None of these writers believes atheists, agnostics, or skeptics are less moral than their religious fellows. Were there any evidence that unbelievers were more peccant, Dennett notes, the religions would be onto it like a duck on a June bug. Virtuous behavior, he points out, isn't an argument for the truth of the belief, but conversely, proponents of religion must be relieved that vicious behavior doesn't negate beliefs of the perpetrator, either.

* * *

These authors dramatically part company when it comes to the other side of the moral question: namely, what's wrong with religion, and why do you want to get rid of it? The ways they differ will take us to the essence of each of their books.

The first of these was Sam Harris's *The End of Faith* in 2004. Harris is a neuroscientist with a philosophy B. A. and a penchant for polemic. His thesis is that all religions have basic canonical beliefs that are contrary to all lived experience, that they are all dangerous, and that moderates, by ignoring or loosely interpreting the basic beliefs, betray both faith and reason. All religions are dangerous, asserts Harris, but at the moment Islam is the worst offender. "If a stable peace is ever to be achieved between Islam and the West, Islam must undergo a radical transformation."

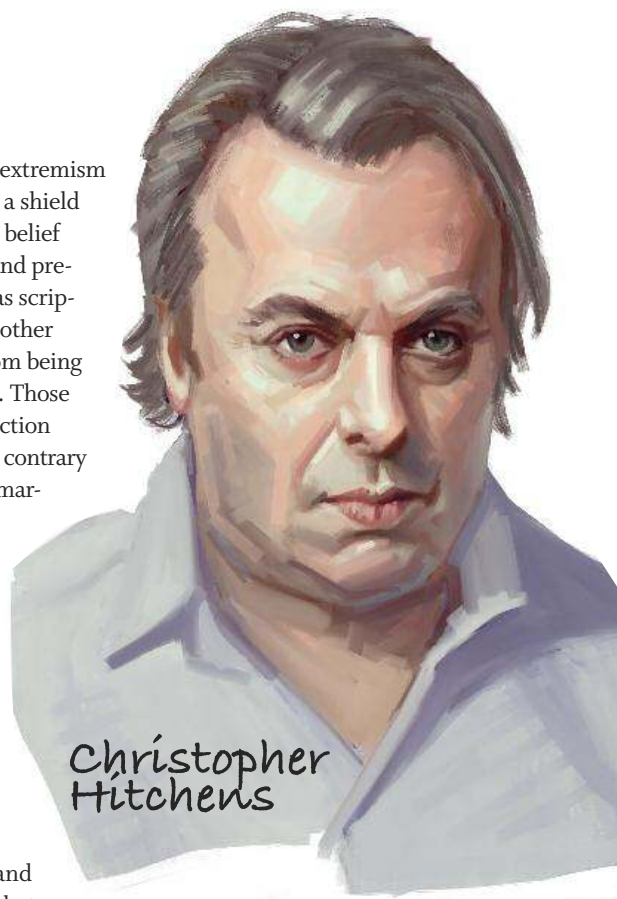
He excoriates Christianity as well, from the cynical fundamentalist support of Israel (the rebuilding of Solomon's Temple will usher in the end of the world—a consummation devoutly to be wished by the believers in the inerrancy of the Bible) to the waste of police resources, money, and prison space on victimless crimes, to the social agenda that will only be fulfilled when every bedroom and clinic in America is surveilled or self-surveilled. Fundamentalists and their allies want to punish what is not evil ("sodomy, marijuana use, homosexuality, the killing of blastocysts") and allow or cause real evils (choking off funds for family planning clinics, sending nonviolent drug offenders to prison, and stifling legitimate research).

Faith, even "moderate" religious faith, poses a threat to the survival of us all. "Our religions are *intrinsically* hostile to one another," writes Harris, and the result is violence all over the world. Moderates

foster tolerance for extremism because they create a shield protecting religious belief from examination and preventing ideas such as scriptural literalism and other irrational beliefs from being publicly challenged. Those who clutch at conviction without evidence or contrary to it "belong at the margins of our society, not in our halls of power."

In *Letter to a Christian Nation* (2006), Harris addresses some of the criticisms of his previous book and continues to insist that the tolerance and hands-off attitude that moderate Christians "demand for their own religious beliefs gives shelter to extremists of all faiths."

Richard Dawkins is an evolutionary biologist, and for him the worst thing about religion is that it subverts reason and "saps the intellect." His central argument in *The God Delusion* is in a chapter titled "Why There Almost Certainly Is No God." He begins with the argument from design, which says complex things cannot come about by chance, or that it takes a cleverer thing to make a thing. "Natural selection," argues Dawkins, "explains...how organized complexity can emerge from simple beginnings without any deliberate guidance." The fact that natural selection operates without an external hand does not mean that it operates by *chance*. But Darwin's discovery turned the argument from design on its head: while intuitively, we think that it takes a cleverer thing to make a thing, and that the pot can't make the potter, Darwin discovered a "process that does that very counterintuitive thing" and that's what makes it so revolutionary. Dawkins thinks theists who embrace evolution don't really know what they're saying, because the process that Darwin explained by which very complex things are made from very simple things without any intervention or "guiding hand," but only the mechanism of natural selection, means it is very unlikely that there is a God. So fundamentalists who fight so strenuously



against the teaching of evolution know exactly the threats it poses. One is that geologic time and the fossil record destroy the inerrancy of the Bible. The second is that it takes God right out of the argument from design and substitutes a process—not *chance*, but a process.

A cosmological version of the argument from design asserts that it cannot be accidental that we happen to be on a planet just far enough from a star to derive energy from it but not be baked, where water can exist in liquid form and an atmosphere be retained, and so on. Dawkins reminds us that every day we discover how many more planets of more stars might come close to conditions amenable to life, and if the formation of life on any one is a billion to one shot, there would still be a billion likely places in the universe.

Even mild and moderate religion helps to provide the climate of faith in which extremism naturally flourishes, writes Dawkins, agreeing with Harris. Dawkins believes “we should all wince” when we hear a child called a Catholic child or a Muslim child or a Protestant child, and he thinks it a form of abuse “to indoctrinate tiny children in the religion of their parents.”

Daniel Dennett’s project in *Breaking the Spell: Religion as a Natural Phenomenon* is to shatter the taboo against examination of religion, and he devotes many pages to a careful answer to the question of why we would even want to examine it. Dennett is a philosopher, so his method tends toward an exhaustive question-possible answer-likely answer-objection-response-conclusion way of proceeding. He invites us to go along with him, educate ourselves in evolutionary theory, learn what evolutionists make of religion as a natural phenomenon, and ask the question *cui bono?* about all of its parts. We can investigate why we like sweetness, or alcohol, or what the point of sexual vs. asexual reproduction is, and we can also do this with religion. Imagine we were Martians looking at humans, almost all of whom devote time and energy to religious activity such as prayer or ritual, make sacrifices such as not working on certain days, not eating certain things or anything at all at certain times, deliberately destroying valuable property in elaborate ceremonies, and erecting and maintaining large buildings just for occasional gatherings. The Martians would consider this “natural” in that almost all these creatures do it, and would as naturally ask why? They might not accept literally the answer some of the humans gave them.

Dennett wants to know how spiritual belief becomes codified into religion. He traces the way folk

religion is formed. What *works* leads to *ritual repetition*, which in turn leads to *explanatory stories*. We trust to parents to keep us from danger and we trust the knowledge of ancestors, leading to their deification. Shamans enter the picture in order to find out what the ancestors are telling us. Reflection begins to transform folk religion into organized religion and to add mysteries to the explanatory stories. Some shamans are always more adept than others at exploiting the mysteries and convincing people their cures work. Dennett asks whether religious *membership* works in an evolutionary way. Following Dawkins, he suggests that religious ideas or parts of religions may operate in a self-replicating way (both writers call them *memes*). For example, if the safety of an individual depends on his rationally choosing to join a group that espouses particular religious ideas, those ideas will be preserved and reproduce. The memes benefit and replicate, but they have to attract hosts.

Dennett does not believe true believers are nearly so common as they report themselves. Churches encourage their followers to profess and affirm belief, even though some of the followers’ beliefs may be weak. So Dennett thinks there are many more *believers in belief*, those who think that belief in God is a good thing but do not necessarily themselves believe.

Dennett asks and partially answers a series of questions about the phenomenon of belief. Why should people care what others believe? Well, if your religion denies certain scientific facts that, ignored, might cause us all to die sooner, we all should be concerned. What can your religion do for you? There is some evidence that some religions improve the health and morale of their members. But the evidence is mixed, and the question remains whether any amount of health benefits could justify misrepresenting the world. Does religion give meaning to life? And, if so, do those duped by cults and con artists have meaning in their lives even though their beliefs are a fraud? Should we interfere with others’ life enhancing illusions, even if we believe that most of the world’s religions are just illusions? Dennett takes his strongest stand when he says we cannot delegate moral decisions to our priests, rabbis, and imams by saying they are beyond discussion. He agrees with Harris that moderate religionists provide comfort and cover for terrorist fanatics, that it is up to Islam to reform Islam, and that all religionists must strongly condemn, by name, their fanatics and terrorists.

Religion evolved, which doesn’t necessarily make it good, and Dennett never explicitly says

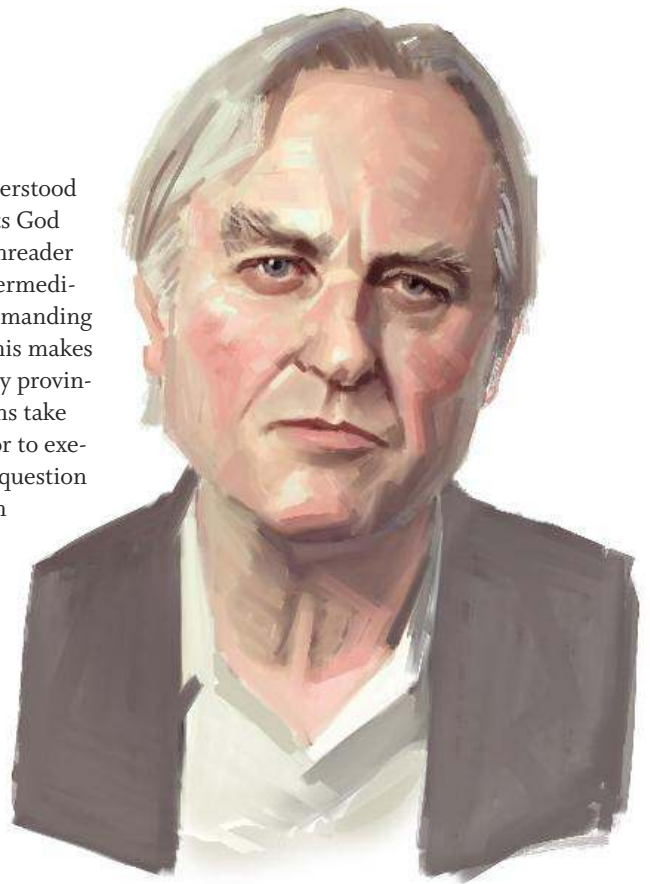
religion is man-made, though that is implied in everything he says. More research is needed, done by people who respect both science and religion. What shall we tell the children in the meanwhile? Dennett does not go as far as Dawkins in saying that indoctrination is child abuse, but he suggests instruction about *all* religions in schools might paradoxically lead to a decline of belief in all of them.

Christopher Hitchens was a journalist, essayist, and critic of culture, politics, and religion. His approach is clear in the subtitle to his *God Is Not Great: How Religion Poisons Everything*. He insists that religions by their nature are incapable of tolerance, and in “Religion Kills,” he illustrates, starting with Ireland north and south, moving on to Beirut, Bombay, Belgrade and Bethlehem, all places where he has witnessed religion’s intolerant, murderous nature. He mentions the Salman Rushdie *fatwah* and the refusal to outright condemn it by religious authorities. Even where bloodshed looks to be political or tribal, religion is “an enormous multiplier” of suspicion and hatred.

Hitchens looks at the three main holy books, all flawed by the inconsistency of their “revelations” to “unlettered and quasi-historical individuals, in regions of Middle Eastern wasteland that were long the home of idol worship and superstition.” The Old Testament rules say nothing about protecting children from cruelty, nothing about rape except when they condone it, nothing about slavery or genocide except when they practice them. The whole commandments story is fantastic, contradictory, and morally repugnant. There was no flight from Egypt, no wandering in the desert, no dramatic conquest of the Promised Land, though conservative religious archaeologists tried to prove otherwise. The New Testament is worse. Its writers want to find warrant in the Old, resulting in the cryptic: Abraham’s willingness to make a human sacrifice of his son somehow gets transmuted into God’s sacrifice of his son; in the older book there is a rumor that a virgin shall conceive. The gospels are at odds about almost everything having to do with Jesus. The historical record doesn’t bear out the gospels, which, like the Old Testament, demonstrate that religion is a human invention. The case for “consistency...authenticity...or inspiration has been in tatters for some time,” says Hitchens. Let the religionists rely on faith alone and “admit that this is what they are doing.” As for the Koran, it has bits and pieces of Jewish and Christian myth. It is in Arabic and relies on oral tradition heavily, and its adherents insist it

can only be understood in Arabic. But its God “entrusted a nonreader (through an intermediary) with the demanding call to ‘read.’” This makes God look awfully provincial. “All religions take care to silence or to execute those who question them,” but Islam still preaches that the infidel must die. Its book is “a set of plagiarisms” and its confusions about dates, precise language, Sunni or Shia make for a seriously unstable version of “the unalterable (and *final*) word of god” (Hitchens never capitalizes this word). The *hadith* or largely orally generated secondary literature of Islam are also bits and pieces from the Old and New Testaments, Rabbinic wisdom, and Persian, Greek, and Indian proverbs.

Theists, in a rather sad defense of their religions’ crimes, sometimes resort to the argument that secular despots have killed more people. Hitchens has the most extended treatment of this argument, saying in part that modern total despots learned their techniques from religious ones, quoting Orwell that “A totalitarian state is in effect a theocracy,” and writing that submission to something all-important and larger than oneself is how Mussolini described Fascism and most Christian mystics describe their faith. The church endorsed Mussolini’s Fascism initially, and the church’s anti-Semitism and anti-communism made common cause with the forces that gave rise to Hitler, to whom it essentially surrendered parish records, while ordering Catholics to abstain from political activity. Hitchens claims the Catholic Church facilitated the escape of Nazis to South America and supported extreme right dictatorships there. The Axis included one country, Japan, with not only a religious person at its head, but an actual deity. The church in czarist Russia protected serfdom and sponsored anti-Jewish pogroms. Joseph Stalin had trained to be a priest in Georgia, tried to make science conform to



Richard Dawkins

dogma, as religions do, in the Lysenko catastrophe, and sought not so much to “negate religion...as...to replace it.” North Korea is not an exaggeration of Communism, but “a debased yet refined form of Confucianism and ancestor worship.”

Hitchens is the best stylist of the four, often funny, frequently hyperbolic, and generally more entertaining. It is he who points out, while discussing the rationalist, skeptical, and scientific-minded Benjamin Franklin’s discovery of how lightning could be attracted, that every steeple and minaret now has its lightning rod. He devotes a whole chapter, “A Short Digression on the Pig,” to speculation that the reason pork is taboo on the menus of several religions is that it might taste a little too much like human flesh, and thus be an unfortunate reminder of dark days of human sacrifice and cannibalism. And he asks how much human presumption and vanity is revealed in pretending that one is “the personal object of a divine plan.”

* * *

Why did all of these books appear when they did, in the middle of the first decade of the 21st-century? The September 11, 2001 attacks on the World Trade Center and the Pentagon provide only a partial answer to the question. Harris clearly aims his first book at what he sees as the cause of these acts of terror and announces it in his subtitle, *Religion, Terror, and the Future of Reason*. But it soon becomes clear in this book, and even more so in *Letter to a Christian Nation*, that Harris has been thinking about the subject of faith in a wider context for some time. He does not believe that terrorism comes from some distortion of Islam: terrorists are only extreme in their faith and in their devotion to the literal word of the Koran, which he quotes extensively to prove his point. The book the Jews call the *Tanakh* and Christians call the Old Testament is also pretty explicit about what should happen to unbelievers and those who are so unfortunate as not to be chosen people. As all of these authors point out, if we buy into “the principle that religious faith must be respected simply because it is religious faith,” in Dawkins’s words, we’re going to have to respect the faith of Osama bin Laden and the suicide bombers. For Hitchens, the deadly complicity of the churches became crystal clear when other religious leaders did not roundly and repeatedly condemn the murderous *fatwahs* pronounced by Islamic leaders against Salman Rushdie when he published *The Satanic Verses*, and against the editors of a Danish newspaper when they

published a cartoon depicting Mohammed.

America was the most spectacular target of religion inspired terrorism at the beginning of the 21st century. But more important, I believe, for Harris, Dawkins, Dennett, and Hitchens, America is the biggest battleground for the fight between religion and reason, where the territories being fought over are the hearts and minds of its populace, and where the seizing of majority political control by religious fundamentalists looks increasingly possible.

The battle over teaching real science in the form of evolutionary biology in American classrooms may seem to be the same old provincial, Scopes trial struggle that has been going on for a century, but developments in the last several decades have made it the educational issue of our time. The present form of the struggle began with the promotion of a poorly disguised religious creationism under the name of intelligent design (ID), most notably in a 1989 textbook titled *Of Pandas and People*. The new disguise for creationism was necessary to try to get around a 1987 Supreme Court decision in *Edwards v. Aguillard*, forbidding the teaching of creation “science” in public schools and citing the Establishment Clause of the First Amendment in declaring such teaching religious instruction and therefore unconstitutional. The ink was scarcely dry on that decision before opponents of the teaching of evolution were working on the idea of ID, which was presented to school boards without ever naming the intelligent designer as God, thus attempting to execute an end run around the Supreme Court’s banning of creation “science.” But proponents of teaching real science, though losing ground in the 1990s, were preparing for a showdown, which came in 2005, right in the middle of the publication of the books of Harris, Dawkins, Dennett, and Hitchens. In *Kitzmiller v. Dover Area School District*, United States District Judge John E. Jones III decided that intelligent design was not science but creationism, “and thus religious,” therefore violating the Establishment clause. The proponents of intelligent design, however, have by no means retreated after that last battle in Pennsylvania. The Discovery Institute is the main fundamentalist Christian organization in this attempt, which includes lobbying efforts to convince Congress to pass so-called academic freedom laws to protect the teaching of creationism. The movement to use public funds to support charter schools that can get around the Establishment Clause is another part of the creationist pincer movement in the battle against teaching evolution and real science.

Those Christians, especially fundamentalists,

who are *millenarians* believing that a huge change in the world will precede its ultimate end also often believe that the change and the end are imminent. These believers rely heavily on the Book of Revelation, the apocalyptic gospel of John the Evangelist. A prominent feature of the apocalyptic view is that before the end times the Jews will return to Palestine and reestablish Solomon's Temple. Harris believes American fundamentalists are cynically supporting Israel in order to hasten end times predictions. As Dennett points out, it's an unfortunate thing if your fellow citizens don't acknowledge scientific facts that will result in all of us dying sooner. It's even worse if they are not only praying for the end to come, but actively working to help bring it about. A nuclear holocaust, which most of the world considers a horror that must be avoided at all costs, does not represent an unimaginable catastrophe to such a believer.

During the presidency of George W. Bush it was widely suspected that he was a millenarian. No evidence was offered for the suspicion, and Bush was notoriously close-mouthed about the nature of his belief. He was a member of the United Methodist Church, the largest mainline Protestant denomination. But he also told French President Jacques Chirac in 2003 that Gog and Magog were at work in the Middle East and that biblical prophecies were unfolding there, according to *The London Independent*. Some took this, along with his offhand remark in answer to the question that he took advice from "a higher father" rather than from George H. W. Bush, as evidence that he may have considered himself the agent of God in the fulfillment of those prophecies.

Dennett's book ends by talking about the millenarians, the end-time believers, and the rapturists (those who think believers will be gathered up to heaven some time before the second coming of Christ, while we infidels will be left behind). He points out that these folks are working hard on the Internet and trying to gain positions of power, and not merely looking forward to the end, but taking political action to help bring it about sooner. He suggests that Christians police themselves and control their outliers through a political investigation by the sitting senators and congressmen who form an influential Christian group in Washington.

Harris, Dawkins, Dennett, and Hitchens are concerned that the attack on reason by religion is a perennial concern. Yet I think there is cause to see the nearly simultaneous publication of their books in the middle of the first decade of the 21st century as addressing a peculiar nexus of literal attack on

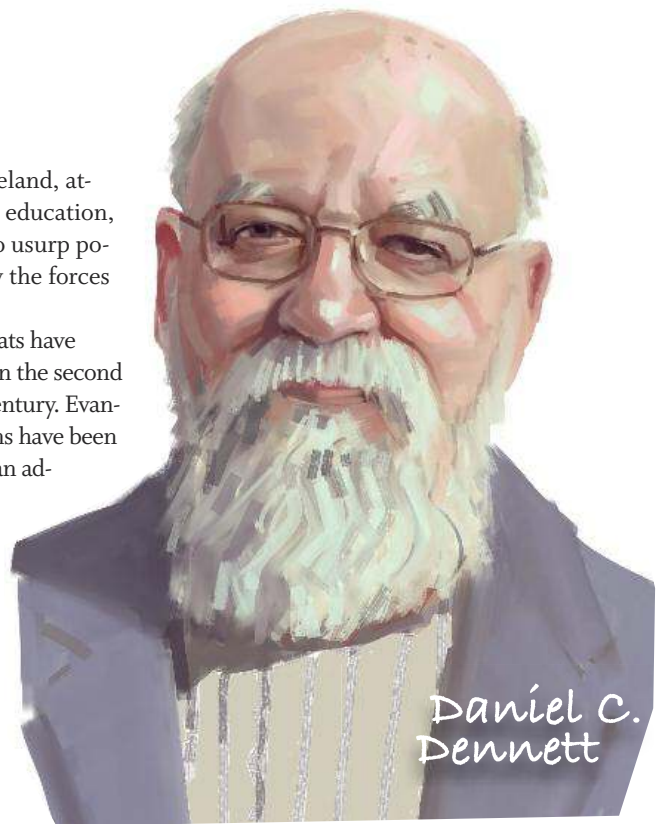
America's homeland, attacks on public education, and attempts to usurp political power by the forces of anti-reason.

Those threats have only increased in the second decade of the century. Evangelical Christians have been encouraged by an administration they are convinced shares their values.

A significant number of evangelical Christians, as well as a sizeable portion of the Muslim world would be

happy if the West engaged in a holy war with Islam; one widespread Muslim narrative says it has already begun. Domestically, attacks on science and dogma-free education have redoubled. In the spring of 2018, the son of the prominent evangelical preacher the late Billy Graham called for a takeover of all school boards in America by evangelical Christians within the next four to six years. If the evangelicals are widely successful in their years-long effort to convert new immigrants and their growing families, political power that would otherwise likely be influenced by Catholicism and its comparatively progressive social program would shift to a regressive social agenda.

Do these developments mean that the wide sales of books by Harris, Hitchens, Dennett, and Dawkins have not translated into any bolstering of the causes of reason and science? If their intended audience was only the atheists, agnostics, and skeptics in the country, polls suggest that the number of such readers is gradually growing against a slowly declining religious population, and the rise of the "nones"—those with no religious affiliation—has exploded in recent years to 25 percent of all Americans and 33 percent of Millennials. If, however, these writers have a readership among a more substantial section—believers in belief, as Dennett would say, rather than believers in God, believers in God who have not drunk the Kool-Aid of religion, and even moderate religionists willing to entertain the idea of their complicity in extremism—then these books' readership may translate into real resistance.



Quackery in America

An Inglorious and Ongoing History

BY MORTON TAVEL, M.D.

THE HISTORY OF QUACKERY IN THE U.S. IS LONG AND colorful and extends all the way back to the nation's founding.^{1,2} It's a system that preys on the unwary and unfortunate and is basically designed to separate people from their money. Despite efforts to control unfounded medical claims, quackery continues to prosper, primarily because of ineffective efforts by our government to curb it.³

Quackery began, Voltaire famously asserted, when the first knave met the first fool. Such encounters may be presumed to have continued in all times and in all places. Certainly colonial America played host to knaves who cheated gullible fools. A surge in the promotion of useless patent medicines and other types of pseudomedical deception occurred during the mid-19th century, when burgeoning quackery combined with an increase in newspapers written to appeal to a populace acquiring the rudiments of literacy, thus providing a fertile ground for villainous patent medicine promoters. Inexpensive U.S. mail service also enabled nostrum vendors to spread their circulars throughout the republic.⁴

With increasing feelings of freedom, the new citizens felt empowered to form their own conclusions and to think for themselves rather than trusting authorities—an attitude which quackery still encourages today as it is one of its most powerful sales tools. Given this attitude, a horde of tricksters appeared, and victimization ran rampant. Amidst this fierce competition, citizens made their own purchasing choices, and the sale of patent medicines escalated enormously.

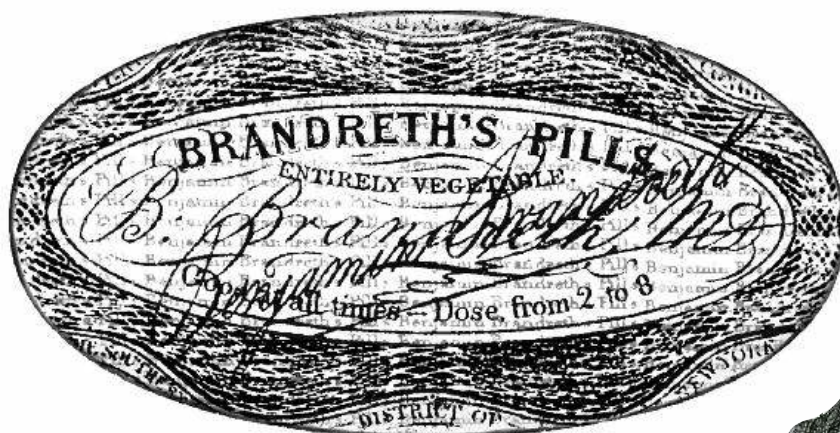
P. T. Barnum, the great showman, who also was remembered for promoting celebrated hoaxes, expressed the belief that "If we could have a full exposure of 'the tricks of trade' of all sorts, of humbugs and deceivers of past times, ...quackish and so forth, we might perhaps look for a somewhat wiser generation to follow us."^{5,6} Regrettably, this hope has never fully materialized.

Yet, Barnum believed that not all patent medicine men deserved the harsh designation of quack. For example, Benjamin Brandreth promoted his Universal Vegetable Pills with perhaps the largest advertising sign seen in New York, blaming all disease

upon the impure state of the blood, a condition which, he boasted, could be both prevented and cured by his pills. This beguiling message lured countless customers—among them Barnum himself. Indeed, the showman remembered, the multiple symptoms listed in Brandreth's advertising so coincided with "every symptom that I experienced," that "extensive consumption" of the pills seemed to Barnum "absolutely necessary to preserve my life." Touring the South at the time, Barnum bought a box of Brandreth's pills. "I took them morning, noon, and night," wrote Barnum. After returning to New York, he hurried to Brandreth's office so as "to congratulate him on being the greatest public benefactor of the age." Brandreth seemed pleased until he learned that Barnum had made his purchases in the South, where the pills were not yet distributed!

Realizing he had not received the genuine product, Barnum expressed amazement. "Was it possible then, that my imagination had done all this business, and that I had been cured by poisons which I supposed were Brandreth's Pills? I told the doctor that, after all, it seemed the counterfeits were as good as the real pills provided the patient had sufficient faith." This proved to be an excellent early demonstration of the tremendous power of the placebo effect, i.e., the self-doser's own belief, a factor that accounts for the success of a huge number of useless remedies to this day.^{7,8} Moreover, the pills taken by Barnum were a powerful purgative. Like scores of other pill men of the period, Brandreth had learned a valuable secret, how, as a pharmacist put it, "to open men's purses by opening their bowels." Faith might work the cure, but faith received a strong boost from the indisputable fact that the pills clearly did something.

In postbellum America, thousands of innocent and unsophisticated people, knowing nothing about the ways of city hustlers, were continually fleeced and robbed, and the mails were used for the purpose of aiding them in their nefarious designs.⁴ In response to such chicanery, Congress enacted a statute in 1872 making mail fraud a crime. Unfortunately this misdemeanor initially applied to finance but not health. At the turn of the century, however, postal authorities



(Above) the ornate but nearly unreadable lid of a Brandreth's Pills box. The tin was surprisingly small—just 2 1/8 in x 1 in.

(Right) Benjamin Brandreth was a pioneer of mass advertising who promoted his pills as “THE GREAT AMERICAN PURGATIVE...ENTIRELY VEGETABLE AND INNOCENT.” The term “purgative” referred to more than just the bowels. The advertising promised “the blood is purified, the whole system is vitalized...throughly cleanses the liver and spleen...”

began to concern themselves with various health claims, such as “male enhancement.” Having no chemical or medical experts in their department, postal officials turned for help to the Bureau of Chemistry, headed by Harvey Wiley. Both a chemist and a physician, Wiley found that some male rejuvenators depended on red pepper for their presumed potency. With his advice, the Post Office Department brought criminal charges against the most outrageous quacks plying their trade through the mails. For lesser deceptions, the issuance of fraud orders prevented mail from reaching their customers: letters were intercepted by postmasters, stamped “FRAUDULENT,” and returned to the senders.

This system, still in operation, has saved countless citizens from being cheated. The Postal Inspection Service ferrets out fraud with great dedication, securing evidence to warrant fraud orders and criminal convictions. Liaison between the U.S. Postal Service and the Bureau of Chemistry's successor, the Food and Drug Administration (FDA), remains close. For instance during the 1950s and 1960s the “National Scientific Laboratories of Des Moines” advertised in chiropractic journals that they would analyze the urine of patients and make diagnoses. Reports regularly disclosed “hormonal imbalance” or “impaired body chemistry,” and recommended the use of a certain brand of vitamins made by an interlocking company. The practitioners shared both the fees for the urinalyses and the charge for the vitamins. Eventually Walter Cronkite exposed the scheme on the CBS television news. A postal inspector, in the process of submitting his own urine for analysis, gathered evidence

in the case, and three promoters were eventually convicted of mail fraud. Before this termination, deceived citizens had spent 11 million dollars on phony urinalyses and needless vitamins.

In 1906, in response to urging by the Bureau of Chemistry, the Pure Food and Drugs Act was created by Congress and approved by President Theodore Roosevelt. The new law instituted modest controls over labeling of patent medicines. The presence and amount of a short list of drugs deemed dangerous—including alcohol, the opiates, and acetanilide—required indication on the label. Nor could the proprietor place upon his label “any statement, design, or device” regarding the medicine or its ingredients that was “false or misleading in any particular,” without risking prosecution for misbranding.

The Bureau of Chemistry was charged by law with initiating enforcement, either by seizures aimed at driving offending medicines from the marketplace, or criminal actions against proprietors, which could result in fines and imprisonments. The first court trial under the 1906 law involved a proprietary with the improbable name of Cuforhedake Brane-Fude, a headache mixture containing acetanilide. Its proprietor was a pharmacist who possessed political influence around Washington. The labeling was deemed false and misleading, stating that it could “cure” a headache, and it was food for the brain. Twelve jurors agreed, convicting the proprietor of misbranding his product. Both the Bureau and Roosevelt had hoped for a severe sentence, including jail time that would deter would-be violators. The judge listened but did not accede, thus setting a precedent almost invariably

followed under the 1906 law: convictions for engaging in quackery did not result in imprisonment. The judge fined the company's proprietor \$700, a sum much greater than levied upon many subsequent violators.

Besides the no-jail, low-fine policy that generally prevailed, another obstacle to the Bureau of Chemistry's efforts at curtailing quackery arose from an adverse Supreme Court decision. In seeking to squelch a purported cancer remedy, it was discovered that the 1906 law's prohibition of false and misleading labeling statements did not apply to therapeutic claims. Congress plugged this loophole in 1912 with the Sherley Amendment, but, paying heed to what the justices had said, banned only those labeling claims that were "false and fraudulent." But demonstrating fraudulent intent proved difficult. In 1922, for example, the government lost such a case lodged against a cherubic former court reporter and still active Sunday school teacher who sold a liniment made essentially of turpentine, ammonia, and raw eggs as a cure for cancer and tuberculosis. This defeat emboldened all quacks who could assume a guise of injured innocence or political morality. To reverse this thwarting of justice, the FDA spent a decade developing evidence of fraudulent intent for future legal battles.

Although some progress against quackery followed enforcement of the 1906 law, the general success of the self-medication market has remained largely unchanged to this day. Besides legal difficulties encountered enforcing the law's provisions, FDA officials faced certain limits of the law's coverage. For example, no clause restrained fake medical devices, and as the radio came to fascinate popular attention, quacks marketed weird gadgetry promising cures, even long distance cures by radio waves.

Despite the 1906 law banning false claims made in labeling, many wily promoters cleaned up their labels and simply provided therapeutic promises in pamphlet, poster, and printed ads. They believed correctly that such advertising would persuade many readers to buy a nostrum and disregard what the label said. The influence of advertising claims over labeling facts continues to deceive health product consumers to this day.

In 1914, the Federal Trade Commission (FTC) was created and given wide powers to investigate, publicize, and prohibit "unfair methods of competition." As a result, the 1920s saw a modest curtailment of deceptive advertising in the health field, with some advertisers being ordered to cease and desist. However, in 1931 the FTC lost a major case in the Supreme Court while seeking to ban advertising of a desiccated thyroid preparation as a "scientific and

harmless" way of losing weight. Although danger accompanied the product's use, the court decided that hazard to the public did not give the FTC authority to restrain its advertising, for the Commission had not undertaken to prove, as its basic law required, that such advertising had injured its competitors in the weight-reducing business.

In 1938, Congress passed the Wheeler-Lea Act that increased the FTC's power to control advertising of health products. Besides limiting the "unfair methods of competition" between competitors contained in the 1914 law, the new law extended to misleading statements to the consumer as well. What was not said in an advertisement, as well as what was said, could be taken into account in determining if the ad was false or misleading.

The Wheeler-Lea Act represented a victory in Congress for the FTC. When the New Deal began, food and drug officials recognized the new reform period as an opportunity to secure legislation strengthening many features of the 1906 law, which proved to be inadequate for proper consumer protection. Quack devices were also covered. Thus, the FDA sought to assume control of advertising in the drug, device, cosmetic, and food fields. This power was initially ceded by Congress to the FTC, but two months after the Wheeler-Lea Act, the Food, Drug and Cosmetic Act expanded the FDA's powers. As a quackery-fighting weapon, a medicine could now be banned as misbranded for any false or misleading assertion in its labeling, especially including the omission of needed warnings. More information than before about ingredients had to be placed upon the label. No newly discovered drug could enter the marketplace until its sponsor had persuaded FDA officials of the drug's safety. The new law also covered medical devices. And it increased penalties and let the FDA seek an injunction if public safety required fast action.

Employing these new powers, the FDA began a vigorous effort to make self-medication safe, going after obesity products containing dangerously potent drugs, and they seized powerful painkillers not adequately labeled with directions for use and warnings against misuse. Worrisome devices such as pessaries, breast developers, and corrosive abortifacient pastes were targeted, and the FDA unleashed all three of its weapons: seizures, injunctions, and criminal actions. Thus, many of the most flagrant and dangerous deceptive schemes which had flourished earlier were now considerably reduced.

For a host of reasons, however, quackery did not vanish. For one thing, the FDA operated on a limited

budget—as is the case today—with numerous tasks to perform. The combating of quackery was not necessarily the most important. Moreover, since the law applied to products in interstate commerce, cheaters could label a nostrum in conformity with the law, ship it across state lines, and then separately ship posters making excessive claims to be displayed where the medicine was sold. Such a scheme worked until FDA lawyers, moving the issue slowly through the courts, persuaded the Supreme Court to consider the posters part of the labeling. The court responded by ruling to strengthen consumer protection. In spite of such measures, however, in areas where great complexity reigned, permitting clever doubletalk, as in the relation of diet to health, nutrition quackery boomed. Overzealous claims made by salesmen in health-food stores or door-to-door, often far exceeded the printed labeling that did not violate the law.

The FDA's small staff curtailed quackery's worst excesses with remarkable diligence. They won major battles in a wide variety of fields, including one notable example: Harry Hoxsey's cancer clinic in Dallas, which did not cure cancer but dangerously postponed for many patients recourse to the best methods of treatment available at the time. Finally, after three trips to the Supreme Court, the FDA got it closed in 1960, whereupon—as is true of other specious treatments banned in the United States—it migrated to Mexico.

In order to extend its battle against quackery in the 1960s, the FDA collaborated with the American Medical Association in sponsoring National Congresses on Medical Quackery in order to alert the public to the alarming magnitude of pseudomedicine. In terms of money wasted, health quackery had never before in American history amounted to such a gigantic enterprise. Although the FDA had secured many injunctions against shippers of falsely labeled devices, up to 5,000 practitioners, especially chiropractors, continued to use bogus electrical machines.

Responding to numerous excesses, in 1962 the U.S. Congress enacted the Kefauver-Harris Drug Amendments that added increasing rigor to the FDA's surveillance of the pre-market testing of drugs. The effectiveness standard of the new law governed not only new drugs appearing in 1962 and after, but also all new drugs that had been marketed since 1938. This law also placed an expanded burden of proof upon those who would market a new drug. Not only must the FDA be persuaded that a new drug is safe, as the 1938 law required, but now also the agency must receive convincing proof that the drug is effective in treating the ailments for which it is intended.



Harry Hoxsey (left) chose a title for one of his books that would be hard for a frightened cancer patient to ignore: "You Don't Have to Die."

(Below) An FDA flyer from 1956 warning consumers about the Hoxsey cure which consisted largely of an herbal paste for exterior cancers and herbs and vitamins for interior problems.

YOU DON'T HAVE TO DIE

THE AMAZING STORY OF THE
HOXSEY CANCER TREATMENT
HARRY M. HOXSEY, N.D.

Public Beware!

WARNING AGAINST THE HOXSEY CANCER TREATMENT

Sufferers from cancer, their families, physicians, and all concerned with the care of cancer patients are hereby advised and warned that the Hoxsey treatment for internal cancer has been found worthless by two Federal courts.

The Hoxsey treatment costs \$400, plus \$60 in additional fees—expenditures which will yield

nothing of value in the care of cancer. It consists essentially of simple drugs which are worthless for treating cancer.

The Food and Drug Administration conducted a thorough investigation of the Hoxsey treatment and the cases which were claimed to be cured. Not a single verified cure of internal cancer by this treatment has been found.

Those afflicted with cancer are warned not to be misled by the false promise that the Hoxsey cancer treatment will cure or alleviate their condition. Cancer can be cured only through surgery or radiation. Death from cancer is inevitable when cancer patients fail to obtain proper medical treatment because of the lure of a painless cure "without the use of surgery, x-ray, or radium" as claimed by Hoxsey.

Anyone planning to try this treatment should get the facts about it.

For further information write to:
U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Food and Drug Administration
Washington 25, D. C.

1956-1957 (REVISED) 11-11-56

U. S. GOVERNMENT PRINTING OFFICE: 1957 O-411764

Additional reviews of over-the-counter drugs were performed in 1971.⁹ The non-prescription drugs examined during this massive reappraisal persuaded FDA officials of an important need to tighten requirements for all self-dosage drugs. The FDA created 17 expert panels, each charged with making decisions in one field wherein self-treatment was deemed legitimate. They specified which ingredients were safe and effective, which claims could properly be made on labels, and which, among those currently being used, no longer would be tolerated. Deviations from the standard would be automatically illegal. The over-the-counter drug review process was to have driven most of the ineffective ingredients out of use; however, as explained below, this goal has remained largely unachieved.

In response to industrial lobbying aimed at circumventing these onerous restrictions threatening to control all health products, in 1994 Congress passed some ill-advised legislation—the Dietary Supplement Health and Education Act—which made it possible for many products to avoid being designated as drugs. This act classified “dietary supplements” as “anything that supplements the diet,” including vitamins, minerals, herbs, amino acids, enzymes, organ tissues, metabolites, extracts, or concentrates, thus effectively opening the floodgates to all sorts of chicanery, which also allowed quack remedies to acquire a new—less sinister-sounding—designation as “supplements.” Although this Federal Act stipulated that ingredients must be accompanied by evidence that there is a “reasonable expectation of safety” acceptable to the FDA, even this meager expectation has never been adequately enforced. Thus these products were allowed to bypass the rigorous requirements for both safety and efficacy required for approval of prescription drugs.

A major difference between a drug and a dietary supplement is that dietary supplements may not claim to “diagnose, cure, mitigate, treat, or prevent specific illnesses.” Consequently, dietary supplement manufacturers can make only general “structure/function” claims, which are often vaguely worded assertions of health benefits such as “support the body’s natural defenses,” “promote heart health,” “better circulation,” “increased energy,” “better joint health and mobility,” etc. They regularly provide a disclaimer that their product “has not been evaluated by the FDA.” Their wording is often evasive because claims to treat specific diseases cause products to be considered drugs. Firms making such assertions legally must follow FDA’s premarket new drug approval process to provide hard evidence that products are both safe and effective—a demanding and expen-

sive task! The estimated number of supplement products in the U.S. increased from 4,000 in 1994 to more than 55,000 in 2012.

Since these products are now legally marketed in the U.S., their appearance on the shelves of standard pharmacies, retail outlets, and on the internet, confers an illusion of legitimacy that is clearly unwarranted. When one can obtain them readily without a prescription, especially in response to vigorous media advertising, why wouldn’t we expect to see robust sales of these unproven remedies. Indeed estimates place sales at over \$28 billion yearly.

The Dangers of Supplements

Since virtually none of these products is proven to be effective in prevention or treatment of any disease, the flip side, i.e., hazards, become urgently in need of study. Below are a few obtained from several sources.

Between 2007 and mid-April of 2012, more than 6,300 adverse events associated with dietary supplements were reported to the FDA from supplement companies, consumers, health care providers, and others. Included were 115 deaths, more than 2,100 hospitalizations, and 1,000 serious illnesses. One study¹⁰ estimated that more than 23,000 annual emergency department visits for adverse reactions attributed to dietary supplements occurred nationwide from 2004 through 2013. These reports by themselves don’t prove the supplements caused the problems, but the sheer numbers give cause for concern. The haphazard method of data collection suggests that these numbers underestimate the true incidence of adverse events.

Although the FDA gets more reports about serious problems with prescription medications than about supplements, there’s a big difference between the two. That is, prescription medications may possess powerful side effects that are well recognized. When used appropriately, however, they actually combat diseases and save lives. By contrast, when healthy consumers use supplements, there are seldom demonstrable health benefits.

Unfortunately, current laws prevent the FDA from simply removing many suspicious products from the market without a lengthy legal process. The ephedrine alkaloids provide a good example. Ephedra is an herbal supplement that was linked to many heart attacks, strokes, and deaths, eventually banned by the FDA in 2004, but only after several states and counties had already introduced legislation outlawing its sale in their local stores. The effort dragged on for a decade, during which ephedra weight loss products were implicated in thousands

of adverse events, including deaths. In addition, the FDA estimates that 70 percent of dietary supplement companies are not regularly following basic quality control standards that would help prevent adulteration of their products with similar disastrous outcomes.

What's even worse is that felons are responsible for contaminating products with potentially toxic—and even life threatening—ingredients. On December 20, 2013, the newspaper *U.S.A. Today* reported that numerous dietary supplement companies have been caught adding illegal contaminants, and these businesses were often found to be run by people with criminal backgrounds. But whether or not there is underlying criminal intent, according to research published in one scientific medical journal, just over half of all drug recalls in the USA from 2004 to 2012 were contaminated with hidden ingredients (often drugs).¹¹ Of the 237 supplements recalled for hidden ingredients, most were promoted for sexual enhancement, bodybuilding, or weight reduction. In a December 22, 2013 article *The New York Times* reported on the potential for toxic effects, citing that dietary supplements probably account for nearly 20 percent of drug-related liver injuries that require hospitalization, often leading to liver failure, the need for liver transplantation, or even death.

But the problem doesn't stop there. Supplements may not even contain what their labels say. A recent investigation by the New York State Attorney General's office¹² led to the discovery that four national retailers were selling supplements that contained either little or none of the medicinal herbs advertised on their labels, consisting of instead of cheap fillers and contaminants such as powdered rice, wheat, and houseplants.

Critics of the industry have argued that the FDA has too little power to prevent fraudulent or dangerous products from regularly reaching the public. Unsafe herbal products generally are pulled from stores and outlets only after they have demonstrably caused harm, and the unsystematic data gathering process makes it difficult to prove causal relationships between products and adverse reactions. Compounding the problem, the FDA is hamstrung by inadequate powers and funding.

Conclusion

Since knavery and gullibility may be expected to persist, governmental regulation will never completely snuff out quackery. Nevertheless, some immediate measures could prevent many frauds and needless suffering. First, the Dietary Supplement Health and Education Act should be rescinded, and all “supplements” should be subjected to the same scrutiny that governs drugs. A non-partisan scientific group consisting of representatives from many fields could be empowered with recommending which of the many questionable non-prescription products should be allowed to continue to stock retailers' shelves and be sold elsewhere. In order to accomplish these ends, the FDA's size and legal powers would also require significant strengthening.

If implemented, such measures might minimize the rampant presence of quackery that persists to this day. **S**

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Personhood and Abortion Rights

How Science Might Inform this Contentious Issue

BY GARY WHITTENBERGER

ALTHOUGH IT HAS BEEN 45 YEARS SINCE ROE V. WADE was decided by the Supreme Court of the United States (SCOTUS), abortion continues to be a highly controversial and polarizing issue within the body politic. At the two ends of the continuum are the radical pro-life and radical pro-choice advocates. The radical pro-life position is that from the moment of conception the human organism is a person that should have full human rights, including the right to life, and these rights should be fiercely protected by the state. On the other side, the radical pro-choice position is that the pregnant woman already has full human rights, including the right to bodily autonomy, and that she can freely decide to end her pregnancy at any time she wishes for any reason at all. Many pro-lifers view the zygote—the one-celled human organism resulting from fertilization—as sacred, and believe that causing the death of the zygote, embryo, or fetus, either directly or indirectly, is murder. By contrast, the pro-choicers believe that the organism becomes a person only after it leaves the womb and becomes disconnected from the life support of the mother. The main purpose of this essay is to articulate a third position that falls between these two extremes. Call it the “pro-person” position. Although it leans more towards the pro-choice stance, it has a much stronger philosophical and scientific foundation.

Most of us would agree that all persons should be assigned the full spectrum of human rights, e.g. rights to life, bodily autonomy, property, etc. But what is a person anyway? When does the human organism developing inside a woman become a person? Traditionally, the answer was left to theologians and religious leaders. The prevailing view during the time of Aristotle was that the human soul entered the forming body at 40 days in male embryos and at 90 days in female embryos.¹ On the other hand, during medieval times theologians referencing Genesis concluded that the soul enters the body when the baby takes its first breath. Today, many religious people opine that “en-

soulment” occurs at fertilization. As efforts to define, identify, or locate the soul have failed, and as religion has declined in its influence, different thinkers have simply pinned the beginning of personhood to different developmental milestones.

The most popular milestones have included: conception, first heart beat, quickening (fetal movement when first detected by the pregnant woman), onset of pain perception, first brain waves, first brain waves in the cerebral cortex, birth itself, and first breath. On May 4, 2018, the governor of Iowa signed into law a bill which bans most abortions once a fetal heartbeat is detected, occurring usually around six weeks of pregnancy.² On the other hand, the decision in Roe v. Wade in 1973 accorded importance to fetal viability, but this has obvious drawbacks. Viability depends very much on modern medical technology and the skill of physicians and nurses. With the best of technology, a 20-week-old fetus may occasionally be kept alive, but without it even a 36-week-old fetus may perish. In the future it will probably become possible to sustain a human organism in a special artificial incubator from fertilization for a period of nine months, making viability a moot point. Personhood should not be defined by the fetus’ location, dependence, or connection to another human or to machines. Personhood should be defined by the species and the current capacities of the fetus.

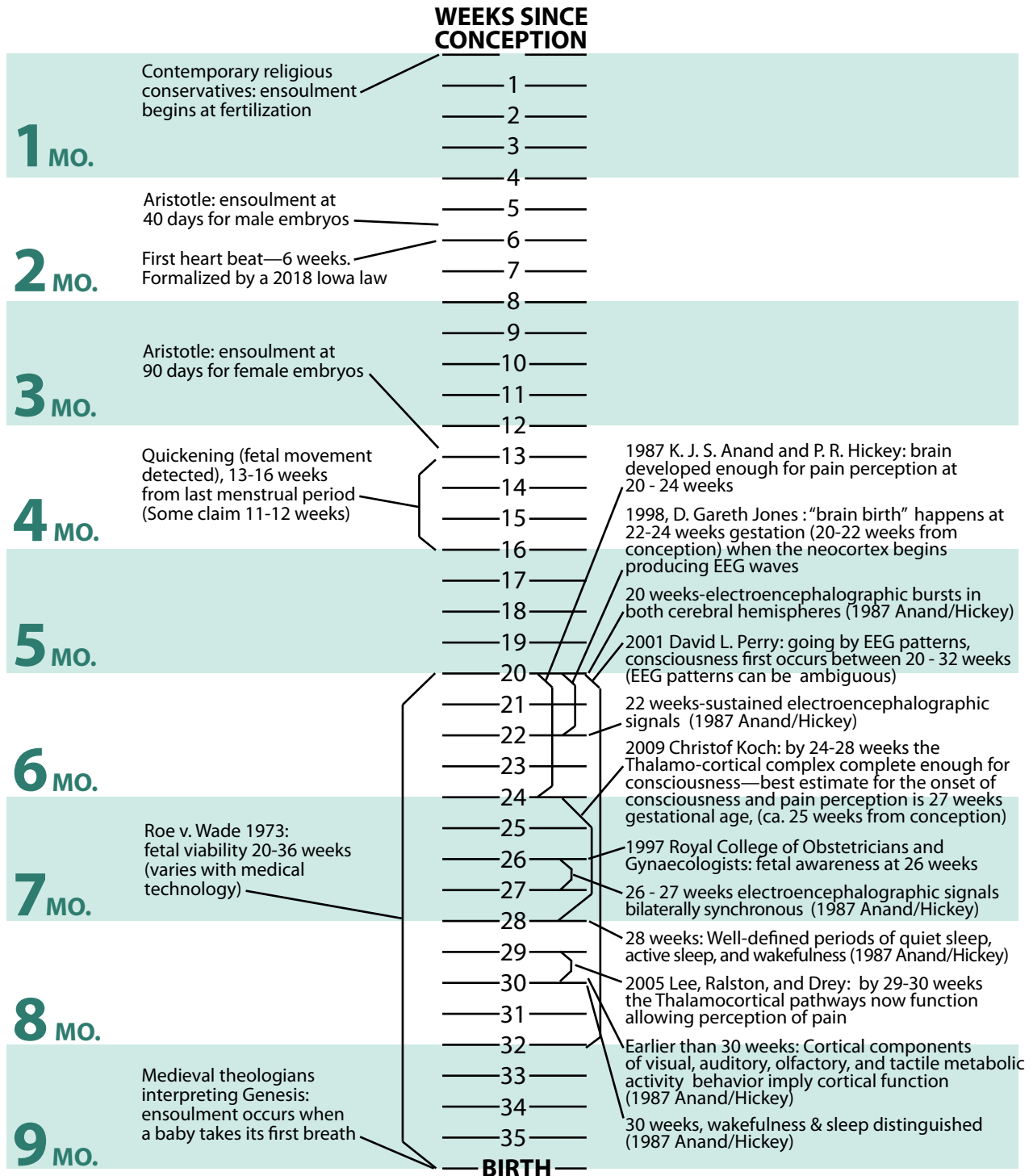
Standard dictionary definitions of “person” are simplistic. Two relevant ones from Merriam-Webster are “human, individual” and “one (such as a human being, a partnership, or a corporation) that is recognized by law as the subject of rights and duties.”³ Three from Dictionary.com are “a human being, whether an adult or child,” “a self-conscious or rational being,” and “the body of a living human being.”⁴ And finally, the *Oxford Living Dictionary* defines a person as “a human being regarded as an individual.”⁵ Wikipedia provides more depth, defining “person” as “a being that has certain capacities or

When does the human life begin?

Traditional Cultural Developmental Milestones

When does the human fetus acquire the capacity for consciousness?

Science looks at Developmental Milestones



attributes such as reason, morality, consciousness or self-consciousness, and being a part of a culturally established form of social relations such as kinship, ownership of property, or legal responsibility,” adding that the “defining features of personhood and consequently what makes a person count as a person differ widely among cultures and contexts.”⁶

“What is a person?” is a deep and important philosophical question. When most of us think of a person we think of “the man or woman on the street,” i.e. a human being who is conscious, senses, thinks, feels, behaves, has preferences and values, remembers, learns, makes decisions, communicates, and interacts. Let’s call this paradigm of personhood “the human adult.” And yet, most of us also think that this paradigm does not go far enough. We believe babies and children are persons too. This is probably because they have the rudimentary cognitive capacities that are developed to their greatest extent in the human adult. At the same time, however, we have learned from the biological sciences that the human zygote has none of these cognitive capacities. And so, sometime between fertilization and natural birth the developing human organism acquires a set of basic cognitive capacities that will eventually distinguish it as a human adult from its nearest genetic relative—the chimpanzee. There is one of these cognitive capacities that is easy to understand and appreciate, upon which the others probably depend, and which can serve as our marker of personhood. This is the capacity for *consciousness*.

We all have an intuitive grasp of consciousness. When we are asleep at night and not dreaming, we are unconscious, and when we wake up in the morning we are conscious. When we are unconscious, we don’t know that anything is happening, but when we are conscious we know that something is happening. William James, known as America’s first psychologist, conceived of consciousness as a stream of experience.⁷ Now, with this useful intuition, imagine that there was a time when you were in the womb and your brain was so immature that it could not enable consciousness. You had never before been conscious! Now further imagine that your brain, especially your cerebral cortex and thalamus, became large, complex, connected, and structured enough that it enabled consciousness for the first time. Let’s call this event “the onset of consciousness” in the individual human organism. Yes, it was probably a fuzzy or amorphous experience in one or more modalities (hearing, sight, touch, pain, etc.), but nevertheless the “lights were finally on in the house.” I contend that at this time in the 21st century the best answer to the philosophical question “What is a person?” is “any human organism

with the current capacity for consciousness.”

An obvious retort to this idea is “That would mean that whenever we go to sleep, we are not persons, but whenever we awaken, we are persons.” This challenge fails to recognize the difference between the capacity for and the state of consciousness. Not until the organism is conscious for the first time may we conclude that it has the capacity for consciousness. After that, the capacity perseveres because it is tied to underlying brain processes, as we shall see later. And so, the sleeping human organism has the capacity for consciousness and is still a person. A related challenge is “That would mean that a person in an extended coma is not a person, and this entails a contradiction.” By the definition I have presented the person who *permanently loses the capacity for consciousness* would become a human who is not a person. He or she would lack the same defining property of personhood that they lacked earlier as a zygote, embryo, or fetus. These considerations lead to a general principle of “Never Before or Never Again.” This means that *a human organism is not a person when it has never before or will never again possess the capacity for consciousness*.

Another objection to my definition is that the onset of consciousness must be a process, not a discrete event—a dimmer knob instead of an on-off light switch. This could be, but I doubt it, and if so, it matters little. For now we may just assume that the onset of consciousness is similar to waking up in the morning. There is that first moment when we just know we are aware and are experiencing the world.

Now that we have answered the philosophical question “What is a person?” we may move on to the scientific question of “When in the course of development does the human organism acquire the capacity for consciousness?” One of the most important scientific discoveries of the last 400 years, right up there with the discoveries of the laws of motion, evolution, DNA, and relativity, is the discovery of the dependence of experience and cognitive functions on brain structure. Speaking cautiously by calling it an “astounding hypothesis” in book title form, Francis Crick, the co-discoverer of DNA, proposed that “You, your joys and your sorrows, your memories and your ambitions, your sense of personal identity and free will, are in fact no more than the behaviour of a vast assembly of nerve cells and their associated molecules.”⁸ Over and over this hypothesis has been supported by thousands of scientific studies, and there appear to be no disconfirmations of it. And so, the onset of consciousness must depend on or be tied to brain structures and processes. This finding forms part of the naturalistic

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or materialist view of the world. Even dualists and idealists admit that the brain is absolutely necessary for the mind to function.

So, when does the onset of consciousness occur in the fetus with respect to conception? In the *Roe v. Wade* decision of 1973, writing for the majority, Justice Harry Blackmun wrote, “We need not resolve the difficult question of when life begins. When those trained in the respective disciplines of medicine, philosophy, and theology are unable to arrive at any consensus, the judiciary, at this point in the development of man’s knowledge, is not in a position to speculate.”⁹ The problem here is that Blackmun and his SCOTUS colleagues were addressing the wrong question—“When does life begin?” Depending on perspective, there were two correct answers to that question that were already known in 1973. Life on the Earth began 3.5 billion years ago. The life of a unique human organism, however, does begin at conception. But the right question for the SCOTUS would have been, “When does the human fetus become a person?” Or as we have defined it here, “When does the human fetus acquire the capacity for consciousness?” Perhaps in 1973 there was not a consensus on that question, but now experts in medicine, biology, neuroscience, and philosophy are honing in on the answer. I will first cite the findings and opinions of experts in fetal development of the brain and then tie these together to reach general conclusions.

Feeling pain is clearly one aspect of consciousness, and the onset of pain may be viewed as a proxy for the more general onset of consciousness. In a 1987 article in the *New England Journal of Medicine*, K. J. S. Anand and P. R. Hickey summarized findings linking brain structure and pain perception in fetuses and neonates.¹⁰ “The timing of the thalamocortical connection is of crucial importance for cortical perception, since most sensory pathways to the neocortex have synapses in the thalamus. Studies of primate and human fetuses have shown that afferent neurons in the thalamus produce axons that arrive in the cerebrum before mid-gestation. These fibers then ‘wait’ just below the neocortex until migration and dendritic arborization of cortical neurons are complete and finally establish synaptic connections between 20 and 24 weeks of gestation.” They continue, pinpointing when, precisely, these neural connections are made:

Functional maturity of the cerebral cortex is suggested by fetal and a neonatal electroencephalographic patterns, studies of cerebral metabolism, and the behavioral development of neonates. First, intermittent electroencephalographic bursts in both cerebral hemispheres are first seen at 20 weeks gestation; they be-

come sustained at 22 weeks and bilaterally synchronous at 26 to 27 weeks. By 30 weeks, the distinction between wakefulness and sleep can be made on the basis of electroencephalographic patterns. Cortical components of visual and auditory evoked potentials have been recorded in preterm babies (born earlier than 30 weeks of gestation), whereas olfactory and tactile stimuli may also cause detectable changes in electroencephalograms of neonates. Second, in vivo measurements of cerebral glucose utilization have shown that maximal metabolic activity is located in sensory areas of the brain in neonates (the sensorimotor cortex, thalamus, and mid brain- brain-stem regions), further suggesting the functional maturity of these regions. Third, several forms of behavior imply cortical function during fetal life. Well-defined periods of quiet sleep, active sleep, and wakefulness occur in utero beginning at 28 weeks of gestation.

Several years later in 1998, D. Gareth Jones from New Zealand summarized relevant findings in his article in the *Journal of Medical Ethics*.¹¹ “Gertler had proposed 22-24 weeks gestation for ‘brain birth’ on the basis that the neocortex begins producing EEG waves at this time.” “In similar fashion, Burgess and Tawia defined a functioning brain as one where there is identifiable activity of the kind that normal adult brains (cortices) indulge in. They argue that what is required is a critical minimum level of structural organisation, with functional components present and mature enough to perform. On the basis of EEG readings, they conclude that a fetus becomes conscious at 32-36 weeks gestation.” “Also relevant here is the issue of fetal awareness, which has been placed at not earlier than 26 weeks gestation by a 1997 working party of the Royal College of Obstetricians and Gynaecologists.”

In a paper sponsored by the Markkula Center of Applied Ethics in 2001, Dr. David L. Perry stated “Partly because of the ambiguity of fetal EEG patterns, it’s difficult to say precisely when consciousness first occurs. But somewhere between 20 and 32 weeks gestation, the cortical neurons become capable of firing in ways that make consciousness possible. The brain-stem and nervous system may function before that time, and there may be reflex reactions to stimuli, but there is no one ‘there’ yet to experience sensory inputs—the lights are on, but nobody’s home.”¹²

In a 2010 newspaper article health reporter Megan Ogilvie nicely summarized much of the scientific work on the onset of consciousness: “What is known is that consciousness cannot occur until the peripheral nervous system joins up with the cerebral cortex, the region of the brain responsible for memory, awareness and language. That connection between the

sensory receptors—what allows us to sense the outside world—and the higher brain doesn't fully occur until about the 26th to 28th weeks of gestation.”¹³

Again, focusing on pain perception in their 2005 article in the *Journal of the American Medical Association*, Lee, Ralston, and Drey concluded: “Pain is an emotional and psychological experience that requires conscious recognition of a noxious stimulus. Consequently, the capacity for conscious perception of pain can arise only after thalamocortical pathways begin to function, which may occur in the third trimester around 29 to 30 weeks’ gestational age, based on the limited data available.”¹⁴

Christof Koch, one of the world's leading neuroscientists who worked for many years with the late Francis Crick, has said “But when does the magical journey of consciousness begin? Consciousness requires a sophisticated network of highly interconnected components, nerve cells. Its physical substrate, the thalamo-cortical complex that provides consciousness with its highly elaborate content, begins to be in place between the 24th and 28th week of gestation. Roughly two months later synchrony of the electroencephalographic (EEG) rhythm across both cortical hemispheres signals the onset of global neuronal integration. Thus, many of the circuit elements necessary for consciousness are in place by the third trimester.”¹⁵

A comprehensive review of the relevant scientific literature remains to be done. However, based on the evidence presented here, general conclusions may be reached. The best estimate for the onset of consciousness in the fetus (especially the beginning of pain perception) is at 27 weeks gestational age, which is roughly 25 weeks from conception. (Gestational age is defined as the number of weeks since the beginning of the pregnant woman's last menstrual cycle. The actual age of the embryo will be less than gestational age.) Greater precision in specification of the onset of consciousness is likely to be achieved with advances in neuroscientific theory and methods. Functional magnetic resonance imagery (fMRI) of the developing fetus will undoubtedly play a great role in the next decade.

Although the available scientific evidence does not yet enable a precise answer to our question “When does the human fetus acquire the capacity for consciousness?” we have an adequate answer for now. The formulation of moral rules and laws cannot wait on a final answer from science, if there is such a thing as a final answer. Blackmun and the SCOTUS realized this in 1973 when they laid out the shaky trimester plan that depended so heavily on the concept of viability of the fetus. But since the early 1970s

religion has withered, philosophy and science have advanced, and we are now at a point when we can do much better. A valid personhood amendment today would go something like this:

For purposes of this Constitution and relevant laws, a ‘person’ shall be construed to be any human organism that has the current capacity for consciousness. Based on the best available scientific research and theory, the beginning of personhood in the human fetus shall be construed as the start of the 25th week post conception. Furthermore, the end of personhood shall be construed as the permanent loss of the capacity for consciousness in any particular human organism. This amendment should be reconsidered and updated with advances in science after 25 years.

Human organisms are unique, and surely they do not all become persons at the same time since their conceptions. They are not robots designed to unfold on an invariant schedule. Imagine a graph that accurately describes brain development with respect to consciousness for a sample of a thousand human fetuses. On the X-axis is plotted time in weeks since conception (considered at the end of each week), and on the Y-axis is plotted the percentage of fetuses in the sample that have acquired the capacity for consciousness. The graph is likely to resemble an S-shaped curve. It is reasonable to expect data points at zero percent on the Y-axis for the weeks 1-24, marks at one hundred percent on the Y-axis for weeks 28-39, and marks at intermediate percentages at weeks 25, 26, and 27. Drawing a vertical “personhood line” at the 24th week since conception, such that fetuses before then are classified as nonpersons and fetuses after then are classified as persons, is a conservative approach designed to minimize false negatives, i.e. the classification of a particular fetus as a nonperson when it is really a person, which could lead to aborting a fetus “too early.” In this approach doctors could use “the fetus is at least 25 weeks old” as a proxy for “the fetus has acquired the capacity for consciousness and is now considered a person.” And doctors should be able to make sound estimates of the age of the fetus based on physical tests, scans, and interviews of the pregnant woman.

The philosophical and scientific foundation for the pro-person position is now secured. Both the pro-life and pro-choice positions are misguided. The zygote, embryo, nor early fetus are persons as here defined, as the pro-lifers have suggested. But contrary to the pro-choicers, the late fetus is indeed a person. In alignment with this new pro-person position I suggest these moral principles and cultural changes:

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1. No human rights, including a right to life, should be assigned to the human organism during development before it becomes a person. And so, a woman should be able to remove or kill the zygote, embryo, or fetus inside her before it becomes a person for any reason at all without penalty to her or to others who help her.
2. Human rights, including a right to life, should be assigned to the human organism during development when it becomes a person. And so, a woman should not be permitted to remove or kill the fetus inside her after it becomes a person without penalty to her or her helpers, unless she has a *very good reason* that could only be that continuing the pregnancy would pose significant risk of permanent harm or death to her.
3. Abortions should be provided only by licensed medical practitioners under safe conditions.
4. It should be against the law for a woman to perform a self-abortion, get an abortion from an unlicensed practitioner, or to get a late abortion for any reason other than the *very good reason* specified above, or for any other person to cooperate in or enable these acts. No person should have a right to privacy to commit illegal acts, even if the act happens to be an illegal abortion.
5. A violation of abortion laws should carry a penalty of one year and one day in jail. This would make the crime a felony.
6. Legal abortion should be accessible, free, quick, private, and safe.
7. Gradually cultural changes can and should be

made to reflect the new understanding of personhood. Only after their fetuses become persons, parents should name their fetuses, and should talk, read, and sing to their fetuses. Perhaps eventually, birth certificates can be replaced by personhood certificates, with citizenship in the country established at date of personhood.

The pro-person position, as I have outlined it in this essay, recognizes the late fetus and the host woman both as persons with human rights. When these rights come into conflict, as can occur during the last 15 weeks of pregnancy, then the state must intervene through a clear constitution, laws, and/or policies to resolve the conflict. The pro-person position provides a specific path for resolution. The pro-life position has been mistaken from the start. It is indefensible to invoke a magical “ensoulment” and to thereby classify the zygote as a person. While more reasonable, the pro-choice position is also off the mark. It has relied on obsolete notions such as trimesters, viability, and privacy implied in or lifted from *Roe v. Wade* and the premise that a fully conscious fetus is not a person. On the other hand, the pro-person position corrects all these errors and is based on a solid philosophical and scientific foundation, which can still change as new evidence, reasons, and arguments are brought forth. In summary, the core idea of the pro-person position is that the human organism becomes a human person when it acquires the capacity for consciousness at approximately 25 weeks after conception. **S**

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How to Teach Evolution to Religious Students

BY SURAT PARVATAM

IN A STUDY CONDUCTED AT A PUBLIC COLLEGE IN THE United States, only 50 percent of the students said that they believe in evolution. More broadly, a Gallup poll found that only 44 percent of adult Americans said that they believe humans were created by God and that evolution had no part in the process.¹ According to a Pew Research Centre survey, 60 percent of Americans believe that “humans and other living things have evolved over time,” while one-third of them reject evolution and believe “humans and other living things have existed in their present form since the beginning of time.” About a quarter of the adult American population (24 percent) also thinks that “a supreme being guided the evolution of living things for the purpose of creating humans and other life in the form it exists today.”²

Apart from climate change, evolution is currently the most charged and debated topic in the public sphere. This is mainly because many students and adults feel that there is a conflict between their religious beliefs and acceptance of evolution. Unless efforts are taken by scientists and educators to change the way we communicate about evolution, this resistance to accepting evolution will persist and may even increase.

Reasons for Disbelief

In a study conducted in a large Midwestern university, almost 30 percent of students in junior- and senior-level biology courses said that they do not accept evolution.³ Many students in the study reported being religious, although they varied in their strength of religious identification and the type of faith practiced. Several studies have tried to determine the role of religion in accepting or rejecting evolution. Results from multiple studies strongly suggest that it is one of the primary factors predicting a person's beliefs about evolution. “There is often the inaccurate perception that there are only two extremes,” said Dr. Sara Brownell (in an email to me), a neuroscientist at Arizona State University turned full-time education researcher who has worked extensively on how to reduce this perceived gap: “one can either accept evolution and be an atheist or one can be religious and reject evolution.”

The good news is that although religion plays a major role, another factor is how well a person understands evolution. A 2017 study by University of Pennsylvania scientists⁴ surveyed high school students and asked them questions on their knowledge of evolution, such as “There is a population of fish that can

CREATIONISM CONTINUUM



Illustrations by Simone Rein

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eat minnows. The minnows move really fast and are hard to catch. In the next generation, what kind of fish who eat these minnows are more likely to survive?” The students were also tested on their views on acceptance and rejection of evolution, where they were asked questions about the origin of plants and animals. Answers ranged from “They were created by God in their current form; they developed through natural processes guided by God; they developed through natural processes set up by God but then continued on their own; or that they developed entirely through natural processes.” Then they analyzed the degree of acceptance of evolution among the students. To measure this, the students were asked to select which one of the four options best described what they thought: (1) human beings have developed over millions of years from less advanced forms of life, but God guided this process; (2) human beings have developed over millions of years from less advanced forms of life, but God had no part in this process; (3) God created human beings pretty much in their current form in the last 10,000 years or so; (4) God set up the laws of nature, which then unfolded on their own. The researchers then tested to determine whether there was a relationship between the degree of acceptance of evolution and knowledge of evolution. The study found that for each one point increase in the test for knowledge of evolution, the students were 1.2 times more likely to believe in evolution compared to the creationist theory. Thus, the level of knowledge about evolution seemed to influence whether they accepted or rejected evolution.

The two main factors that appear to influence the acceptance of evolution are religion and understanding concepts in evolution.

Difference in Religious Beliefs of Students and Teachers

Although more than 50 percent of the students in U.S. colleges and universities are religious, only 25

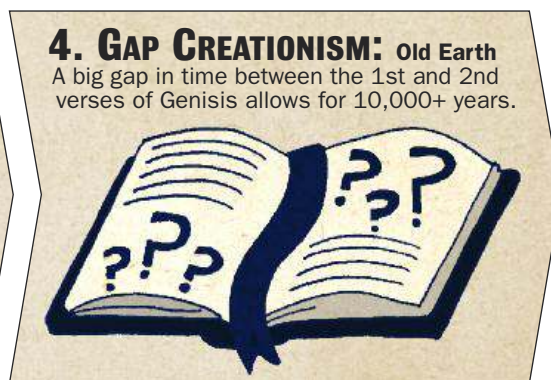
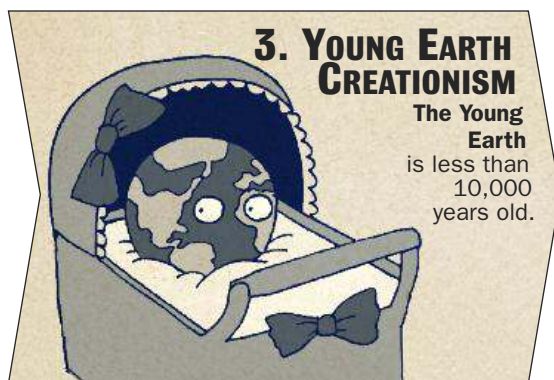
percent of biologists and 10 percent of evolutionary biologists are religious.⁵ Why does the religion of teachers and professors matter?

Studies show that current and previous religious beliefs of educators can determine how willing they are to address the conflict students perceive between religion and science, particularly the theory of evolution. As atheist educators had never experienced this conflict themselves, they were dismissive of this clash amongst their religious students, and some even went so far as to make disparaging comments about religion.

Not acknowledging religious beliefs among students, and not discussing these potential conflicts, can further alienate religious students who may feel a sense of isolation in biology classes. A recent study proposes the use of “religious competence” to bridge this gap between secular instructors and religious students while teaching evolution.⁶

How to use Religious Competence While Teaching Evolution

Cultural competence refers to the appropriate use of cognitive and behavior skills to interact with members of different cultures. It is practiced by doctors to teach patients, employers to deal with employees, and in other situations where one community has to interact with and understand another despite differences in race, ethnicity, country, LGBTQIA status, or religion. In a recently published study, researchers from Arizona State University proposed the use of religious competence to teach evolution to religious students.⁶ “There are ways for many religious beliefs to be compatible with evolution and there are many examples of individuals who have reconciled this perceived conflict and both accept evolution and hold religious beliefs” noted Dr. Brownell, the author of the study. They proposed six ways to bridge this gap.



5. DAY AGE CREATIONISM: Old Earth

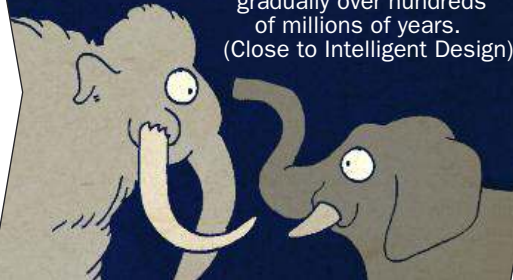
The six days in Genesis are much longer periods—from thousands to billions of years.



**THOUSANDS
= TO BILLIONS
OF YEARS**

6. PROGRESSIVE CREATIONISM

Old Earth—God created new forms of life gradually over hundreds of millions of years. (Close to Intelligent Design)



1. *Acknowledge the conflict.* Accepting and acknowledging that a conflict exists in the minds of religious students is the first step. It makes them feel included in the group.
2. *Explore students' views on evolution and religion.* Discuss the different religious ideologies of the students and their views on evolution and religion. Apart from gauging the mindset of the students, it also makes the students analyse their own and their fellow classmates' views on the subject.
3. *Teach the spirit of science.* "Using the process of science is critical to understanding science as a whole," says Dr. Brownell. Having general discussions on which scientific methods are used to test a hypothesis; what determines if a piece of information is fact, theory, or hypothesis; and on the limits of scientific knowledge can help students to understand scientific methodology. Studies show that understanding the scientific method and accepting evolution are positively correlated⁷⁻¹⁰ Another study, conducted in 2018 among school students (14-16 year-olds) in the UK, found that acceptance of evolution in students was negatively correlated with low aptitude and lack of knowledge about science.¹¹ The authors of that study propose that teachers focus on teaching scientific methodology and evidence-based research rather than focus on religious belief systems to increase evolution acceptance.
4. *Different interpretations of Bible.* Instructors can introduce different viewpoints on the relation between religion and evolution, and can tell the students that there could be different interpretations of a religious text. In another study conducted in a medium-sized private university in the Midwest, the instructors told first-year students taking a course titled "The History and Theory of Evolution," that specific parts of the Bible need not be interpreted literally.¹² For ex-

ample, the Bible states that creation unfolded in six days. In this case, this may not necessarily mean six earth days but rather could be extended periods of time, even billions of years. Such reinterpretations can reduce the perceived conflict between religion and evolution.

5. *Presenting positive role models.* In a 2017 study conducted in an introductory biology course at a large public university located in the Southwest,¹³ students interacted with two guest lecturers: one, a biologist and devout Roman Catholic, discussed his own experience of how he reconciled faith and evolution. The second was a female evolutionary biologist who discussed the current research in evolutionary biology and also provided students with a female role model. They were also shown video lectures and different viewpoints of religion were reviewed. The instructors also discussed how many religious leaders and scientists have chosen not to read the Bible literally. In the beginning of the course, 50 percent of the students perceived a conflict between religion and evolution; by the end, only 26 percent of the students reported a conflict. Margaret, one of the religious students in the class, responded, "[The religious scientist] helped me to see that it is possible to have religion and science both within your life. It helped me realize that I do not necessarily have to pick one over the other." Thus, introducing students to religious role models who accept evolution, or scientists who are religious, can foster the idea in students that both can coexist.
6. *Reducing misconceptions regarding evolution.* Many students have misconceptions and stereotypes about evolution. Identifying these misconceptions, having discussions and lab exercises to challenge misconceptions, and interpreting data with an instructor to understand the principles that underlie evolutionary theory can also reduce the bias against it.

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The "Creationist Continuum" was adapted from *Evolution vs. Creationism: An Introduction*, second edition, 2009, by Eugenie C. Scott

Inclusive Teaching Benefits Science

Why should educators make all this effort to teach evolution to religious students? Alienating any community of students based on their race, caste, gender, preference, or religion is detrimental for science as a whole. For example, African-American students are generally more religious than others; according to the National Science Foundation, out of a total of 200 doctorate degrees awarded in evolutionary biology in 2016 in the U.S. only four were awarded to African-American students.¹⁴ By not acknowledging the presence of conflict between religion and acceptance of evolution, and by not developing teaching strategies to include everyone, large sections of populations may not be

considering scientific careers. "We have found that religious students often struggle with reconciling biology with their religious identity, and this may in part explain the underrepresentation of religious individuals in science," Dr. Brownell concludes.

With the rise of "fake news" and the relatively high non-acceptance of sound scientific concepts, it has become imperative for science educators and communicators to modify their teaching and communication strategies to include everyone in the discussion. Using cultural competence strategies such as these in everyday discussions, and especially in classrooms, can help reduce the negative attitude toward evolution. **S**

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The Arguments for Creationism and the Arguments for Evolution

A Study in Contrasts

BY RALPH M. BARNES

PERSUASIVE ARGUMENTATION IS PART OF THE HUMAN experience, and it is just as much a part of science as it is part of other human institutions. Scientists try to convince other scientists of their hypotheses. Scientists and science journalists also try to persuade members of the general public of various scientific claims. Scientists and science journalists are not the only individuals who make persuasive arguments about science, however. Those without any scientific credentials can, and do, argue for and against certain scientific claims. Others who have scientific credentials, but operate outside of the mainstream scientific community, generate persuasive arguments for and against certain scientific claims. For example, molecular biologist Peter Duesberg has scientific credentials, but he has argued for years that HIV does not cause AIDS. Michael Behe also has scientific credentials, but he has argued for a claim very much outside the scientific mainstream: intelligent design creationism (ID).

Several years ago, I became curious as to whether those in the scientific mainstream argued for their position in the same way that those outside the scientific mainstream argued their case. For instance, are the types of arguments used by mainstream scientists similar to the types of arguments employed by creationists? A little digging revealed that there was already some information on this topic. Weaver¹ found that the two sides of the Scopes trial argued their case in different ways. Stempien and Coleman² analyzed the arguments used in five different oral debates about the issue of origins. They concluded that creationists were suc-

cessful in these debates because their arguments differed in form (but not content) from the arguments used by proponents of evolution. Rebecca Church and I³ described the ways that proponents of creationism and evolution differed in the manner in which they framed their arguments in terms of proof and certainty. They noted that creationists had a penchant for claiming that proponents of evolution had referred to evidence for evolution as “proof” of evolution. Creationists would then point out that the so-called proof was not 100% certain and, therefore, it wasn’t actually proof at all. Creationists concluded that scientists are either liars, or they are floundering because they can’t produce any proof to support their position.

Some of these studies looked at court transcripts or oral debates that were decades old (e.g., the Weaver study as well as the Stempien and Coleman study). The Barnes and Church study analyzed texts found in fairly contemporary websites. However, that study didn’t look at the specific kinds of persuasive arguments generated by the various sides of the origins controversy. Because there were certain unanswered questions regarding the nature of persuasive arguments about origins, Church, Samuel Draznin-Nagy, and I decided to analyze the contemporary websites that persuasively argued for either creationism, ID, or evolution.⁴ Our main goal was to identify all the persuasive arguments, and then describe them in terms of type and topic. It was our hope that this approach would shed some light on the specific manner in which creationists and proponents of evolution argue for their positions.

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The Study

My colleagues and I used Google search to select the most commonly visited websites related to “scientific” creationism, ID, and evolution. We did not use sermons, PowerPoint presentations, audio, or video files. All of the websites we chose were advocacy sites that presented lists of arguments arguing for one of three positions: creationism, ID, or evolution. We ultimately selected 72 websites (including 34, 15, and 23 websites promoting creationism, ID, and evolution, respectively). We consider ID a type of creationism rather than an alternative to creationism.⁵ However, ID was created as a strategy to use changes in terminology to overcome legal hurdles that have kept creationism out of the public schools.⁶ For this reason, it seemed likely that ID and non-ID forms of creationism might use different arguments and rhetorical strategies. Our choice in keeping these two categories distinct allowed us to determine whether proponents of ID use different kinds of persuasive arguments than individuals from other creationist traditions.

Once we selected the websites we would analyze, we had to identify the persuasive arguments in those websites (see Table 1). In some cases, our efforts to locate and identify arguments were made easy because some websites listed arguments by bullet points or numbers, while others used paragraphs or outlines to separate unique arguments. Once the arguments were located, our next job was to choose a systematic method for dissecting and labeling the arguments. Toulmin⁷ created a useful and widely used system in which an argument may be divided into its component parts, which include data and claim. Data includes the evidence or reasons given in support

Table 1. Frequencies of Arguments

POSITION OF WEBSITE	NUMBER OF WEBSITES	NUMBER OF ARGUMENTS
Creationism	34	638
ID	15	104
Evolution.....	23	184
Total	72	926

of a claim, while a claim is the conclusion that is supported by the data. For instance, consider the argument “Because dinosaur and human footprints were found together at the Paluxy River we know that humans and dinosaurs lived together at the same time.” The data would be the footprints and the claim would be “humans and dinosaurs lived together at the same time.” This example illustrates that the data may include incorrect information or faulty reasoning. In labeling part of an argument as “data” we do not imply that the data is either correct or trustworthy—merely that it has been used as support for a claim.

Once we had identified the data and the claim of each of the arguments, it was our task to describe them. The data component of each argument provided us with the argument type while the claim of each argument provided us with the argument topic. As can be seen in Tables 2 and 3, we identified 8 unique argument types and 8 unique argument topics.

The names and the general forms of the argument types are presented in Table 2. Some of the argument types require some additional explanation.⁸

Table 2. Summary of the Rubric for Argument Type.

CODE FOR TYPE.....	GENERAL FORM
1 Authority: Religious	Because Bible/religious figure said so, therefore claim.
2 Authority: Science	Because a scientist said so, therefore claim.
3 Empirical: Presence	Because of some observed empirical datum, therefore claim.
4 Empirical: Absence	Because some empirical datum has not been observed, therefore claim.
5 Appeal to Law.....	Because of Law X, therefore claim.
6 Reason: Complexity	Because X is irreducibly complex/has specified complexity, therefore claim.
7 Reason: Paley	Because life is like a watch, and a watch implies a watchmaker, therefore claim.
8 Reason: Other	Because of some type of formal, informal, or folk reasoning, therefore claim.

Examples of argument type 5 nearly always referred to the first and second laws of thermodynamics. Appeals of Empirical: Absence included such arguments as “Because no missing links have been found, evolution didn’t happen.” The focus of these arguments was not on empirical evidence that had been discovered, but on missing or absent empirical evidence. Appeals to reason rarely (if ever) relied on deductive syllogisms. Instead, the appeals to reason found in our selection of websites commonly employed informal or folk reasoning examples. We felt that it would be worthwhile to separate the category of reasoning into subcate-

gories. The Reason: Complexity argument type referred to arguments based on data that life is irreducibly complex or has some level of specified complexity. The Reason: Paley argument refers to William Paley’s teleological argument (AKA the watchmaker analogy). The Reason: Complexity argument is similar to the Reason: Paley argument, but we only identified data as Reason: Complexity if the data explicitly referred to concepts such as irreducible or specified complexity. The Reason: Other category captured all the examples of appeal to reason that were not related to either complexity or Paley’s argument.

Table 3. Summary of the Rubric for Argument Topic.

CODE FOR TOPIC	GENERAL FORM
1 DWM	Because data, therefore species X and Y descended/did not descend from a common ancestor.
2 Mechanism of DWM	Because data, therefore mutations/natural selection can/cannot be responsible for descent with modification.
3 Age	Because data, therefore the earth/universe was created X years ago.
4 Biogenesis.....	Because data, life must have been created by natural/supernatural means.
5 Origin of Matter/Universe	Because data, matter must have been created by natural/supernatural means.
6 God Exists	Because data, therefore God/a Designer exists.
7 Bible Creation Story.....	Because data, therefore the origin story in Genesis is accurate.
8 Other.....	Because data, therefore claim.

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The names and the general forms of the argument topics are listed in Table 3. Some of these argument topics require a few words of explanation. Arguments that an Intelligent Designer exists were coded as argument topic 6. The intelligent designer was explicitly identified as the Christian god in many, but not all, of the creationist and ID websites. However, given that a goal of the ID movement is to eliminate religion from their teaching materials in order to open the door for the introduction of creationism in the public schools, it is likely that the term Intelligent Designer is a synonym for God in all creationist writings.⁹ Topic 7 (Bible creation story) included such things as the Genesis creation account, the story of Adam and Eve, Noah's flood, and God's behavior as described by the Bible.

Samuel Draznin-Nagy and I independently coded both the type and topic of each of the arguments based on the rubrics for the categories listed in Tables 2 and 3. The summary of the results for the types of arguments can be found in Figure 1.¹⁰ When looking at the type data, the first thing that is evident is that pro-evolution websites overwhelmingly use arguments based on positive empirical evidence. In contrast, appeal to reason was the most common argument type for both creationist and ID websites. Websites that identified themselves as promoting ID did show a different pattern of argument types than other creationist websites. Specifically, the ID websites focus more narrowly on appeals to reason, whereas creationist websites frequently employed appeals to authority (e.g., the Bible says so) as well as appeals to empirical absence (e.g., there are no missing links) and empirical presence (e.g., the supposed dinosaur and human footprints at the Paluxy River).

The summary of the results for the topics of arguments can be found in Figure 2. When looking at the summary of the topics, it is evident that the websites promoting evolution are very narrowly focused on the topic of descent with modification (DWM). In fact, 171 out of the 184 arguments found in websites promoting evolution deal with this topic. While descent with modification is the most common topic in creationist websites, it accounts for less than 40 percent of the creationist arguments. The second most popular topic in websites promoting creationism involves the details of the Biblical creation story. ID websites stand in stark contrast to both evolution and creationist websites, in that the overwhelmingly most common topic in ID websites is the existence of God.

Figure 1. Percent of argument types as a function of document goal

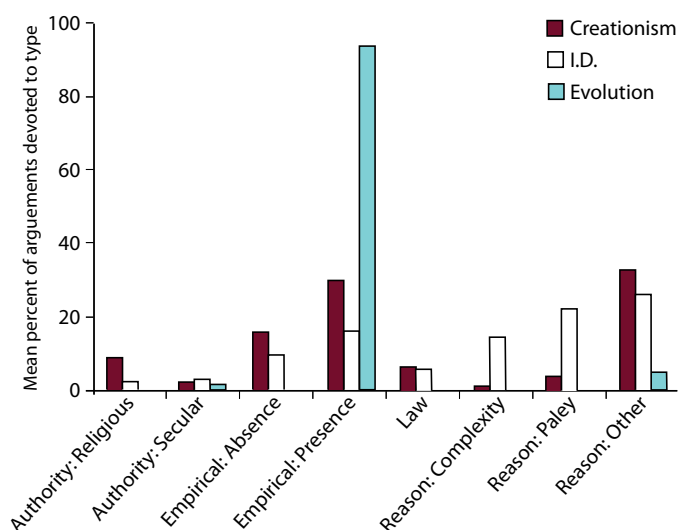
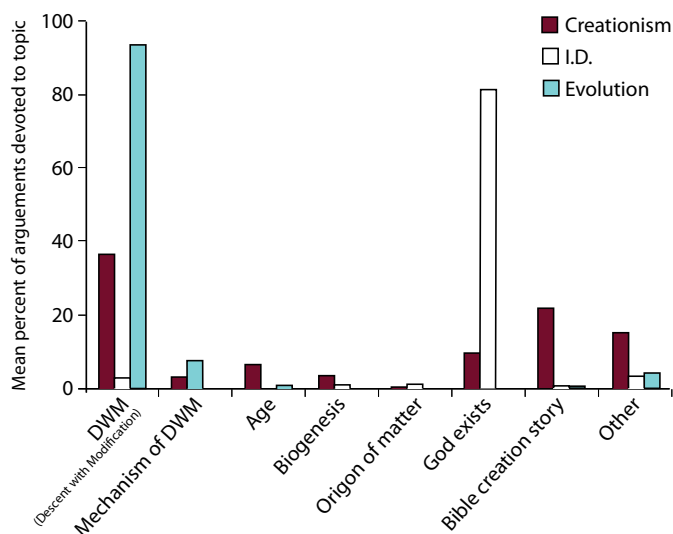


Figure 2. Percent of argument topics as a function of document goal.



Discussion

There are several lessons to be learned from this analysis. It is well known that creation "scientists" do not gather and publish empirical evidence in the same way that mainstream scientists do. Now we see that they don't generate or use persuasive arguments in the same way that scientists do. Those arguing for creationism differ from those arguing for

**“A thrilling and fascinating book,
which could change your view of
human history and human destiny.”**

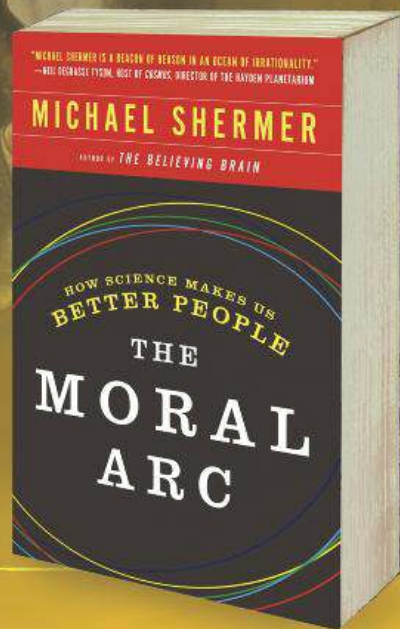
— Steven Pinker, author of *The Blank Slate*

**“An honest, clear account
of morality and justice that makes those theoretical
concepts come alive as ubiquitous real-life choices.”**

— Jared Diamond, Pulitzer Prize-winning author of
Guns, Germs, and Steel and *The World Until Yesterday*

**“Michael Shermer is a beacon of
reason in an ocean of irrationality.”**

— Neil deGrasse Tyson



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a scientific position in terms of both the types and topics of their arguments. In terms of types of arguments, scientists overwhelmingly rely on appeals to positive empirical evidence. In contrast, ID creationists tend to rely on appeals to reason, while other creationists rely on a wide range of appeals to support their claims.

In terms of the topics of the arguments, scientists narrowly focus on descent with modification. However, creationist websites address a much wider range of topics. For instance, many creationist websites argue for things such as a very young earth/universe, a literal Garden of Eden, a creation that took a literal week to complete, the existence of God, and a worldwide flood. Many creationists aren't narrowly attacking the theory of evolution so much as they are attacking natural history in general. One might wonder why the pro-evolution websites spend so little time responding to claims that the earth is less than 10,000 years old or that a worldwide flood once covered the planet. Why is there a disconnect between the topics found in pro-creationism and pro-evolution websites? Scientists might focus on descent with modification because creationists vocally reject the idea of descent with modification as an explanation for the origin of species, and creationists have repeatedly put scientists in a position in which they have had to defend the inclusion of evolution in public school curriculum. Alternately, it may be that scientists think that some of the creationist claims (e.g., young earth, worldwide flood, etc.) are so preposterous that they don't deserve to be taken seriously. It is also possible that scientists are responding to creationist rhetoric in which "Darwinism" and Darwinists are constantly vilified. Self-proclaimed "scientific creationists" like to paint themselves as fans of science in general and enemies only of what they claim is bad science (i.e. evidence supporting Darwin's theory).

Of the three groups, ID creationists have the least interest in the topic of descent with modification. In fact, they don't seem to be very interested in the natural world at all: the most common focus of their arguments is on the question of the existence of the Christian god. The goal of the ID creationist movement was to make an end run around legal decisions such as *McLean v. Arkansas* and *Edwards v. Aguillard* that blocked creationism from public school classrooms.¹¹ The current analysis reveals one way that the ID creationist movement was poorly designed to achieve its goals. Self-described ID creationists seem to be narrowly focused on the claim that God (who they

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refer to as the Intelligent Designer) exists. The most common argument found in the ID websites takes the general form, “because irreducible/specified complexity, therefore God exists.” In contrast, other creationists make many claims about the natural world (e.g., the age of the universe, the origin of species, flood geology, etc.). ID creationists argue that the world supposedly contains evidence of a certain type of complexity, and from that starting point, they leave science and the natural world behind to claim that God exists. Rather than helping creationists get one step closer to inserting creationism into the public schoolrooms, the ID approach was actually a step backward. It has even less in common with true science than the “scientific creationism” approach used by the young earth creationist organizations (e.g., Answers in Genesis, Institute for Creation Research). The present analysis reveals that the ID creationism approach has been, and continues to be, primarily a program meant to prove the existence of God. It therefore bears more resemblance to natural theology and apologetics than it does to science. Seen in this light, it is surprising that ID creationists once believed that ID would

somehow help them achieve their goals.¹²

I have shown that creationism and ID creationism differ from mainstream science in terms of the types of arguments they rely on and the topics they focus on. Creationists are not the only ones who have attacked mainstream science, however. Other groups have challenged, and continue to challenge, mainstream science positions (e.g., AIDS denialists and those opposed to vaccination, i.e., anti-vaxxers). If we analyzed the arguments of those groups and compared their arguments to related arguments generated by mainstream scientists, would we find a pattern of results that mirror those of the current study? That is, do creationists have a unique way of arguing for their position, or is their approach characteristic of other pseudoscientific movements? Members of my laboratory at Montana State University are currently analyzing arguments generated by four groups that have challenged the scientific mainstream: AIDS denialists, climate change denialists, the anti-GMO movement, and anti-vaxxers. We hope that this research program will reveal something about the way these groups are similar to or differ from creationist groups. **S**

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Meeting Our “Enemies” Where They Are

The Advantage of Understanding Your Adversary’s Arguments

BY ANDREW COOPER-SANSONE

THEY MARCH, TWENTY OR SO STRONG, SPILLING grotesque, hate-filled rhetoric into the streets. Multi-colored picket signs remind all passersby that a fiery eternity awaits them after death if they do not fear god’s wrath. Always protesting with a clear purpose, from funerals of mass shooting victims, to fallen soldiers, and pop icons, they deliberately scrape the exposed nerves of grieving families and friends of the deceased.¹ These protestors remind artists, musicians, soldiers, homosexuals, apostates, and anyone who finds fault with their position that, by their mere existence, they are testing an angry god.

Sweaty-faced with terror struck eyes, he sits in front of a green screen that reads Infowars. He jumps frantically from one conspiracy theory to another, never giving any indication that he could be mistaken. He assumes that anything covered by the mainstream media is an attempt to control its viewers’ minds in order to implement a terrifying political agenda. He has thus claimed that during the 2016 presidential election, the mainstream media wanted to cover up the fact that Hillary Clinton is “an abject, psychopathic, demon from Hell that as soon as she gets into power is going to try to destroy the planet.” In fact, in nearly the same breath he suggests that Barack Obama too is a literal demon in disguise, all supported by information Jones obtained from “high up folks.”² This is a man whose Youtube channel, before recently being banned by the company, had roughly 2 million subscribers.

With black masks concealing their identities, one member of the group reads emphatically from a script. A hostage sits in a chair, bound by ropes, awaiting the gruesome fate he has come to accept. The audience watches helplessly through a screen as the group makes good on their promise and brutally executes an innocent man.

The question that inevitably arises when faced with people who will commit these sorts of wrongs is *why*? What is the reason behind these outrageous

acts? The Christian fundamentalist group known as the Westboro Baptist Church (WBC), the internet talk show host and conspiracy theorist Alex Jones, and extremist Islamist terrorists have something in common: *they believe what they say*. This fact of course extends to all manner of religious extremists, woo-peddlers, and even many medical quacks. Many of us see that this type of sincerity is at play, but we don’t necessarily recognize why that is, or what the implications of it might be. Here I want to go further and suggest that it is not simply that they believe, but rather that *they have no choice but to believe in the madness* running through their minds. They did not choose to be who they are, nor to live the lives they have, and in a very important sense, these people are victims of their own brains.

Understandably, many of us do not want to see it that way. We would rather have it that being evil (or a useful pawn for evil people) is a choice borne of libertarian free will. It is far simpler to see your ideological enemies as evildoers who revel in their malicious acts, than it is to recognize them as human beings who are unlucky to have lived the lives they have. If we hope to win these enemies over, we cannot start the conversation from a place of condescension or pure judgment; instead, we must meet them where they are, as ugly a place as that may be. And if we want to succeed in building a better world, we must convince some significant fraction of them that they are wrong, and this can only be done if we cultivate a compassionate understanding for how they have become the people, and sometimes the monsters, we see before us.

Belief and the Software of the Brain

The idea that something can have an internal logical consistency, yet still be ultimately incorrect, aides us in understanding why people commit acts which, from the outside, appear totally insane or carelessly immoral. If you believe, along with characters like

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Alex Jones, that there is a group of powerful elites attempting to control the minds and opinions of the masses through carefully orchestrated propaganda disseminated by the mainstream media, then even the most ridiculous conclusions (including Hillary Clinton and Barack Obama being actual demons in disguise) are on the table, so long as they are coming from the mouths of trusted sources outside of the mainstream. Similarly, if you believe that after your death God will torture you endlessly, with no chance of respite simply for romantically loving someone of the same sex, you suddenly become responsible for the eternal suffering of all the homosexuals you did not at least attempt to convert to God's way. So through that warped lens, it makes perfect sense to spend all your time, money, and energy explaining with as much clarity and volume as possible, as the WBC does, that "god hates fags." And if you think that there is no better way to serve the creator of the universe and help secure your place in heaven than to violently eliminate infidels, apostates, and Muslims who do not subscribe to the "proper" interpretation of their religion, as extremist Islamist terrorists do, then the internal logic of such a vile act speaks for itself. The validity of this concept stretches to many categories of crazy things that people do based on their beliefs, which are deemed so undoubtedly true, so clearly logical in their own right, that they easily lead the believer to act upon them.

This phenomenon is akin to a computer program installed in the brain that systematically alters that individual's cognitive strategy for reasoning. To be clear, we all have such software packages running on the hardware of our brains, many of them quite beneficial to our species: from heuristics and rules of thumb, to our ability to communicate using a particular set of arbitrary sounds and symbols (a language), to our understanding of mathematics, to the scientific method, and beyond. The problem is that unfounded belief can represent an especially pernicious class of neural software. Someone under the control of one of these programs is very often acting logically, but the parameters within which they do so are entirely unnatural and surreptitiously, if not explicitly, wicked. In the case of religion, these constraints are often in the form of restrictions on what questions can and cannot be asked. This means that certain doctrines are non-negotiable so they must be believed and followed without dispute. In the case of the hyperactive conspiracy theorist, these cognitive constraints might be structured as the idea that all major world events are probably the result of powerful people deviously working in the background to convince

the masses to conform to a more controllable way of being. So while someone under the spell of these belief systems may have the capacity to reason effectively, this capacity is undermined by the problematic constraints created by the neural software running their mind. There is no doubt that other socio-cultural variables are at play and these certainly contribute to why anyone acts the way they do, but sincere belief is an extremely powerful algorithm for producing specific behaviors in the world.

We too often perceive positions with which we disagree, be they political, moral, or metaphysical, not as the result of improper functioning of a thinking machine in the heads of those holding such positions, but instead as a result of that thinking machine being fundamentally different from our own. The neural program analogy is useful in understanding this distinction, in that it points to the fact that we could all be doing equally crazy things if we were unfortunate enough to have a particular program running in our heads. In retrospect, we can see how the backwards beliefs once held by persons like Islamist turned Muslim reformer, Maajid Nawaz, and pastor turned secular activist, Dan Barker, were the products of their unchosen life experiences and realizations. However, we do not see that this applies to everyone who is still believing such backwards things. In fact, even the examples of morally abhorrent behavior by the groups mentioned above should be viewed with compassion because they too are people trying to make sense of their world in the only way they know how.

This is not to say that we are all equally good or bad, but rather to acknowledge the point that we all have the potential to turn out one way or the other. Taking this view seriously means that even a truly evil person is, in many ways, a victim of circumstance. It would make things much simpler if these people were just being dishonest about their views, rather than the uncomfortable truth that they are honestly assessing their perception of reality. The truth is that they are unlucky to believe what they do, to have such a skewed view of how things work, but we cannot stop there because simply recognizing this will do nothing to stop it. To truly make a difference, we have to find an optimal strategy for deprogramming this insanity, given that such insanity is more often than not, entirely sincere. And in the above examples of Maajid Nawaz and Dan Barker, minds can be changed and lives turned around for the better.

Free Will and the Nature of Evil

There is a vast collection of philosophical literature stemming from debates regarding the reality or

illusion of free will, and the subsequent implications for moral responsibility. We need not dive into these arguments here, but recognize that whether or not free will is real (I personally believe it is fundamentally an illusion), as individuals we are not responsible for everything that makes us who we are and how we think. The fact is that none of us chose our biology or our parents. We probably had no say in where we grew up, nor the people we happened to meet there. We did not choose to be exposed to the literature or media which helped shape our personal philosophies, and we certainly did not decide exactly *how* that information would affect us.

This common thread of a lack of control over our own identity is the seed of true compassion, and once planted, such compassion quickly grows into uncomfortable places. To realize that the worst in our societies—the violent psychopaths, serial killers, sadists, and the like—are essentially victims of chance is to see that this could be one’s own fate given the right circumstances. However, it also suggests that there may be a way of fixing these individuals. It is not unreasonable to speculate that, given sufficiently advanced understanding and technological tools, we could physically alter the brains of evil people and thereby greatly reduce the probability of future evil being committed. Whether or not a future scenario of that kind is ultimately desirable is not what I am after. The point is that *compassion*, defined as *the drive to change things for the better spurred by the recognition of suffering or misfortune in another*, is a much more useful state of mind than unbound anger or depression. Dwelling in these and other negative states will only bring frustration and a desire for vengeance. If we can recognize that most evil is a result of regular people acting on extremely misguided thought processes, and that those thought processes are made possible by forces over which those people had no control, then we can begin to figure out how best to prevent that type of evil from arising in the future.

Toward an Optimal Strategy of Reprogramming

If you have ever participated in a heated debate you know that you are quite unlikely to convince your immediate adversaries that they are wrong. We all know that screaming matches, overly snide comments, and uncharitable caricatures are only going to add fuel to an unnecessary fire. Disagreements may get unavoidably heated, but making the effort to cool down and actually listen is key to making progress.

Psychological evidence regarding cognitive biases shows that, when confronted with uncomfortable

truths, people tend to dig their heels in even if they are on less than solid footing.^{3,4} Similarly, we also know from work in psychology that we tend to get distracted by strong emotions when arguing with others about moral matters,⁵ so deliberately throwing fuel on these types of fires during a debate is bound to blow up in our faces. The alternative? We need to create an atmosphere of friendly disagreement wherein we honestly want to know what the other person thinks and why. A disrespectful assault on what a person perceives as utterly central to their identity is going to fail most of the time. As noted by the professional negotiator, Daniel Shapiro, we must acknowledge a person’s deeply held beliefs and what part these beliefs play in a person’s perception of their own identity.⁶ Such recognition brings us closer to “the other” in a way that has the potential to open dialogue.

How many times have we in the atheist or skeptical community cringed after being told that we cannot possibly believe that morality is real if we do not believe that God is real? If the religious person on the other end of that claim took enough time to listen to what we have to say about matters of right and wrong, although they might still disagree with our stance, they could come to see how misguided they initially were. Given a long and honest enough conversation, they could understand our thought process and recognize that we are not just opportunistic, hedonistic, evildoers with no sense of right and wrong, but instead people very much like them who also wish to pursue an ethical life. Minds can change radically, opinions can shift dramatically, and societies can evolve given the right circumstances. The question is, how do we make these things happen for the better? What is the best strategy? My answer begins with compassion for our enemies. We need not pity nor condescend to them, but see them as potentially valuable individuals with some mixture of characteristics which, if pointed in the right direction, might make the world a better place to live.

The philosopher, Daniel Dennett, has noted that there is “simply no polite way to tell people they’ve dedicated their lives to an illusion.”⁷ So perhaps we don’t need to be polite, but we don’t need to be nasty either. I think Dennett would concede that there are better and worse, or more effective and less effective, ways of suggesting such a thing. I claim that a compassionate view of someone’s deepest held beliefs is an effective starting point. Starting with compassionate understanding can lead us to ask incisive questions in a way that actually has a chance of impacting the listener’s view. If we see someone with whom we disagree not as stupid, but instead as being under the

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control of a set of beliefs, we can respectfully point out places where their logic does not make sense to us. We can make the debate less threatening, and therefore less apt to producing the emotions which so often render such discussions counterproductive. We must also be patient, because big changes of mind are unlikely to occur after a single conversation. The value of a single conversation lies not in the illusion that we will always succeed in convincing our enemy, but rather in the fact that we can sow or nurture the seeds of change.

We must recognize that most people take an attack on their beliefs as an attack on their identity, and they react with defensive maneuvers, denial, or counterattacks. So it is not that we should be any less harsh on illogical and dangerous beliefs, but we must find a good strategy for actually confronting those beliefs effectively. By definition, this must be a strategy that avoids greater division. The fact is that people will turn away, dig in their heels, and simply stop listening if our only strategy is to make them feel stupid. We are far more likely to succeed in changing the minds of our opponents if we can lead them to question their belief systems, and thus begin the process of change from within. What exactly can we do to bring about such self-questioning? The following are three basic steps that can help in this regard. We will refer to them as “what,” “why,” and “why not.”

First, the “what” should address the fact that you know what their argument is. Here, you should attempt to “steel-man” your opponent’s argument (i.e., the opposite of straw-manning: be able to articulate the argument as well or better than they can) to show that you are listening and comprehending what they are saying.

Next, the “why” strategy should address your opponents core beliefs, or intuitions, which lead them to accept and espouse the particular belief that you find irrational or indefensible. In the case of conspiracists, this might be a deep-seated distrust of powerful entities, especially governments. With religiously based arguments, the core belief might be something like “there must be a just order to things” or “someone must have created the universe.” These core beliefs are frequently tied to some aspect of a person’s perceived identity, and at bottom these aspects can be quite laudable. For example, conspiracists very often see themselves in a similar light as skeptics, in that they recognize the problems with appeals to authority and the importance of evidence; and religious folks often have a deep desire to live ethical lives. Respecting this connection can bring into focus the mechanism responsible for the irrational belief(s) in question.

Finally, the crucial strategy is the “why not,” or the attempt to show your opponent that, while they can still keep their identity, their irrational belief is flawed in critical ways that they themselves should recognize as such. For instance, in the hard case of arguing with the likes of Alex Jones, one might point out that, while he seems to discount anything said by the mainstream media, he will take as fact whatever his “trusted sources” say. Indicating that this conflicts with the aspect of his identity which values assessing claims by the weight of the evidence, rather than by the source of the claim may help attenuate some of his irrational discounting of everything reported by the media. With regard to even more consequential cases, such as with harmful fundamentalists, like members of the WBC and jihadist organizations, one might explain how their behavior is completely antithetical to their core value of doing good. It could also be asked in these cases why, if God is great, would he insist on causing so much suffering in his name?

In the face of true evil, these suggestions may seem trite, but it is important to remember that these small seeds of truth must be planted and, though their growth may be slow or indeed may never happen for some individuals, continual exposure can cause them to thrive in the minds of others. Big changes rarely happen in a single moment. More often, small changes gradually lay the foundation for big changes to reach their tipping point. Focusing our energy on producing these small changes will therefore build the framework required for such tipping points to occur. ■

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What Is It like to Be a Human?

BY COLIN MCGINN

For those who do not closely follow philosophy, this paper grew out of Thomas Nagel's famous 1972 paper "What is it like to be a Bat?" My purpose is expository: to rephrase Nagel's argument so as to bring out its structure.

IMAGINE AN INTELLIGENT BAT CONTEMPLATING THE mind-body problem, name of Tim Nigel. Nigel has noticed that humans have an auditory sense not possessed by bats (of his species): they can hear various pitches. This enables them to appreciate music (unlike Nigel and his conspecifics) and also to have other types of auditory experience not available to bats. We can suppose that bats hear only a single pitch and only echoes of their own monotone shrieks, impressive though their sense of echolocation is. Thus Nigel concludes that he doesn't know what it is like to be a human, at least so far as hearing is concerned. He has some inkling, to be sure, because he does have an auditory sense, but the range and variety of human hearing makes this sense alien to him—just as humans have an auditory sense that provides only partial insight into the auditory sense of bats. He thinks that if he could hear pitch variations in the manner of humans, then he would know (fully) what it is like to be human; but as things stand he cannot grasp the nature of human experience. This is a region of reality he cannot get his mind around (Nigel is a resolute metaphysical realist). He expresses his conclusion by saying that human experience is "subjective" and can only be grasped "from a particular point of view," in contrast to "objective" things that can be grasped "from many points of view, i.e., from no specific point of view."

Having come to this conclusion he notices an implication for the mind-body problem, namely that experiences like those of humans cannot be reduced to physical facts about the human body and brain. For such physical facts can be grasped from many points of view and don't require that one shares the point of view of the organism having the experience. Nigel can know what it is to be a human, i.e., to belong to the human biological species, but he can't

grasp what it is like to belong to the psychological type exemplified by humans, i.e., beings sensitive to pitch differences. But that means that it is not possible to analyze experiences as physical states, because the former are subjective and the latter objective. He has uncovered a feature of mental concepts that renders them incapable of analysis into physical concepts. Nigel's inability to know what it is like to be a human thus leads him to reject materialism.

The essential point of his reasoning is the contrast between concepts of experience and concepts of the physical world—the point, namely, that the former are accessible only to beings that share the experience in question while the latter are not dependent in this way. You can know what it is to be a member of the human species without yourself being of that species, but you can't know what it is like to have human experience without having that kind of experience. And you can grasp the properties of a human brain without yourself having that kind of brain, but you can't grasp the experiential properties with which these brain properties correlate without having those properties yourself.

That is what Tim Nigel concludes from his reflections on human experience (and on which he publishes a paper with the title of the present paper—which quickly becomes classic of bat philosophy). I would like to rephrase the gist of his argument in a way that brings out its logic more clearly than in Nigel's original formulation (not that there's anything wrong with it!). Instead of talking about subjectivity, objectivity, and points of view, I shall say that the relevant feature of (concepts of) experience is *self-acquaintance dependence* (SAD). The term needs some unpacking. We are familiar with the idea of concepts that depend for their possession on acquaintance with members of their extension—it is a cornerstone of empiricism. Thus it may be said that the concepts *red* and *square* are acquaintance-dependent—you have to experience red and square things before you can have these concepts. Putting aside the plausibility of that position, we know what it means;

well, the present idea is that certain concepts require for their possession acquaintance with instances of the property *in oneself*. That is, you have to be aware of the property as instantiated by you if you are to have the corresponding concept.

So to have a concept of a certain type of experience you have to be acquainted with instances of that type in your own person: for example, you can only have the concept of an experience of red if you have yourself had experiences of red. You have to be an instance of the general property the nature of which you aspire to grasp. Such a property is what I call self-acquaintance dependent: you can grasp it only if you are acquainted with it in yourself. Thus for Nigel the concept of pitch perception is SAD: it requires him to have a certain type of experience that he doesn't possess. He can't grasp human auditory experience because he lacks that type of experience, while he can grasp what it is to be human (i.e., that biological species). He can grasp the nature of P-fibers in the human brain but not the type of experience these fibers underlie. Thus experiences can't be brain states since the former concepts are SAD while the latter are not. The argument is by Leibniz's law: experiences have a property that brain states don't have, viz., self-acquaintance dependence of the relevant concepts.

Having got this far the astute Nigel wonders whether his argument generalizes: are all mental states SAD? He concludes that they are, since it is not possible to grasp what these states involve unless you yourself share them—emotions, memories, thoughts, bodily sensations, desires, volitions, etc. It is true that, like perceptual experiences, all these phenomena have non-SAD aspects: neural correlates, functional properties, non-mental causes and effects, number and duration. But these aspects don't exhaust their nature, which always has a bit of SAD in it. For example, how could you know—fully know—what anger is if you had never been angry? How could a non-thinking being know what thinking is? How can memory be fully grasped if you have never remembered anything? Moreover, Nigel concludes, no other types of concept are SAD: *only* mental concepts depend for their possession on instantiating them oneself—not mathematical concepts or moral concepts or color concepts or shape concepts or aesthetic concepts. SADness is the mark of the mental (cf. intentionality or privacy or rationality).

So, at any rate, Tim Nigel contends in his famous paper “What is it like to be a Human?,” and his argument seems clear enough. **S**



Illustration by Anna Maltese

A Dark World Gets Pinker

A Review of Steven Pinker's *Enlightenment Now: The Case for Reason, Science, Humanism, and Progress*

REVIEWED BY JIM DAVIES

ASK JUST ABOUT ANY NON-HISTORIAN you know, and they'll tell you what they think is common sense: the world is a mess and getting worse. If you don't agree, you probably haven't been reading the news, which has been reporting darker and darker stories as the decades pass.

According to Steven Pinker and enough graphs to choke a CNN news anchor, the world has, in almost every way, gotten better. The first part of the book takes a chapter for each way the world could be getting better or worse—poverty, inequality, environmental quality, violence, and so on—and casts a careful eye on the long view. Is the world getting better or is it getting worse? In general, the answers are pretty rosy.

Let's take poverty as an example. In the last two hundred years, the rate of extreme poverty has dropped from 90 to 10 percent—with nearly half that happening in the last 35 years. In America, the poor are getting richer even faster than the rich are.

When you look at lots of issues over the last several hundred years, we see quantitative evidence of the decline of many more bad things, including violence, starvation, war, accidents, and terrorism. We've seen increases in the good things: democracy, longevity, health, equal rights, knowledge, and happiness. It's a long book, but it feels breezy. Each chapter is to the point and well written.

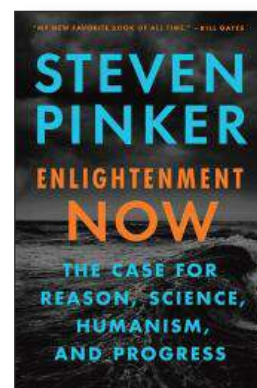
So why does everybody think the world is circling the drain? Why do people think the world used to be better? One way that the world is getting worse is that the news has gotten more and more negative. Since most people's ideas about the state of the world come from the news, their opinions are, unsurprisingly, reflective of the biases of the news media to report sensational,

terrifying stories. Pinker cites a particularly egregious example: although suicide, dying young, and automobile deaths have all gone down, because the progress is not steady, it gives the news opportunities to report only when the problem gets (temporarily) worse. No less than *The New York Times* pulled this trick thrice in the first half of 2016.

We also tend to remember bad events in our own lives as better than they were, and mistake our growing problems of adulthood for a worsening world. All of these effects eventuate in a population that believes, in spite of enormous evidence to the contrary, that the world's getting worse.

Pinker is honest about what's not getting better—specifically, the environment is in a lot of trouble. He refers to our greenhouse gas levels as “unquestionably alarming.” But even the environmental story has a silver lining: things are getting worse, but they're getting worse *more slowly* over time, and in some ways things have only recently started to get better. He argues that carbon emissions go up when a country is undergoing industrialization, and that after that phase has passed, they get greener—there's a tipping point where they start to emit less. America's already past that point, and many other countries are not far behind.

At several points, he wards off a fatalistic attitude about the world getting better or worse independently of what we're doing about it. It's only better because of the efforts we've made, and won't magically continue to get better if we just sit around. The trends of the past in no way ensure that the world will *continue* to get better—we only know that in many ways the world has only gotten better than it was. The optimism Pinker encourages is conditional, not complacent. Is the world going to continue to



Viking, 2018. 576 pp.
75 graphs and tables. \$35
ISBN-13: 978-0525427575

get better? We don't know. Pinker claims that predicting the future of something as complex as our world isn't science.

But trying to predict the future is exactly the point of the chapter on existential threats—big, sudden problems that might threaten civilization—and it is the weakest part of this excellent book. It's not a data-driven chapter. He can't use the same tools, and neither can his opponents.

For example, in his dismissal of the threats to humanity from a superintelligent artificial intelligence (AI), there are rhetorical instances of mockery and anecdotes rather than his usual careful reasoning. He asserts that the idea that something could be thousands of times more intelligent than humans is a fallacy, with neither argument nor evidence in support—there are plenty of smart people on both sides of this issue. Even in this chapter, though, the section on the threat of nuclear weapons is excellent—the threat is real, but no nukes have been used since 1945 and the many times that they might have been employed in conflict nations pulled back from the brink of thermonuclear catastrophe.

Pinker has been criticized for getting the history of the Enlightenment wrong. I'm not qualified to speak to this, but what you should get out of this book doesn't hinge on Pinker's accuracy about the essence of what the historical Enlightenment was or wasn't. If reason, science, and humanism are indeed what are behind the world's improvement, then the accuracy of his attribution of

these ideals to the original Enlightenment is a minor issue. It's the ideas that count more than the history of how they were developed.

These are at best minor problems in an outstanding book that you should read immediately and buy copies of for your friends. It's full of fascinating insights that you'll be tempted to share with people: for example, capital punishment is vanishing in the United States because drug companies don't want to

supply the drugs to kill people, doctors refuse to administer them, and people refuse to fix the required machines when they break down. Mental illness only looks like it's increasing because we have expanded our scope of what counts as mental illness. The only reason terrorism works is because the world has gotten so safe. Even the "epidemic of loneliness" is very probably a myth.

Many years ago, some scientists came up with the "doomsday clock,"

which was intended to represent how close the world was to disaster. Pinker says, "If the hands of a clock point to a few minutes to midnight for seventy-two years, something is wrong with the clock." Optimism reduces defeatism and dire fatalism, which is why this book is so important.

People won't be scared into action with a broken clock. What's more motivating is hope, and especially evidence, that we can make things better. **S**

The Inevitability of Intelligent Life?

Reviews of *The Equations of Life: How Physics Shapes Evolution* by Charles S. Cockell, and *The Human Instinct: How We Evolved to Have Reason, Consciousness, and Free Will* by Kenneth R. Miller

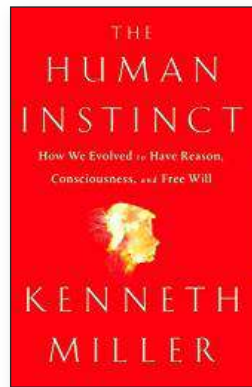
REVIEWED BY NATHAN H. LENTS

THUS FAR, 2018 HAS BEEN A TERRIFIC year for popular science books. Two stand out in particular for confronting head-on some of the biggest and most difficult questions scientists face. In his new masterpiece, *The Equations of Life: How Physics Shapes Evolution*, biophysicist Charles S. Cockell wades with admirable fortitude into the waters of how the laws of physics and mathematics place constraints—and find solutions—to the great challenges of survival. How inevitable was it that life would land on DNA as the repository of genetic information? Why have the vast majority of species settled on two biological sexes? What's so special about phospholipids that all living cells use them for their membranes? How do ladybugs regulate their temperature? These are just a few of the incredibly complicated biological questions that actually have quite simple mathematical answers, as Cockell demonstrates.

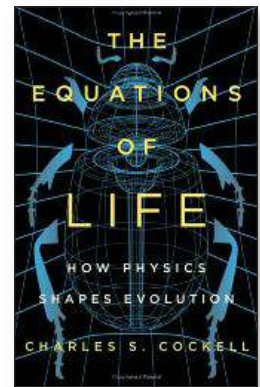
Biologist Kenneth R. Miller tackles questions no smaller than the human intellect itself in his fourth book, *The Human Instinct: How We Evolved to Have Reason, Consciousness, and Free Will*. In it, Miller gives a brief but comprehensive summary of the most important scientific and philosophical work aimed at explaining if and how humans have a true and autonomous inner self. As Miller astutely acknowledges, even the language we use to address this question—words like autonomy, individual, thought, perception, intention, awareness, and conscience—cannot be taken for granted. If these words are to have any meaning whatsoever, that meaning must be created in the very instrument they are meant to describe, the human mind. It is not difficult to tie oneself into rhetorical knots while attempting to discuss the nature of consciousness, yet Miller nimbly walks us through the minefield.

If *The Equations of Life* attempts to

provide simple answers to complicated questions, *The Human Instinct* does the opposite, helping us see just how complicated these questions really are and how divergent the answers could be. These books pair together perfectly because they both strike blows against the prevailing notion that human beings are the most unlikely of species. As Cockell explains, "there is nothing uncanny about life's ability to land on the same solutions." While anyone with basic knowledge of biology is aware of the many examples of convergent evolution, Cockell seasons those examples by deriving the mathematical relations that underlie the convergence. Even if things like building a cell, storing genetic information, and swarming towards food might be easily reduced to physical forces, surely reason and consciousness are in a different realm altogether. Hardly, says Miller. Channeling the eminent paleontologist Simon Conway Morris, among



Simon & Schuster, 2018.
304 pp. \$26.
ISBN-13: 978-1476790268



Basic Books, June 2018.
352 pp. \$32.
ISBN-13: 978-1541617599

others, Miller aggressively defends the claim that, “It is possible, perhaps even likely, that the appearance of humanlike intelligence is part of the deep structure of nature probed again and again by the evolutionary process.”

Life's Equations

In *The Equations of Life*, Cockell introduces us to a unique pedagogical exercise that he has utilized for many years at the University of Edinburgh. Each semester, he challenges teams of students to explore biological processes or life forms and derive the physical equations that underpin them. Of course, he brings his own expertise to the exercise as he and his students unite the fields of classical physics and modern biology. His fascinating book is the result of many years of engaging students in this way. This should serve as inspiration to all of us in the academy charged with not only *teaching* science, but encouraging students to *appreciate* science and what it can and should do for our society.

The striking unity of life has long been considered to be one of the most compelling arguments for common ancestry, and for good reason. Cells could have utilized any number of molecules to store genetic information. What are the odds that all life would have ended up with DNA for our genes if we hadn't inherited it from a common ancestor? Our basic biochemical energy metabolism, with pyruvate, glucose, and glutathione in such crucial positions, seems incredibly arbitrary. Why would these pathways be so strictly conserved were all living cells not related to one another?

The evolutionary biologist Stephen Jay Gould proposed that if we were to rewind the tape of history and then let it run again, life would play out on earth differently every time and the organisms we'd find would be unrecognizable to us today. Cockell skeptically concludes the opposite. From phospholipid membranes that solve “the problem of dilution” to pyruvate as the central node of biochemical energy conversions, the solutions life came up with are anything but arbitrary. Like an electron settling into its lowest energy state, the trillions upon trillions

of cells on earth toyed around with all feasible solutions to life's great challenges. Pyruvate wasn't an arbitrary choice. If we replayed the tape, we'd almost certainly end up with pyruvate again.

Far from undercutting the unity of life, our common physics binds us together even more tightly. For example, the genesis of spots, whether on ladybugs, leopards, or Dalmatians, follows a very simple equation involving just two physical factors, pigments and inhibitors. This equation operates independently of the precise molecular mechanisms, which are of course quite different in those three animals. As Cockell explains, the pigment-inhibitor gradient phenomenon is a Turing pattern. From striking simplicity springs breathtaking complexity requiring little more than overlapping gradients. Whether those gradients are made of molecules, organisms, weather fronts, or star systems, we get spots, vegetation patterns, storms, or the spiral arms of galaxies.

Cockell does not limit his interrogation to why things are, but also why some things aren't. For example, the wheel is a human invention that made so much physical and mathematical sense that it transformed every culture it touched. So why didn't life come up with a wheel with all its many advantages over other means of locomotion? As Cockell explains, it has! The bacterial flagellum turns very much like an axle and crankshaft, with all the efficiency those innovations bring. However, that efficiency breaks down rapidly when brought to larger scales as gravity takes over from buoyancy as the dominant force. When eukaryotic cells, hundreds of times larger than prokaryotic ones, developed their own flagellum, there is a reason they opted to extend and flex their cytoskeleton rather than employing the crankshaft design. Each type of flagellum does well for its scale. Also, as Cockell also reminds us, wheels are only useful if you first pave smooth surfaces for them to run on.

Instinctively Human

Roads and wheels *did* emerge on earth but they required human ingenuity to emerge first. In *The Human Instinct*, we

turn our gaze inward and ask how humanity could have evolved such remarkable intellectual capacities. As one who often writes about the continuity of human and animal minds, I am reminded by this book of the truly stunning leaps our species has made. Miller takes us through a tour of recent research on the uniqueness of human nature, and does so humbly and with an objective distance that makes it sometimes hard to know what his own position is. I recently sat on a panel with Miller at the Boston Public Library on the evolution of human nature. When challenged on his claims of human exceptionalism, Miller conceded, quoting Henry Gee from *The Accidental Species*, “It's easy to come in first when we're the one awarding the prizes.”

But, humans are indeed unique if for no other reason than the fact that we can think about our uniqueness. No other species can do that, even those we have exhaustively taught to communicate through sign language. The contemplation and introspection that Carl Sagan famously referred to as “a way for the cosmos to know itself,” cannot simply be dismissed as anthropocentric self-congratulation. Miller elegantly expands upon this point by reminding us that, on the evolutionary tree of life, “one branch, and one alone, produced a creature with the potential... to reconstruct the very tree of which it is a part.”

Miller goes beyond musing about whether or not we are *special* and asks if we are *improbable*, as so many have said we are. While Gould insisted that it's hard to imagine anything like *Homo sapiens* emerging even if we “replay the tape a million times,” Miller asks more poignantly whether *something* as intelligent as us would emerge, even if we didn't. He makes a very strong case that something would.

Self-awareness, as defined by versions of the mirror test, has been documented in countless species, as has rudimentary metacognition. Many lineages have evolved perspective-taking and empathy, and many use true referential communication using sounds or gestures, in what is clearly the beginning of

language. It appears that some animals really are aware of their own mental contents and that of others. Consider how long multicellularity took to emerge after cells first appeared on earth: 2.5 billion years. Now consider that vertebrates with a true brain have existed for only one-fifth of that time and yet, here we are. Clearly, the jump from one cell to many cells was more improbable than the jump from no brain at all to the discovery of relativity theory. Human beings have been on a unique evolutionary path, distinct from other extant apes, for a mere 7 million years. That seems to have been plenty of time for hominids such as Barbara McClintock and Neil de Grasse Tyson to evolve from otherwise run-of-the-mill primates. Quoting Robert Wright, Miller implores the likes of Gould and Gee to “have some patience.”

The Human Instinct opens with a concise but erudite defense of evolution, that is, the scientific claim that *Homo sapiens* evolved from ape ancestors over the last few million years. Miller has no doubt honed his airtight arguments through years of sparring with creationists since the Dover, PA “intelligent design trial,” at which he was a key witness. In the final chapters, however, Miller courageously takes on the subject of free will and determinism. Understandably, Miller’s writing posture is a defensive one in these sections, as he is fully aware that the notion of free will is currently facing considerable headwinds among scientists. Nevertheless, Miller argues that the claim that our universe and the common human experience is fully deterministic undermines the scientific process itself and implies that all the great strides we’ve made to examine, probe, and describe our universe were predestined, as was the rejection of scientific evidence by too many. Like Stephen Hawking before him, Miller finds this conclusion not only incongruous but self-defeating.

Lessons from Science on Inevitability

One important lesson taught equally by *The Equations of Life* and *The Human Instinct* is that when you have billions of

years and trillions of trials, fantastically unlikely events become not just possible, but inevitable. For so long, popular science writing has underscored the assumption that life is ultimately improbable and that human beings are the most unlikely creatures of all. Maybe not. Though they would seem to hail from separate magisteria, as it were, both of these books come to the rather surprising conclusion that life and humanity, as we know them, may not be so implausible after all. Many of the strange quirks of our world really aren’t so strange.

A common trope in science fiction is to depict extraterrestrial sentient life as basically humanoid, right down to two eyes, ten fingers, and one narrow tube for eating and breathing. Many of the aliens encountered by the various incarnations of the *USS Enterprise* can even interbreed. Mr. Spock, arguably the first extraterrestrial that Western culture became intimately familiar with, was just such a hybrid. Here on 21st century earth, contrarian scientists like myself reliably (and pedantically) respond that life on other planets would likely have evolved to be radically different, possibly to the point of being incomprehensible to us. Everything we find familiar is arbitrary, we would say, and life on other planets could be altogether unrecognizable to our subjective sensibilities.

Cockell and Miller teach us that, in fact, if we ever encounter extraterrestrials, they might not be so different than the life forms we find familiar here on earth. The common animal body plan—meaning eyes, paired limbs, guts with polarity and unidirectional flow, and sensory-perception cephalization at one end of the body—is so advantageous that multicellular creatures are likely to evolve that way anywhere, just as they have multiple times here on earth. And as long as eating, surviving, and reproducing are important to a species, selecting for advanced cognition seems inevitable as well.

Science fiction writers may be correct after all. Extraterrestrial life may be strikingly similar to terrestrial life. In fact, I would further argue that alien species are sure to have their own ver-

sions of the quirks and flaws that I describe in my book *Human Errors*. Cockell even takes down the Horta, one of the few examples of truly “alien” life from the original *Star Trek* series, featured in the episode “Devil in the Dark,” one of the best stories from that era. The Horta are a species whose chemistry is based on silicon instead of carbon. However, as similar to carbon as silicon is, the covalent bonds it forms are weaker, making impossible the kinds of large complex biomolecules necessary for cellular life.

Similarly, Miller argues that the mental abilities we know as human reasoning are also not arbitrary, or at least, they are no more arbitrary than mathematics itself. Humans didn’t *invent* arithmetic, algebra, trigonometry, or even calculus. We *discovered* them. While the scientific method is a purely human endeavor, at least on earth, it does not follow that science is a construct the way that literature or the arts are constructs.

We know that science is more than just a human invention because it works independently of us. Certain principles are elevated as “logic” because they are objectively unassailable. There cannot be a world, at least not in this universe, where a species evolves to understand that two plus two is five. As Cockell demonstrates, from something as simple as two plus two can emerge the forces that propel a dolphin through the water or a naked mole rat through the earth. It can hardly be any other way. And creatures that learn to carefully observe their surroundings will one day attempt to understand them. How else will they test their understanding but by making predictions and testing them through observation?

If his goal is to show how the beauty and complexity of life spring from the logic and simplicity of math, Cockell succeeds enormously. If you agree with Miller, as I do, that science is the ultimate expression of human reason, logic, and curiosity, you will find *The Human Instinct* and *The Equations of Life* to be scholarly, delightful, and utterly satisfying. Perhaps they were predetermined to be so by the laws of physics. **S**

Calling SCAM a Scam

Review of *SCAM: So-Called Alternative Medicine*
by Edzard Ernst

REVIEWED BY HARRIET HALL, M.D.

AS THE WORLD'S FIRST PROFESSOR OF complementary medicine, Dr. Edzard Ernst set out to apply rigorous scientific standards of evidence to find out which alternative medicine treatments worked and which didn't. After 25 years of research and a torrent of published studies, he had determined that most of them didn't. A lot of people were unhappy about his conclusions, and Ernst was forced into early retirement. If his enemies were hoping to silence him, their plan backfired. He no longer has to worry about political correctness or unhappy employers. Retirement freed him to devote all his time to thinking about all he had learned and communicating his findings to the public. In a profusion of books, articles, blogs, and public talks, he has become ever more willing to speak out strongly and call a spade a spade.

Recently he teamed up with a medical ethicist, Kevin Smith, to write *More Harm than Good: The Moral Maze of Complementary and Alternative Medicine*. In it, they argue that complementary and alternative medicine (CAM) is unethical. Now he has written another book, *SCAM: So-Called Alternative Medicine*, showing that the very term alternative medicine is itself a scam. He explains,

Whatever it is, it is *not* an alternative:

- if a therapy does not work, it cannot be an alternative to medicine;
- if a therapy does work, it does not belong to alternative medicine but to medicine.

As comedian Tim Minchin famously said, "You know what they call alternative medicine that's been proved to work?—Medicine."

Ernst has been accused of doing

nothing but debunking SCAM. Not true. He lists 20 CAM interventions that are backed by positive and sound evidence, and he rates most of these as "probably more effective" than conventional options.

The chapter on "The Basics" alone is worth the price of the book. It is a concise distillation of wisdom about the principles of evaluating medical claims. It covers evidence vs. experience, how clinicians can fool themselves, how even clinical trials can give false results, the direct and indirect risks of using ineffective treatments, weighing risks against benefits, placebo effects, specific v. nonspecific treatment effects, eminence-based and celebrity-based medicine, ethical issues, and informed consent.

SCAM claims to understand the root cause of diseases, and SCAMs are often promoted as cure-alls. Ernst calls these claims not just misleading but demonstrably wrong. The SCAMs that are effective are only effective for relieving symptoms. Ernst has never been able to identify a single disease that can be cured by SCAM. He points out that SCAM practitioners often instill fear by telling people they have a nonexistent problem (like "toxins" or "subluxations"). They claim to be holistic but much of SCAM is exactly the opposite of holistic. They spread paranoid conspiracy theories about Big Pharma, the FDA, and the medical establishment. They have many of the features of a cult. Ernst points out that doctors can face reprimands for inadvertent errors while SCAM practitioners can get away with intentional harm.

The chapter on research shows that SCAM research is lacking in both quantity and quality. It is a morass of poor re-

search design, promotion masquerading as research, scientific misconduct, nonsensical investigations, and results that are too good to be true. Ernst describes how pseudo-researchers are seduced by personal epiphanies and by what he calls "the gravy train." He says the line between wishful thinking and overt fraud is often blurry. He lists clear guidelines on how to differentiate good research from bad. He points out the role of criticism in scientific progress and shows that both criticism and progress are glaringly missing in the world of SCAM.

There is more in the book, much more. There is a chapter devoted to SCAM practitioners and the ways they mislead and impress patients. Another chapter is devoted to patients and consumers and the reasons they are attracted to SCAMs. SCAM proponents claim that SCAM steps in to fill the void when orthodox medicine has nothing more to offer. That's not only false but despicable. Orthodox medicine *always* has more to offer; if a cure is not possible, pain relief and supportive and palliative care are always available. And of course, SCAM can't offer a cure either. And then there's the wellness mania; Ernst says wellness is one of the most abused terms in the realm of CAM.

The final chapter is titled "The Funny Side." Ernst provides instructions showing readers how they could invent their own SCAMs and become charlatans. He has some choice words for ignorant politicians and for SCAM



Societas/Imprint Academic Ltd.,
2018, 220 pp. \$29.90 PB,
ISBN-13: 978-1845409708

advocate Prince Charles, quoting Christopher Hitchens: “We have known for a long time that Prince Charles’ empty sails are so rigged as to be swelled by any passing waft or breeze of crankiness and cant.... The heir to the throne seems to possess the ability to surround himself—perhaps by some mysterious ultramagnetic force?—with every moon-faced spoon-bender, shrub-flatterer, and water-diviner within range.”

I’ve always had trouble remembering the difference between efficacy and effectiveness. Ernst explains that eff-I-cacy refers to the treatment’s performance under I-deal conditions and eff-E-ctiveness refers to its performance under E-veryday conditions; a

great mnemonic that I won’t forget.

I laughed out loud at his description of how a homeopathic manufacturer prepared the homeopathic remedy Uranium 200X. They had no legal way of obtaining uranium, so they went on a tour of the Hanford nuclear facility and they held a vial of water up against a glass wall in front of the cooling chamber. They called that their mother tincture of uranium. Back in their lab, they diluted it 200 times with ethanol to make a 200X dilution, and then had the problem of getting rid of all the leftover ethanol. It was illegal to dump it down the drain, and the disposal service refused to take it because it said uranium on the label, even

though they tried to explain that it couldn’t possibly contain a single atom of uranium. They ended up surreptitiously burying it in the backyard.

In a Postscript, Ernst says the book is not intended as a text *against* but a plea *for* something. His aim was to stimulate the reader’s ability to think critically about SCAM and about healthcare in general. He hopes that the SCAM boom will do some good. It might induce conventional healthcare professionals to remember that time, compassion, and empathy are some of their core values which cannot be delegated to others.

It’s a gem of a book. I highly recommend it. **S**

Dead Weight

A review of *Skin in the Game: Hidden Asymmetries in Daily Life* by Nassim Nicholas Taleb

REVIEWED BY CHRIS EDWARDS

SOMETIMES YOU CAN JUDGE A BOOK BY its cover. The image under the title of Nassim Nicholas Taleb’s new book, *Skin in the Game: Hidden Asymmetries in Daily Life*, presents the would-be reader with a barbell holding large weights on one side and smaller weights on the other. The mixed metaphor (one might expect to see a reference to skin and/or a game) sets the tone for an uneven book that’s heavy on personal attacks and vendettas but light on substance.

Taleb achieved authorial fame with 2008’s *Black Swan*, and followed that work with *Antifragile* in 2012. The first book showed how models based on predictive analytics can fail dramatically when unlikely events occur that crash the system. It became popular in no small part because of the financial crisis in the housing sector that occurred the same year. It’s not clear what the connection was, though, since the housing crash came as a result of consistent flaws in the

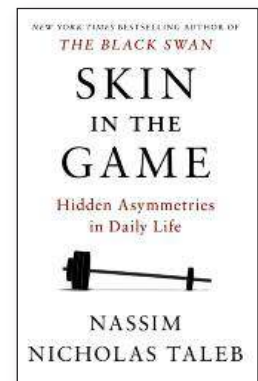
lending system and not as a singular unlikely event. *Antifragile* put forth the thesis that universities exist to formalize ideas and processes that actually evolved in the wild where real people work.

Skin in the Game stems from these books. Taleb’s new thesis is that people who make decisions and predictions should share in the pain and/or rewards that come as an outcome of those decisions. In the *Introduction*, he writes “If you have the rewards, you must also get some of the risks, not let others pay the price of your mistakes. If you inflict risk on others, and they are harmed, you need to pay some price for it. Just as you should treat others the way you’d like to be treated, you would like to share the responsibility for events without unfairness and inequity” (p. 4).

First of all, does it ever occur to anyone that the entire notion of “treating others the way you’d like to be

treated” caused the entire #metoo movement? Certainly, powerful men who send inappropriate pictures of their anatomy to women are doing something they would like to have done unto them. Secondly, what does “some price” mean in regard to risk inflicted upon others? Should a high school football coach who risks the lifetime cognitive function of young men be forced to suffer concussive blows himself, or is losing the game enough of a price? Just how much skin should a person in a position of power actually have in the game?

This question comes up with Taleb’s first attempt to buttress his argument with history. He writes



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304 pp. \$30.
SBN-13: 978-0425284629

“Prominent people took risks—considerably more risks than ordinary citizens. The Roman Emperor Julian the Apostate...died on the battlefield fighting in the never-ending war on the Persian frontier—*while emperor*” (p. 11). Is this impressive? By analogy, should Lincoln have taken up a rifle at Gettysburg? Should surgeons stand ready to suffer the same physical consequences as their patients if something goes wrong? We know what asymmetry is, but what does symmetry look like?

Taleb offers no answers to this question because the book is a thin premise for him to infuse a bunch of unconnected thoughts into your brain. By page 22, we are treated to Taleb the alpha-male life coach. He quotes a take-no-baloney fictional character he has invented with “*Start by being nice to every person you meet. But if someone tries to exercise power over you, exercise power over him.*” Other than the fact that such guidance would disqualify a person from nearly every job and human relationship, this is sound advice.

Then book reviewers get the metaphorical knuckle sandwich because “someone has to have read the book to notice that the reviewer is full of baloney, so in the absence of skin in the game, reviewers such as Michiko Kakutani of the *New York Times* (now retired) or David Runciman, who writes for *The Guardian*, can go on forever without anyone knowing they are either fabricating or drunk” (p.44). (Forgive me for demurring here, but we book reviewers are a nervous people, prone to paleness and coughing fits; we are hardly suited for fighting back.)

Then we get Taleb the anti-evolutionist: “The main idea behind complex systems is that the ensemble behaves in ways not predicted by its components.... Studying individual ants will almost never give us a clear indication of how the ant colony operates. For that, one needs to understand an ant colony as an ant colony, no less, no more, not a collection of ants” (p. 69). Not really. Evolutionary pressures act

on ants, not on colonies. The colony helps ants to survive more than vice-versa and the interactions are meaningless unless they benefit individual genes.

At times, the “skin in the game” phrase takes on a Jeff Foxworthy “you might be a redneck” tone as it’s used to add emphasis to sentiments, such as “If I wanted to lower taxes for myself, and I do, I am obligated to fight for it, for both myself and the collective, other taxpayers, and to not run away. Skin in the game” (p.37). Whether the statement makes sense or not, really isn’t important. One is not invited to ask whether lower taxes really benefits the collective or not. We are not really asked to read this book so much as we are asked to marvel at Taleb’s bluster and machismo.

Mostly, we get Taleb the belittler. He humiliates working people: “Evidence of submission is displayed by the employee’s going through years depriving himself of his personal freedom for nine hours every day, his ritualistic and punctual arrival at an office, his denying himself his own schedule, and his not having beaten up anyone on the way back home after a bad day. He is an obedient, housebroken dog” (p. 98). I would like to stand up for people with jobs and self-control, but I must admit I’m still nursing my wounds from the comments about book reviewers.

He builds up caricatures like the “Intellectual Yet Idiot” (IYI) someone who “...joins a club to get travel privileges; if he is a social scientist, he uses statistics without knowing how they are derived (like Steven Pinker and psycholopasters in general); when in the United Kingdom, he goes to literary festivals and eats cucumber sandwiches, taking small bites at a time...” (p.126). Hey now! That’s going too far; what’s wrong with cucumber sandwiches, books, and chewing that’s respectful of the digestive system?

Taleb might not like working people, taxes, academics, or bureaucrats, but it’s Steven Pinker who really gets him rolling his sleeves up. According

to Taleb, Pinker misuses data tables (in addition, one presumes, to enjoying the occasional nibble of a cucumber sandwich) and Taleb really lets Pinker have it:

[T]he science journalist Steven Pinker played that trick with his book *The Better Angels of Our Nature*, which claims a decline of violence in modern history, and attributes this to modern institutions. My collaborator Pasquale Cirillo and I, when we put this “data” under scrutiny, found out that either he didn’t understand his own numbers (actually, he didn’t), or he had a story in mind and kept adding charts, not realizing that statistics isn’t about data but distillation, rigor, and avoiding being fooled by randomness—but no matter, the general public and his state-worshipping IYI colleagues found it impressive (for a while) (p.138).

For those of us who consider Pinker’s book a worthy candidate for the western canon, it seems a bit much to paint Pinker with the implied vulgarity of “science journalist,” and we might even ask for a more thorough explanation of what Pinker got wrong. The point of this section of the book is not to provide a real skeptical analysis of Pinker’s work, but to deride Pinker as an IYI. And Taleb hates the IYI, mostly because, as he wrote in an earlier passage “...he doesn’t even deadlift” (p. 127).

Ah, here we have found the source of the weights that form half of the mixed metaphor on the cover. Taleb thinks that people who do not look the part of their jobs, are actually more likely to be successful because they’ve had to cut through the B.S. of social interactions and public expectations. Educational attainment is B.S., academic credentials likewise, everybody else is weak and stupid and gyms should not look like gyms because all those fancy machines just dupe people into paying money while “...the simpler barbell (a metal bar with two weights on both ends) is the only standard piece of equipment that gets you to recruit your

entire body for exercises—and it's the simplest and cheapest to get." (p.166).

At this point in the book, I more than got Taleb's main argument. People should share in the risk that they impose on others so that learning through

mistakes can occur. When those in power don't suffer consequences through having skin in the game, they cannot learn. Curious about the man, I typed his name into Google images. Sure enough, there was Taleb, gripping

a barbell in a gym. If you can sometimes judge a book by its cover then you can sometimes judge an author by his picture. The thing is, for a man so critical of everyone else, Taleb's not really lifting all that much weight. **S**

Who Are You?

The Biological Mind: How Brain, Body, and Environment Collaborate to Make Us Who We Are by Alan Jasonoff

REVIEWED BY PETER KASSAN

THE STATED MISSION OF THE MIT Center for Neurobiological Engineering is "to reverse engineer the human brain." The director of the center, Alan Jasonoff, is a biophysicist and the author of *The Biological Mind*, the stated mission of which is to refute "a false idealization of this organ and its singular significance—a phenomenon I call the *cerebral mystique* [emphasis in the original]." Jasonoff explicitly acknowledges Betty Friedan's pivotal *Feminine Mystique* as the predecessor he means to echo. I'd guess that *The Cerebral Mystique* was the book's original title, as its present title doesn't really convey what the book is actually about, and the subtitle ("How Brain, Body, and Environment Collaborate to Make Us Who We Are") is even further off the mark.

The Biological Mind is an argument Jasonoff is having with himself—one well worth overhearing. The book's central argument suggests that the very notion of reverse engineering the human brain is unrealistic, unattainable, and misguided.

The book is divided into two parts. Part I, titled "The Cerebral Mystique," is a history of humankind's relationship with its own brain—from eating it, to discarding it as unimportant when preparing a body for the afterlife, to understanding it as the seat of the soul, to phrenology, to its present day idealization. A main point of the first part of

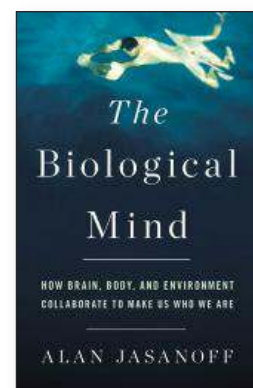
the book is that thinking of the brain apart from the rest of the body (in short, brain-body) is the modern version of Cartesian mind-body dualism. Jasonoff demonstrates persuasively that the brain is as much an organ as, for example, the kidneys (which can be equally depicted as unfathomably complicated), and how intimately and profoundly the brain is connected to the rest of the body. Jasonoff also persuasively demonstrates how the notion that the brain is primarily a computer-like network of neurons is misguided and ill-informed, leaving out as it does astrocytes and other glial cells, synapses and neurotransmitters, along with the hundred million neurons outside the brain in the enteric nervous system.

Part II, "The Importance of Being Biological," extends the arguments of Part I by demonstrating how *neuroessentialism* neglects the many other factors that influence or determine actual behavior in the world. Jasonoff begins with a brief but comprehensive history of modern psychology from Wilhelm Wundt and William James through the behaviorism of Ivan Pavlov, John Watson, and B. F. Skinner, its overthrow by John Searle and Noam Chomsky, the cognitive revolution, up to present-day psychiatry and neuroscience, including fMRI (although Jasonoff is too modest even to mention his own work in that field). Part II also

provides some chilling examples of how medical science has sometimes resulted in horrific mistreatment such as forced sterilization and lobotomy, as well as more benign recent interventions and innovations. Jasonoff also discusses (and largely dismisses) transhumanism in its various forms, most notably freezing the brain or uploading it to a computer.

Part II concludes with a chapter Jasonoff introduces as a departure from the rest of the book, which it certainly is. "What It's Like to Be in a Vat" is a fantasy of Jasonoff finding himself living in a computer-simulated reality. It's probably the least successful part of the book, this idea having been more vividly explored in several science fiction novels and especially films, most famously in the *Matrix* trilogy.

Aside from this unfortunate misfire, *The Biological Mind* is an engaging, informative, and highly persuasive survey of what we know about how brain creates mind and, more importantly, what we don't know, which is considerable. It is also occasionally unguardedly personal and a pleasure to read throughout. **S**



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Junior
SKEPTIC

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SECRETS OF THE OUIJA BOARD

HELLO!

Today we will dim the lights and gather around an object of mystery: the ouija (pronounced "wee-ja" or "wee-gee"). With a little pointer, these simple but spooky devices spell out answers that appear to come from some invisible source.

Some people believe ouija boards release secrets from our subconscious minds. Others claim ouija boards harness supernatural forces to predict the future or contact spirits of the dead. Ouija boards have been used to write entire books, and praised as a source of cosmic wisdom. They have also been blamed for madness, mayhem, and murder. Some even fear that ouija boards are gateways for evil demons. Are any of these claims true?

Let's Find out!



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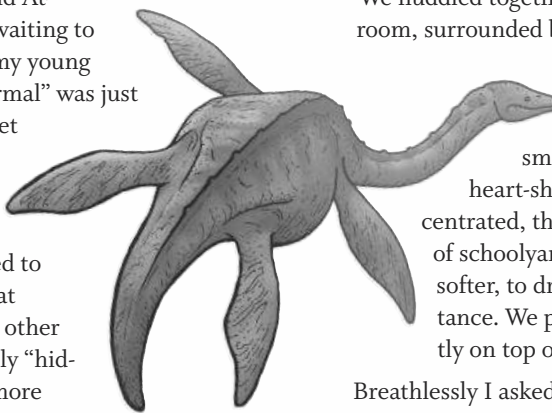
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WHAT THE OUIJA TOLD ME ABOUT NESSIE

When I was a kid, I was absolutely wild for far out paranormal mysteries. I believed we lived in a world teeming with ghosts, psychic powers, aliens, and Atlantean ruins just waiting to be discovered. To my young mind, the "paranormal" was just science we didn't yet understand.

I loved legendary monsters most of all. I wanted to personally prove that Nessie, Bigfoot, and other "cryptids" (supposedly "hidden animals") were more than just stories. I dreamed and schemed of ways to find them. I imagined piloting submarines into the ocean and leading teams of investigators into rugged mountain forests. And I was happy to accept all the help I could get—even magical help!



And so it was that a group of my friends gathered one fateful fifth-grade lunch break to hunt for monsters using a ouija board. We huddled together in a hushed classroom, surrounded by empty desks. We focussed on the board: the letters of the alphabet, the shiny smooth surface, the little heart-shaped pointer. As we concentrated, the rambunctious sounds of schoolyard play seemed to grow softer, to drift away into the distance. We placed our fingers gently on top of the pointer.

Breathlessly I asked the question that burned in my heart: "Will I be the one to find the Loch Ness monster?" And then, slowly at first, the pointer began to move beneath our fingers. Smoothly, strangely, seemingly all on its own, the pointer slid to "Yes."

MISTAKEN PREDICTION

My experience with the ouija board was spooky, exciting, and wonderful. It told me the one thing I most wanted to hear: that my fondest, wildest dream would come true!

But it didn't. The board was wrong.

I actually did grow up to investigate monster mysteries, but not in the way that I expected—and certainly not in the way that the board predicted. The ouija board told me I would personally locate a genuine monster at Loch Ness. It even told me where to look. Obviously it didn't turn out that way. If I had captured Nessie, you would have heard about it!

Instead, years later, I got the opportunity to research the Loch Ness mystery for JUNIOR SKEPTIC #19 (bound inside SKEPTIC Vol. 11, No. 1) and my book *Abominable Science!* (co-authored with scientist Donald Prothero). As I studied



the evidence, I came to realize that Nessie isn't a mystery that will ever be solved by anyone capturing a real live monster. The evidence shows that Nessie is a modern myth, not an animal. She exists only in those stories I loved as a kid.

So what really happened in that empty classroom, all those years ago? It *felt* like the ouija board harnessed some sort of mysterious supernatural force to give me a glimpse into the future. I *seemed* to receive eerie, accurate messages from...somewhere else. But it turned out that those "messages" weren't accurate at all. If they weren't mystical psychic predictions, what were they? Where did the board's answers really come from?

It didn't feel like I moved the pointer myself. However, it does seem awfully suspicious that the board predicted something unrealistic that *I already wanted to believe*. Did I somehow fool myself? If so, I wouldn't be the first!

AN ANCIENT ORACLE?

Modern ouija boards have been popular for well over a century. But the basic idea is much, much older than that. Ouija-like devices go back at least as far as ancient Greece and Rome—and they've been fooling people just as long. They've been invented many times in many different cultures. They take many forms, but all such devices combine three things:

- 1) A written alphabet or some other way to indicate answers;
- 2) Some easily moved object for spelling or pointing to answers, such as a swinging pendulum or the ouija board's light little pointer;
- 3) A belief that the pointer is moved by mysterious forces, not by the people using the device.

For example, one such ouija-like device was built almost 1,700 years ago by Roman soothsayers. Their device was a round metal dish with the alphabet carved around the outside edge. To consult this oracle, the soothsayers went through a purifying ritual and then dangled a ring over the dish on the end of a thread—a kind of pendulum. The ring swung toward various letters to spell out answers.

The soothsayers asked their oracle to predict the name of the next Emperor. This turned out to be a very bad idea.

Their fortunetelling device predicted that a Roman official named Theodorus would rise to the throne. In fact,

Theodorus actually was conspiring to become Emperor.

Unfortunately for them, the ruling Emperor Valens found out about the prophecy and the conspiracy. He wasn't pleased—and Valens was a bad tempered man. He had countless people arrested, tortured, and executed: not just Theodorus, the soothsayers, and others involved in the plot, but even people who had merely *heard* the failed prophecy. The Emperor's forces arrested anyone even slightly suspected of disloyalty or dabbling with magic. Many innocent people were killed. Others had their property seized and were sent into penniless exile.

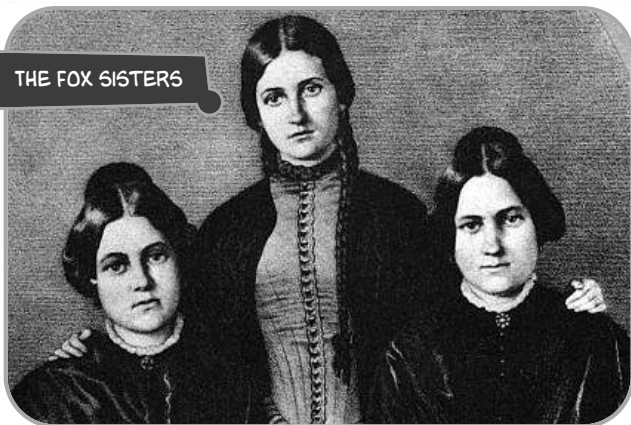
Was this the most deadly ouija prediction of all time? Well, not quite. This Roman device was ouija-like, but it wasn't a ouija board. It did use a written alphabet to spell out messages, but it did not use a sliding pointer. It used a swinging pendulum instead.

Ouija boards, mystical pendulums, and dowsing rods are all devices used for "divining" (attempting to learn or find something using magic or paranormal forces). Dowsing rods, for example, are sticks or wires that supposedly point out water and other substances.

Divining devices have been common for millenia. Some were similar to ouija boards. But the fully modern ouija board could not be invented until all the right pieces were in place.

ANCESTORS OF THE OUIJA

THE FOX SISTERS



We'll learn that the origin of the modern "talking board" remains shrouded in mystery. But the ouija board was not invented all at once. It grew out of older beliefs about contacting supposed spirits. It was based upon earlier devices intended to help spirits communicate with the living.

That story begins in New York state—with a childhood prank! One night in 1848, 15-year old Margaret Fox and her 12-year old sister Kate tied an apple onto a string and snuck it into bed. In the darkness, as they pretended to sleep, the girls "would drop the apple on the floor, making a strange noise" that fooled their superstitious mother into thinking the house was haunted.

Their prank worked better than they ever dreamed. It changed the girls' lives—and soon started a new religion!

Margaret and Kate repeated the mysterious bumping sounds night after night. Their poor sleepless mother became "almost sick" with terror and exhaustion. Then the girls added a new twist. Margaret called out to their pretend ghost and it thumped back in response, answering questions with different numbers of bumps. The girls convinced their parents and neighbors that they could communicate with ghosts!

The girls had an older, married sister who quickly saw this as a business opportunity. She took charge of the girls' new career as "mediums"—supposedly, "psychics" with an ability to communicate with spirits of the dead. The Fox sisters thought up more tricky ways to produce the illusion of communicating with spirits. They learned how to produce rapping sounds secretly with their feet, and even to make it appear that spirits were levitating small tables.

The Fox sisters became a sensation. They amazed the public, and inspired imitators. Many other people soon claimed that they too were mediums. Thousands of believers flocked to rituals called *séances*, where mediums in darkened rooms claimed to summon spirits. It was the

beginning of a new religion called Spiritualism.

At first, most of these supposed spirits seemed happy to communicate in the same ways the Fox sisters made famous: rapping noises and "table tipping." Believers would sit down with a medium around a table and place their hands on the table's surface. Soon the table would appear to tilt, move, or jump about on its own, sometimes tapping out messages.

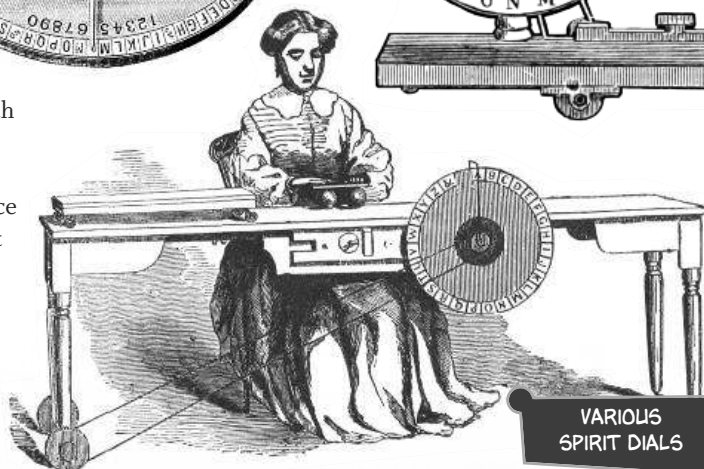
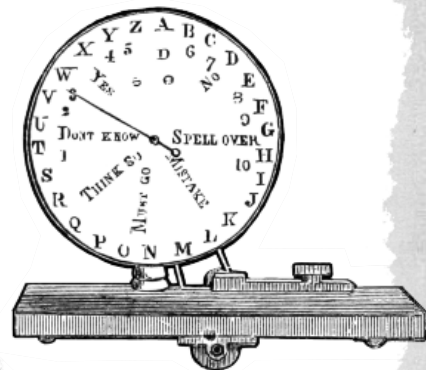
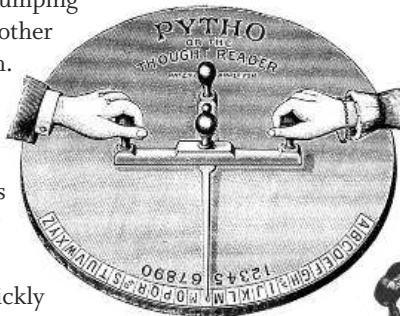
But spelling out answers with the thumping of a table wasn't very efficient. Even the simplest message took a long time! Believers found table tipping a "tedious and inconvenient" way to receive messages. Soon they began to ask a sensible question: if the spirits had the power to lift and shove full-sized tables, couldn't they move something smaller and easier to use?

Searching for a Better Way

According to one* important early promoter of spirit communication, "This suggestion was made simultaneously in America, in France, and in various other countries." He wrote that one idea for easier communication appeared in Paris in 1853. During a *séance* that summer, a spirit message gave instructions to "Fetch the little basket from the next room; fasten a pencil to it; place it upon a sheet of paper; put your fingers on the edge of the basket." The idea was that spirits would guide people's hands to move the basket, causing the pencil to scrawl out messages on the paper.

This invention was one of the direct ancestors of the ouija board—a simple device called a "planchette," which we'll come back to shortly.

At almost the same time, others began to experiment with



VARIOUS SPIRIT DIALS

various other more complicated machines to spell out “spirit” messages without the hassle of table tipping. One American clockmaker came up with a spirit communication machine that resembled a dial-faced clock. In a circle around the outside of the dial he wrote the alphabet, the numbers 1–10, and some simple answers such as “Yes,” “No,” and “Don’t know.” When in use, a needle similar to the minute hand of a clock would swing around to point to letters and spell out answers.

It’s unclear exactly how this device worked, but another inventor improved the design and dubbed it a “Spiritoscope.” This version had a lever on which a medium would place his or her hands. Slight pressure on the lever caused the needle to rotate around the dial. He also built another machine that combined table tipping with an alphabet dial. A medium would sit with his or her hands on top of table mounted on wheels. If the table rolled left or right, a pulley caused the alphabet dial to rotate.

Another dial machine advertised as “Pytho the Thought Reader” worked when multiple people took hold of knobs attached to the pointer. The spirits were supposed to guide their hands to rotate the pointer.

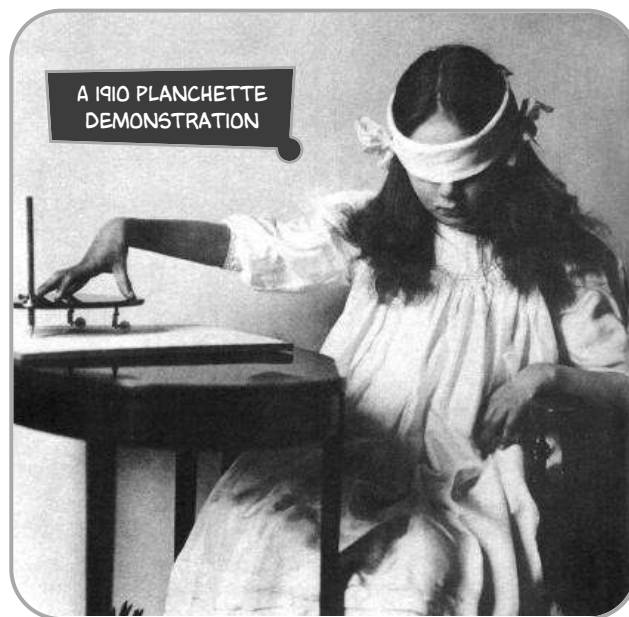
Together with table tipping and the planchette, the early spirit dials were direct ancestors to the ouija board. The dial devices had two things in common with the ouija: they spelled out messages using a pointer and a written alphabet; and, like the planchette, *they only worked if someone was touching them*. This fact would later provide the clues needed to solve the mystery.

The Planchette Craze

The improvised basket-and-pencil planchette was quickly improved. Soon many businesses sold heart-shaped wooden planchettes (“planchette” means “little board”). Most had two swivelling wheels for easy movement, plus a pencil as a third leg. The planchette immediately took off in France as a wildly popular fad that eventually spread through Europe and around the world. Planchettes were introduced to America in 1860. They took time to catch on, but then exploded as a nationwide craze in the late 1860s.

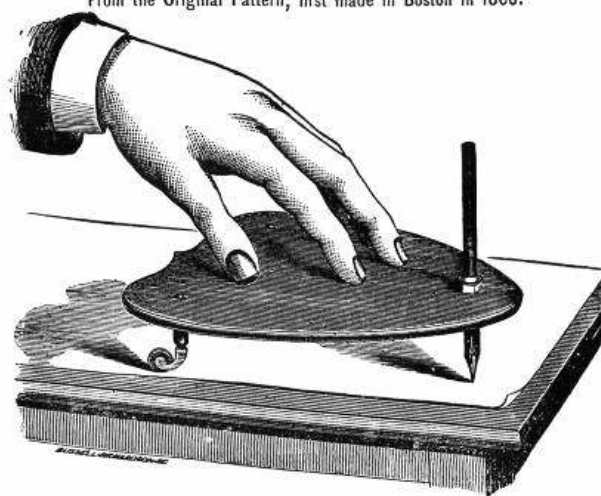
Planchettes had many advantages. They were simple to make and cheap to buy. Also, planchettes did not require people to seek out a medium. Anyone could buy a planchette and try it for themselves at home. Hundreds of thousands of people did just that.

Planchettes were a tool for “automatic writing”—writing words without feeling consciously aware of what you are writing. Anyone who’s ever absent-mindedly doodled while thinking about something else has an idea of how this feels. Spiritualists did not believe they were merely distracted when writing automatically using a planchette or a loosely held pencil. They believed that their hands were guided by spirits to deliver important messages from the afterlife.



THE BOSTON PLANCHETTE.

From the Original Pattern, first made in Boston in 1860.



What is hidden
hidden and
cannot be disclos
ed by Planchette

AN EXAMPLE OF WRITING DONE WITH A PLANCHETTE

INVENTING THE OUIJA

The mysterious ouija is one of the most popular board games of all time. They feature in countless books, movies, and television programs. Court battles have been fought over ouija boards. They've entertained, inspired, baffled, and sometimes frightened millions of people.

But who invented the ouija board? Here's the weird thing: no one knows!

A toymaker named William Fuld made the ouija board famous in the 1890s, but he didn't invent it. He bought the rights to produce ouija boards from a man named Elijah Bond and his business partners. Although Bond came up with the name "Ouija" and patented the game in 1891, he didn't invent it either. So where did it come from?

Evolving Spirits

The planchette and spirit dials were improvements over table tipping—better, faster, easier ways to spell out supposed spirit messages. But Spiritualists still weren't satisfied. Automatic writing with a planchette was tricky, and the messages were difficult to read. Spirit dials were complicated, expensive contraptions.

No one knows who first thought to combine the best parts of both: a clearly written alphabet, and a cheap little planchette to use as a pointer. It's probably an idea that occurred to a number of people. Certainly by the 1870s, some Spiritualists had started to write out the alphabet on homemade cards or tabletops to use with their planchettes.

Then, in 1886, these "talking boards" suddenly burst into the pages of newspapers across America. They had become a popular regional craze, "setting whole communities of eminently sober and respectable Ohio people on their heads." The long-popular planchette was "simply nowhere...compared with the new scheme for mysterious communication" with spirits.



Talking Boards Take Over the Country

The 1886 talking boards and their use were practically identical to the ouija boards sold in stores today. As one news story explained,

Any one can make the whole apparatus in fifteen minutes with a jack-knife and a marking brush. You take the board in your lap, another person sitting down with you. You each grasp the little table with the thumb and forefinger at each corner next you. Then the question is asked, "Are there any communications?" Pretty soon you think the other person is pushing the table. He thinks you are doing the same.

As the pointer spelled out messages, seemingly by itself, people reacted in much the same way that they do today. Most were entertained. Others felt "superstitious awe" when they appeared to receive messages from dead loved ones or predictions of future events. And some worried that talking boards were evil or dangerous. The first news reports mentioned one family that became so obsessed that the father burned their board.

Despite such concerns, papers reported, "Nearly everybody is now crazy over the latest fad, the 'Talking Board.'" With so many people going "wild over" homemade boards, one toy company decided to produce them for sale. They even sent one of their "witch boards" to the President of the United States! Grover Cleveland graciously replied:

I acknowledge with thanks the "witch board" which you sent me as a wedding present. I accept it as an evidence of kind feeling and friendship and can admire it for its ingenuity, but I hardly think that I shall immediately test its power to "disclose the past and forecast the future."

Naming the Ouija Board

Talking boards had already been popular for a few years before Elijah Bond and his partners patented a device they called the "Ouija or Egyptian luck-board." Bond described the ouija as a "toy or game" meant to amuse two or more people. The game was played "by asking questions of any kind and having them answered by the device used and operated by the touch of the hand, so that the answers are designated by letters on a board."

Bond applied for his "Ouija" patent in 1890, giving talking boards the famous, trademarked brand name currently owned by the toy company Hasbro (which also produces Monopoly, Transformers, Nerf, and My Little Pony). "Ouija" combined the French word "oui" with the German word "ja." Both words mean "yes," so Bond's question answering game was a "yes yes" board!

By Christmas of 1890, "The Ouija—the Wonder of the Nineteenth Century" was for "sale by all first-class Toy Dealers and Stationers."

Trouble in the Midst of Success

Ouija boards were a hit. They weren't the first talking boards to reach the market, but they were the first to become famous and make a lot of money. Their success inspired countless imitations. But ouija boards dominated all competitors, including the earlier toy company that sent their "witch board" to President Cleveland. The witch board company soon announced that they "could not compete with the widely known and wonderful 'Ouija,'" so they were getting out of the talking board business altogether.

The early years of the ouija business were successful, but also messy. We can skip over the details, but there were lawsuits, partners forced out, bitter fights about who "really" invented the ouija, and legal battles to stop the sale of imitation talking boards.

In the midst of all that, a young man named William Fuld became the person who made "Ouija" a household name—and he got rich doing it. Fuld filed new patents for improvements to the game. He worked for the original ouija business, then formed a new company with his brother Isaac. The brothers paid for the right to make the boards, but William later forced his brother out of the business. This caused a bitter feud and court battles between them. In the end, William held the exclusive right to make ouija boards. The courts ordered his brother to stop making talking boards of his own.

Booming Board Business

William Fuld made millions from the sale of ouija boards. His family controlled a profitable, popular product for seven decades. His elderly son eventually sold the game to board game company Parker Brothers in 1966.

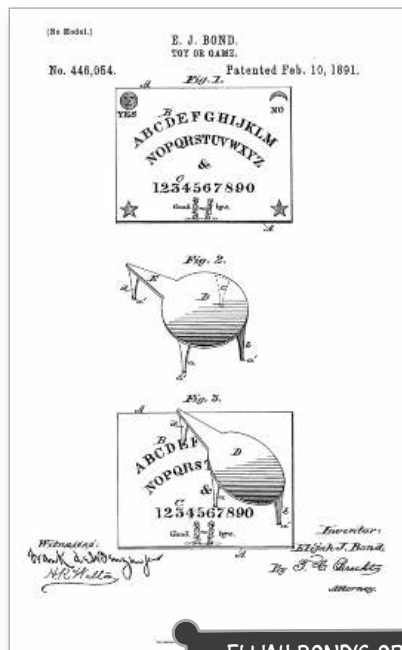
For Fuld, the ouija was a business success story, not a mystery. He did not think the boards contacted spirits. "Believe in the ouija board?" Fuld laughed. "I should say not. I'm no spiritualist." His original ouija patent described the device as a "parlor game." It worked through the "involuntary muscular motion of the hands of the players, or through some other agency," he added vaguely.

However it worked, people flocked to the game, especially during times of trouble. Ouija board use repeatedly exploded

as a popular fad. For example, there was a huge ouija craze soon after the end of World War I. Countless people hoped to contact loved ones who lost their lives in the war. By Christmas 1919, stores were struggling to keep the game in stock. According to one of New York's largest department stores,

It is safe to say that the demand for ouija boards has increased 500 per cent within the last few months. They are the most popular 'playthings' on the market, and at this store alone close to 2000 have been sold within the last few days.

There was another ouija board craze in 1944 during World War II. Newspapers reported that the latest fad was the result of people's "deep-rooted anxieties" about the safety of friends and relatives fighting in the war. The popularity of ouija boards surged yet again during the years of the Vietnam War. In 1967, papers reported that ouija board sales had tripled since the year before. Well over two million ouija boards were sold in 1967, making them briefly more popular than Monopoly.



ELIJAH BOND'S ORIGINAL OUIJA PATENT



A CLASSIC OUIJA BOARD

Taxing the Ouija

All those sales meant profits. Profits lead to tax. Amusingly, ouija boards once went all the way to the U.S. Supreme Court in an attempt to pay less tax. In 1920, the makers of the game went to court to argue that it wasn't really a game, and should not be taxed as a game. The ouija was a "form of amateur mediumship and not a game," the

company claimed. They lost, then appealed the decision in a higher court. Everyone agreed that some people used the ouija in serious attempts to communicate with spirits. Nevertheless, the appeals court decided, the ouija was patented as a game. Also, "it is very largely sold" as a means of "social amusement or play and is actually so used." Therefore the ouija should be taxed as a game. Finally the company applied to the U.S. Supreme Court, but the court decided to throw out the case.

GHOST WRITER?

For some, the ouija board was a way to find personal freedom and creative inspiration. In 1915, a quiet housewife named Pearl Curran suddenly became famous for claims about a highly creative spirit guide she called “Patience Worth.” She claimed that Patience Worth constantly dictated books, plays, and poetry to her through the ouija board. Curran published several of these novels and poetry books, all supposedly authored by a ghost. (Not to be outdone, one of Curran’s close friends also published a book written by ouija board—dictated, she claimed, by the spirit of Mark Twain!)



PEARL CURRAN

Readers and critics loved the Patience Worth books. One review praised her work as a “world literary marvel.” Curran’s fans believed that the books were written by a genuine spirit. But doubters said the whole thing was a “fraud and a delusion” designed for “notoriety and making a fortune.” Was Curran pretending? There are two big clues that she was.

Patience Worth “spoke” in old timey language because she was supposed to have died two centuries earlier. (“Mayhap thou sendest thy men,” and suchlike.) But language experts said this was fake. “The language employed is not that of any historical age or period,” said one expert. Instead, Patience showed “clear misuse, misunderstanding and even invention” of terms and phrases. Patience also sometimes wrote in modern English about periods long after her supposed death.

It seems that Curran may have slyly admitted the truth. In 1919, a professor published a psychology paper arguing that Curran had multiple personality disorder. That same year, Curran published a short story written in her own name (later made into a movie). The main character is a woman so depressed in her dead end job that she *pretends* to have another personality—a bolder, more exciting personality—and winds up convincing a psychologist that she has multiple personality disorder! The character comes clean at the end of the story. She explains that pretending to be another person helped her to express herself and find success in life. “I didn’t mean no harm to nobody,” she says. “I just didn’t want to be me. I was sick of myself. ... Every rusty hope in me broke loose.” It’s likely Curran did the same thing. “Patience Worth” changed Curran’s boring old life, launching her career and unleashing her creativity.

A DEADLY GAME?

From the beginning, a few people worried that talking boards had a dangerous, darker side. However, these fears were not common during the first several decades of the ouija’s popularity. One 1919 book, *The New Black Magic and the Truth about the Ouija-Board*, did warn that “the board should not be tolerated in any Christian household or placed within the reach of the young.” And one Catholic priest made headlines in 1920 with claims that the “ouija board is an instrument of the devil.” But Spiritualists thought talking boards were wonderful. Most other folks simply viewed them with amusement.

In the 1970s that started to change. Horror movies such as *The Exorcist* portrayed ouija boards as supernatural gateways for evil spirits or demons. Some people claimed that this was true in real life. The ouija developed a new reputation as the most sinister game in the world.

Devils and Demons?

Stoker Hunt’s 1985 book *Ouija: The Most Dangerous Game* was written during a time when many religious people in America feared that vast numbers of Satan worshippers were secretly infiltrating society. We now know that these fears were based on urban legends, not a genuine danger. But many Christians feared that Satanists were kidnapping, torturing, and murdering people by the thousands. They also worried that these supposedly common and powerful cults were trying to lure children into worshipping Satan. Christian writers claimed that Satanists used Dungeons & Dragons, ouija boards, “and other occult games” to turn innocent teens into cult members.

None of these claims turned out to be true.

Panic about Dungeons & Dragons was frankly pretty silly (a topic for another day), but concerns about ouija boards made more sense—at least from a certain point of view. Christian author Edmond Gruss explained some of those concerns in his book *The Ouija Board: A Doorway to the Occult*. First, séances, planchettes, and talking boards were all invented as part of the religion of Spiritualism. Spiritualists believe these are tools for communicating with the spirits of the dead. Christian writers complained that many “spirit” messages agreed with Spiritualist beliefs and disagreed with Christian beliefs. For example, Christians and Spiritualists both believe in an afterlife. However, many Christians believe that the living are not permitted



IF DEMONS DID EXIST,
WOULD THEY PLAY
BOARD GAMES?

to contact the dead. Some also believe in the existence of harmful demons. For that reason, they consider any attempt to contact “spirits” to be highly dangerous. “The Ouija,” they say, “opens the doors to the supernatural, to supernatural attack.” Christian writers have claimed that ouija use can cause people to become “possessed”—to have their bodies invaded and taken over by demonic spirits.

However, these religious beliefs are purely matters of faith. They have no basis in scientific fact. There is *absolutely no believable evidence that spirits, demons, or possession are real things*.

So does that mean ouija boards are harmless fun after all? Well, sure—except when they aren’t!

Don’t Trust an Unreliable Source!

The biggest real risk of using a ouija board is *believing messages that aren’t true*. No one should rely upon information or predictions from a ouija board! A ouija board may accurately repeat things the players already know or guess, but it cannot magically divine new information. Nor can it foretell the future.

On this fact, scientific skeptics, paranormal researchers, and Christian critics completely agree: ouija board answers are often totally false, and sometimes ridiculous nonsense. Even the ouija’s biggest fans agree that the game is not a reliable source of information. Pro-ouija author Gina Covina urged readers of *The Ouija Book* to “do without...the notion of true and false” and approach “Ouija messages as if they were dreams.” They might give us clues about our own subconscious hopes or worries. However, we should not expect “literal, logical” meaning from ouija messages, Covina wrote.

It’s important to remember that advice. Ouija board answers are not reliable, even when they sound detailed and convincing. One Canadian researcher described a typical case. A ouija board gave specific details about a supposed drowning accident, including a street address for the victim’s brother. However, “that information was utterly false. The address didn’t exist. The brother didn’t exist.” The drowning never happened at all.

The True Dangers of Ouija Boards

Completely false messages are common when using a ouija board. That’s to be expected. The ouija is basically a storytelling board game. As we’ll see, the players create the answers together. That’s fine if the game is played for fun. But ouija boards can cause problems *if the players don’t understand that the answers are make believe*.

When a ouija board said I would discover the Loch Ness monster, that was a completely bogus prediction, but it caused no harm. It merely encouraged my childhood fantasy. In other cases, however, false information from ouija boards has caused mischief, fear, injury, and even death.

For example, when one wealthy woman passed away, she left her fortune to “John Gale Forbes”—a man named by her ouija board. However, John Gale Forbes wasn’t a real person. He never existed. The woman’s living relatives had to go to court to sort out the mess.

Other people have been intensely terrified by untrue ouija predictions of death or disaster. *Ouija: The Most Dangerous Game* gave the example of a 12-year old girl who asked “When will I die?” The board (incorrectly) answered “13.” Unfortunately, she believed this false prediction. The poor girl was scared and depressed for an entire year, causing sorrow for her whole family.

Occasionally people have become so obsessed with their ouija boards that they’ve stopped taking care of themselves properly. Some have been committed to psychiatric hospitals. (Those people probably had other mental health problems, but the ouija may have made them worse.)

In rare cases, ouija board messages have provoked violence. There are reports of suicide, assault, and even murder. The most infamous of these is the bizarre 1933 case of Dorothea Turley and her daughter Mattie.

Murder by Ouija Board

Dorothea Turley was a New York beauty queen who married a sailor from the U.S. Navy. They settled in Arizona to raise their teenaged son and daughter Mattie on a ranch. Dorothea didn’t like living in the country. She became bored and unhappy. Then she fell in love with a “dashing cowboy.”

One terrible, tragic afternoon, 15-year old Mattie shot her father twice in the back while he was outside working in the corral. He was rushed to the hospital, where he survived for several days before passing away. At first everyone thought this was an awful accident. But Mattie soon confessed to the police that she shot her father on purpose.

Why? A ouija board told her to do it.

Dorothea and Mattie often played with the board. Mr. Turley said this was “a thorn in my flesh for years. It always told them to do whatever they wanted to do against my wishes.” One day, Mattie explained, “Mother asked the Ouija board to decide between father and her cowboy friend.” The pointer moved and “spelled out that I was to kill father.” The board spelled out detailed instructions for Mattie. It said she wouldn’t even get in trouble. Horribly, a few days later, Mattie did as she was told.

Mattie pleaded guilty to her crime. Mr. Turley survived in the hospital long enough to call Mattie an “an uncontrollable girl who deserves a sentence in the reform school.” That’s exactly what happened. But it also appeared that Dorothea had used the ouija board to trick her daughter into committing murder. Dorothea was arrested, convicted, and sent to prison.

SOLVING THE OUIJA MYSTERY

We've learned how the ouija was invented, and how it became a wildly successful board game. We've seen how it has inspired people, but also how it can create problems if its unreliable messages are taken seriously.

Now it's time to answer the big question: *how do ouija boards actually work?* To find out, we need to go back to the beginning.



Something More...?

You'll recall that Spiritualism began with trickery. In 1848, the Fox sisters learned how to produce the illusion that they were communicating with spirits. Many imitators soon claimed that they too could summon spirits at séances. This in turn inspired widespread crazes for table tipping, then planchettes, and eventually ouija boards.

There's no doubt that the Fox sisters and other mediums routinely fooled their audiences. They faked the appearance of miracles. The Fox sisters later confessed. Many other mediums either came clean or were caught cheating.

While Spiritualists knew such cheating was common, they were convinced that trickery wasn't the whole story. It was one thing for phony psychics to fool strangers during séances. But people also gathered with their own trusted loved ones to experiment with table tipping. Everyone swore they weren't moving the table on purpose—but still the table moved! Clearly *something* was happening. Other people tried planchettes, automatic writing, ouija boards, dowsing rods, or pendulum divining. These devices *all appeared to work even when there was no one else around.*

Seeking Answers

How could the mysterious movements of those devices be explained? Users knew for a fact that they weren't deliberately faking anything. They reasoned that spirits must be responsible. But was this truly the best explanation?

Most scientists dismissed such claims as superstitious nonsense. Nevertheless, there were a few scientists who considered table tipping, dowsing rods, and similar paranormal claims to be genuine unsolved mysteries. Some became curious enough to investigate.

Amazingly, the correct solution was named by science just four short years after the Fox sisters first frightened their mother. A doctor named William Carpenter argued

that the movements of divining devices such as dowsing rods and magic pendulums

were caused by something he called the “ideomotor effect”—that is, muscle movement (“motor”) triggered by an expectation or idea (“ideo”).

Carpenter believed that these divining devices worked because of the “expectant attention” of the person who held them.

He reasoned that “*anticipation of a given result...directly and involuntarily prompts the muscular movements that produce it.*” For example, if someone *expects* a pendulum they're holding to swing in a certain direction, unnoticeably tiny muscle movements will tend to *make it swing that way.*

Testing a Magic Pendulum

The ideomotor effect had actually been discovered decades before Carpenter gave it a name. A French scientist named Michel Chevreul had privately come to the same conclusion in 1812 after experimenting with a divining pendulum. Chevreul had been told that the pendulum would swing in different specific ways if held above a variety of substances—water, mercury, small animals, and so on. After seeing this demonstrated, he tried it himself. Sure enough, the pendulum moved just as it was supposed to, even though Chevreul tried his best to keep his hand completely still. He was “quite amazed” that the swinging slowed to a stop whenever a pane of glass was inserted between his mercury sample and the pendulum. When the glass was removed, the pendulum started swinging again, as though it could detect the mercury.

Clearly the divining pendulum “worked”! But how? Chevreul suspected he might be fooling himself. He wanted to find out whether the pendulum's movement was “truly independent from any type of muscular movement in my arm,” he said. So he tried two tests.

He used a wooden brace to prevent movements from his arm and then his fingers. When his arm was braced, the pendulum swung less. When his fingers were also braced, the pendulum didn't move at all! “That caused me to think that quite probably a muscular movement that was taking place unbeknownst to me” was causing the pendulum to swing.

Then he blindfolded himself. He had an assistant hold the

glass under the pendulum and then remove it, several times at random. It turned out the pendulum did not react to the mercury or the glass unless Chevreul could *see how it was supposed to react*. He concluded that there was an automatic, unintentional “tendency to movement in a specific direction” whenever he *expected* that movement. It *felt* like the pendulum moved on its own, but it didn’t. This showed “how easy it is to take illusions for realities,” Chevreul said.

Chevreul and Carpenter’s ideomotor explanation also turned out to explain table tipping—and the ouija board.

The Ouija’s Simple Secret

There was always an obvious clue to the mystery of divining devices such as ouija boards, planchettes, and mystic pendulums: none of these devices work unless someone is touching them. How does the ouija’s pointer move over the board? Simply put, “we push it with our fingers,” admits *The Ouija Book*.

This pushing can take two different forms. Sometimes someone cheats and pushes on purpose. Phony mediums had many tricks to make tables appear to move and float. Likewise, ouija users may deliberately move the pointer without the other players’ knowledge. This is probably what Dorothea Turley did to deceive her daughter Mattie.

But people may also move a table or ouija pointer *without realizing they are doing it*. This is just what scientist Michael Faraday found in 1853 when he put table tipping to the test. Faraday gathered some “very honourable” volunteers. All were “successful table-movers” who insisted “that the table moves the hands and not the hands the table.” As it turned out, they were mistaken.

Faraday decided to test their sincere belief that they were pressing straight down on the tabletop and not pushing the table horizontally. He made a stack of “four or five pieces of smooth slippery cardboard...attached one over the other by little pellets” of sticky, gum-like adhesive. He placed this under the hands of his table-tippers. If the table moved first, it would drag the bottom sheets of cardboard out of alignment. But it was the top sheets of cardboard that moved the most. This showed that the hands had pushed the stack of cardboard along, and the “table had followed and been dragged by it.”

Faraday did several more tests. He made various contraptions with needles that would tip one way if the table moved on its own, but tip the other way if the person started pushing. When the volunteers could see the needle, the table didn’t move. But if the needle was not visible, they soon started pushing the table in the expected direction without realizing that they were doing so.

Faraday concluded that Carpenter was correct. Table tipping worked through the ideomotor effect.

Ouija: An Ideomotor Board Game

The ouija board works the same way: tiny unconscious muscle movements cause the pointer to start sliding. It *feels* like the pointer moves on its own, but actually the players *make* it move.

A 2018 study by Marc Andersen and his colleagues (“Predictive minds in Ouija board sessions”) helps explain how this works—and why it feels so spooky. The team asked pairs of volunteers at a paranormal conference to play with a ouija board. Eye-tracking cameras recorded exactly where the players looked while they played. At first the pointer moved to letters at random. But once it started to spell something, one person or the other would often glance ahead to the next letter. They *expected* the pointer to move in a certain direction, and then it did.

Imagine that the players had asked the board to name an animal, and the pointer went to the letter “C.” That could be the beginning of “chicken,” or “cow,” or lots of other critters. But often one player would guess what the next letter might be—say, an “A.” Their expectant attention and the ideomotor effect would then tend to move the pointer toward that letter. Once the board spelled “C-A,” both players might expect the next letter to be a “T,” causing the pointer to move there next.

This is why the game works best with two or more players: the players basically take turns being surprised about what happens next. Also, every player underestimates how much he or she is moving the pointer. This all adds up to a powerful, spooky illusion that the board spells words by itself—even though the players create the answers together.

Experimenting with the Ouija Yourself

Ouija boards have sometimes confused people who had mental health problems. They can frighten people who take ouija messages seriously. Also, they can be very upsetting for people struggling with something like the death of a loved one. But if you would like to try the game with friends, it is one way to feel the ideomotor effect for yourself. The right mood will help get the best results. Sit down with calm, relaxed concentration. It might be best to set aside your skepticism as much as possible, just for a few minutes, and let your imagination free. (People who think that the ouija has paranormal powers find the moving-on-its-own illusion more convincing than skeptics do.) Be open to *receiving* messages—but remember not to *believe* them!

FURTHER READING

TO LEARN MORE, CHECK OUT THESE VERY HELPFUL ONLINE RESOURCES:

MYSTERIOUSPLANCHETTE.COM
MUSEUMOFTALKINGBOARDS.COM
WILLIAMFULD.COM

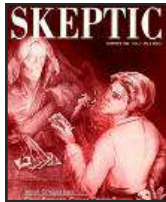
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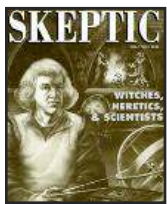
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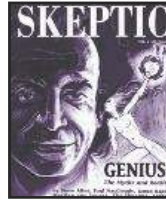
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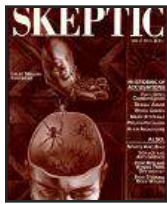
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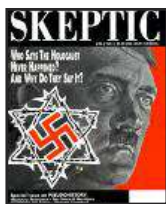
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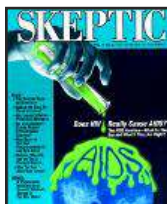
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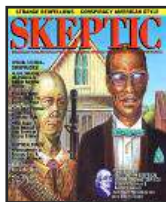
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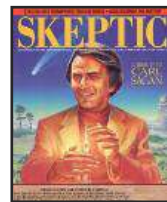
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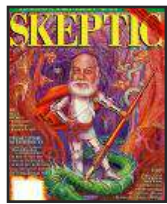
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magv4n3-Conspiracy: Jerry Brown Interview by Miele; World's End by Callahan; Farrakhan & Paranoid Style by Brackman; Freud's Follies by MacDonald; Political Correctness Conspiracy by Siano; End of Science by Horgan; End of Science Illusions by Casti; Heretic-Personality by Shermer; Hollywood ET by McDonough; Mesmerism by Ben Franklin, Antoine Lavoisier; *Bell Curve* Book Cracks; Randi on Police Psychics; Tomorrow? by Leikind.



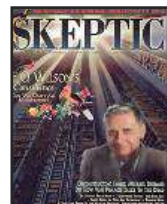
magv4n4-Is History A Science? Tribute to Carl Sagan: Can History Be Science?; F. Sulloway on *Born to Rebel*; Early Ghost-busters; Debunking Nostradamus; Critical Thinking About History; Norm Levitt Replies to Critics; R. Olson on Left & Right Science; What Happened to N-Rays?; Randi-How To Be Psychic: Im-moral Creationism. Reviews: Evolution & Literary Theory; Killing of History; Amazing Kreskin. Dumbth News.



magv5n1-Ecology: Economists v. Ecologists by F. Miele; Scientists' Warning to Humanity; Julian Simon Interview; Not-So-Wise Use Movement by P. Lindholdt; Population Risk Assessment by E. Shneour; Myth of the Beautiful People by M. Shermer; Ancient Astronauts by E. Wojciehowski; Dumbth News by R. Cassingham; Modern Demonology by F. Crews. Randi's Swift: Dowsing, Human Magnetism, Pegasus Awards, Futurists.



magv5n3-Anthropology: Interview: Donald Johanson; Human Origin Stories by Miele; God & Ghost Dance by Shermer; Mead & Anthro. by Freeman; Indians v. Archaeologists by Feder; Millennium by Stephen Jay Gould; Dumbth News by Cassingham; Di Conspiracies by Gerlich; X-Files Meets Disney by McDonough; Houdini v. Margery by Polidoro; Fairies Frauds by Randi; Alternative Medicine by L. Jaroff; Reviews.



magv6n1-Science & Society: E.O. Wilson Interview by F. Miele; Review of Wilson book by B. Siano; Van Praagh-How He Talks To the Dead by M. Shermer, plus Commentary by G. Posner; Skeptical Of Objective Journalism by A. Kitty; GRE As Fringe Science by K. Oldfield; Drug Policy Debate Guide by E. Goode; Fraud In the Name of Religion? by M. Fried; New Age High Tech by J. Randi; Dumbth News; Evil Eye by G. Bohigian; Reviews.



magv6n2-Taking God Seriously: Deepak Chopra Danger by P. Molé; Ray Hyman Interview; Atheist v. Agnostic by Shermer; Karl Popper On God; TT Wars by L. Sarnar; Against God by M. Pigiucci; For God by B. Mazet; Answering Creationists by T. Edis; Intellectual Danger by J. Randi; Self-Help Coach by D. Lease; '97 Dumbth Awards by R. Cassingham • Jr. SKEPTIC: TT & Me by E. Rosa; Lucky 7 by E. Antisdale; Web reviews by C. Walker & S. Kinney.



magv6n3-Why Professors Believe Weird Things: Sex, Race, & the New Left by N. Levitt; Susan Blackmore Interview; Is God Dead? by M. Shermer; Meme Critique by J. Polichak; Alternative Religion Supporters by S. Kent & T. Krebs; Facilitated Communication by B. Gorman; Snake Oil Psychotherapy? by T. Dineen; Randi on True Believers, Waco. Jr. SKEPTIC; Bigfoot! by Harter; Crystals by A. Chesworth; Golfball Finder by Cohen.



magv6n4-JFK: Jack Horner Interview; JFK-Facts & Fictions by N. Gerlich; JFK-Case Still Open by A. & M. Snyder; Pope & Science by M. Shermer; Anastasia: Miraculous Survival Myth by T. Callahan; Dumbth News by R. Cassingham; Dowsing Challenge by Randi; Ig Nobel Awards by S. Gibson • Jr. SKEPTIC; Aliens Among Us? by A. Chesworth; Abducted! by M. Shermer; Psychic Math! by A. Benjamin; UFO Photos



magv7n1-Influence: Carol Tavis Interview; Fraud & Science by *D. Kevles*; Biologist Views Belief by *K. Parejko*; Christian Science & Quantum Physics by *R. Miller*; Hypnosis Reconsidered by *B. Seidman*; Public Relations by *B. Siano*; Communication's Hidden Dynamics by *D. Brenders*; The Knowledge Filter by *M. Shermer*; Alternative Medicine by *H. Zief*; Randi Addresses Congress; Dumbth by *R. Cassingham*; Jr. SKEPTIC: Fortunetelling.



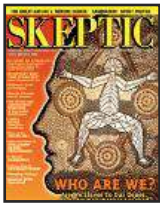
magv7n4-Pseudoscience: Interview of Phil Klass by *Posner*; Sagan Bios by *Shermer & Morrison*; Holistic Healing by *Molé*; Phantom Assaults by *Bartholomew & Goode*; Satan Panic by *Wade*; Penis Panics by *Bartholomew*; Eye Movement Therapy by *Rosen*; Sai Baba by *Gogineni*; Thought Field Therapy by *Swenson*; Lilienfeld & McNally; Photo ESP by *Kauffman & Brown*; Psi Missing by *Riniolo & Schmidt*; Jr. SKEPTIC: TV Psychics.



magv8n3-Chaos & Complexity: Jared Diamond Interview by *M. Shermer*; Quick Introduction to Chaos Theory by *F. Miele*; Chaos Skepticism by *M. Pigliucci*; Contingencies by *M. Shermer*; Latest Cosmology by *R. Ebert*; Complex Systems by *L. Lam*; Darwin Bumper Fish by *S. Gibson*; Randi on Cold Reading; Reverse Speech by *W. Langstoni & J. Anderson*; Cultural Relativism by *R. Bartholomew*; Stephen Jay Gould Festschrift.



magv10n1-Roswell Requiem: by *B. D. Gildenberg*; Psychic For A Day by *M. Shermer*; HAARP Conspiracy? by *D. Naiditch*; Fear by *D. G. Myers*; Blind Research by *R. Sheldrake*; Pet Psychics by *B. Farha*; Three Views Of Time Travel by *A. Bernardin*, *M. Shermer*, and *T. Dace*; Skeptical Maxims: by *J. Hrynshyn*, *J. Gribbin*, *P. Molé*; Homeopathy by *Randi*; Evolutionists Give Up by *B. Muller*; Jr. Skeptic: Alien Life by *D. Loxton*



magv11n2-Nature v. Nurture Human Nurture by *H. D. Schlinger*; A Consilient View of Human Behavior by *F. Miele*; Are Sports Streaks Random? by *A. Bernardin*; Alternative Health Journalism by *C. Bowerman*; A New Chronology of History by *J. Colavito*; Spiritualists Prove Religion With Science by *P. Firenze*; How to Investigate by *J. Randi*; Politicization Of Science by *D. O. Kridler*; Mexican UFOs by *J. C. Smith*; Cryonics by *G. Benford*; Jr. SKEPTIC: Sasquatch by *D. Loxton*



magv12n2-Artificial Intelligence Quest by *P. Kassan*; Design Illusion by *R. Dawkins*; Dover ID Trial by *B. Humburg & E. Brayton*; ID as Scientific as SETI? by *R. Camp*; Young Earth Creationists by *J. Rosenhouse*; Other ID Theories by *D. Brin*; Ted Serios's Camera Brain by *C. Campbell*; Omnitron by *Randi*; Coral Castle Enigma by *W. Stansfield*; Jr. SKEPTIC-Pyramid Power by *D. Loxton*. REVIEWS: 9/11; Privileged Planet Film; Republican War on Science



magv14n1-Global Warming: G W Skepticism by *P. Frank*; How We Know Warming Is Real by *T. Schneider*; Global Warming Solutions by *W. Calvin*; Hydrogen by *A. Friedemann*; Last Chance to Win \$1,000,000 by *J. Randi*; Detox Quackery by *H. Hall*; Houdini & Séance Fraud by *S. E. Rivkin*; Kong & Nessie by *D. Loxton*; Journalism's Flaws by *S. Salerno*; Supernatural Claims by *C. T. Palmer*, *K. Coe*, & *R. L. Wadley*. Reviews: Dragons by *Loxton*



magv14n4-Ponzi: Ponzi Scheme Psychology by *S. Greenspan*; FAITH HEALING: Medicine by *K. W. Krause*; Benny Hinn by *R. Shaffer*; Peter Popoff by *M. Carrier*; Self-Esteem Myths by *S. Salerno*; Gulf War Syndrome by *H. Hall*; Randi on Double Blind Studies; Evaluating Science Claims by *R. M. Barnes*, *A. L. Alberstadt*, & *L. E. Keilholtz*; Global Warming Consensus by *G. Whittenberger*. Reviews: Jr. SKEPTIC: *I. Rowland's* Psychic Cold Reading.



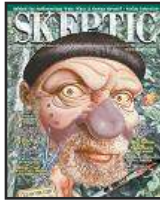
magv16n1-Happiness by *S. Salerno*; Zen Motorcycle Maintenance by *C. Edwards*; Genetic Tests by *H. Hall*; Gardner Tribute by *Randi & M. Shermer*; Changing Minds by *M. J. Kane*; Intellectuals v. Think Tanks by *M. Pigliucci*; Antony Flew's Conversion by *K. Grubbs*; Quantum Consciousness Myth by *M. Bief*; Mars Effect Statistics by *A. Y. Panjchin*; Sports Dominance by *S. Sniderman*. Jr. Sk: Griffins- Loxton.



magv7n2-Cloning: Science, Ethics of Cloning by *F. Miele*; Cloning & Science's Moral Limits by *M. Shermer*; Richard Seed Interview; Evolution Information by *R. Dawkins*; Evil & Group Selection by *N. Thompson*; Theology & Evolutionary Psych by *K. Konkola & G. Sunshine*; Fake Quotes by *J. George*; Medical Discoveries? by *H. Zief*; Population Myths by *D. Henige*; Humor by *S. Asma & D. Lease*; Randi's Pigasus Awards; Jr. SKEPTIC: Urban Legends.



magv8n1-Race & Sports: Black Domination by *J. Entine*; Race Sports Myths by *J. Hoberman*; Race Differences by *V. Sarich*; Meaning of Dominance by *M. Shermer*; Ernst Mayr Interview by *F. Sulloway & M. Shermer*; Free Energy by *R. Park*; Nonzero/Human Gaia by *D. Wilson*; Chiropractic by *S. Homola*; Attention Deficit Disorder by *J. Leo*; Geller Compass Trick by *Randi*; Mind/Body Problem by *W. Lee*; Women Skeptics? by *S. Gibson*; Jr. SKEPTIC: Darwin by *P. Linse*.



magv9n1-Anthropology Wars: Steven Pinker Interview; Intro to Anthro Wars by *F. Miele*; Science v. Spin Doctoring in Anthro Wars by *M. Shermer*; "Noble Savage"? by *P. Frank*; Margaret Mead Anthro Controversy by *P. Shankman*; Testing Mediums by *J. Randi*; Belief & New Transcendence by *D. Brin*; Velikovsky at 50 by *D. Morrison*; New Atlantis by *G. G. Fagan & C. Hale*, Jr. Skeptic: Did We Go To the Moon? by *P. Linse*



magv10n2-Stephen Wolfram's Science by *D. Naiditch*; Are We Getting Dumber? by *R. Ehlich*; Why Smart People Believe Weird Things by *M. Shermer*; Can the Media Help Science? by *H. N. Pollack*; The Media Harms Science by *S. Waxman*; Psychic Grief Counselors by *R. Freedman*; Randi; Mystery Balls by *R. Saberi*; B. Muller-Humor; John Edward Seminar by *B. J. Phelps*, *S. Pedersen*, *E. Wogen*; Test Sylvia Brown by *B. Farha*. Jr. SKEPTIC: Yeti by *Loxton*



magv11n3-Catastrophe by *R. A. Posner*; Collapse by *J. Diamond*; Double-Blind Protocol & Science by *S. Bratman*; Consumer Electronic Myths by *E. Winer*; Many Powerful Memories Untrustworthy? by *D. Greenberg*; Psychic Renier & Court TV by *G. Posner*; Shakespeare's Authorship by *D. Price*; Cholesterol by *M. E. Deutsch*; Forum: Nature-Nurture Debate; Randi; Film reviews: Question of God, Ramtha; Jr. SKEPTIC: Sasquatch Part Two by *D. Loxton*



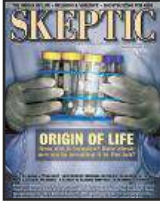
magv13n3-Medical Controversies: Flawed Psychiatry by *J. Sorbara*; Reading Medical Research by *H. Hall*; Secondhand Smoke Debate: *S. Zion v. H. Hall*; Animal Research by *N. Shanks*, *R. Greek*, *N. Nobis*, & *J. Swingle-Greek*; Vaccine-Autism Myth by *M. Normand & J. Dallery*; Science Disputes/AIDS Origin by *B. Martin*; Randi on S. Harris; Cold Cures by *Hall*; Bonobo Politics by *F. de Waal*; Cosmology & ID by *Pilpel*; Jr. SK: Alien Astronauts



magv14n2-Is the Evolution of Intelligence Likely to Happen Again On Earth or On Other Planets?; Grief Stages a Myth? Criminal Profiling; Near Death Experiences; Phoenix Lights; Behind the Anti-science Film *Expelled*: 9/11 Conspiracy; Popular Medical Fallacies; Dyson & the Paranormal. REVIEWS: Snake Oil, Suckers; Perceptual Distortion; Arguments for God; Postmodern Misadventures; DNA Evolution; Spiritual Brain; Jr. Sk: Crystal Skulls.



magv15n1-Christian Origins Conspiracy Matt Ridley Interview; Atheism a Stealth Religion?; Hugh Ross v. Michael Shermer; Morristown UFO Hoax; Randi on Firewalking; Internet Matchmaking; Ape Language Controversy; Testing Orgone Energy; SkepDoc on Homeopathy, Placebo Effect; Flawed Justice System; Teach Critical Thinking. REVIEWS: Core theory; Science of Love; Metaphysical Mind; Film: Oppenheimer. JR SK: Scooby-Doo



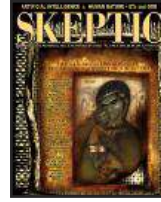
magv16n2-Origin of Life by *P. F. Deisler*; Jr. New Atheists by *M. Dowd*; Accents by *K. Stollznow*; Religion & Violence by *B. G. Purzycki & K. Gibson*; Kurzweil's Flaws by *C. Edwards*; Science & Magic by *Randi*; Ayurvedic Medicine by *M. Carrier*; Incomprehensible Universe by *D. Zeigler*; Naturopathy by *H. Hall*; Literary Test by *M. Simkin*; Stradivarius Myth by *R. L. Barclay*; 9/11 Conspiracies by *S. Sommers*; Reviews: Jr. SKEPTIC: Investigation by *Loxton*.



magv7n3-Millennium: *T. Dufresne* Interviews Frederick Crews; Search for Immortality by *A. Herd*; Creation & The End by *T. McIver*; Celestine Prophecy by *P. Molé*; Millennial Meanings by *M. Shermer*; That's All Folks! by *D. Lease*; Randi Comments; Dumbth by *R. Cassingham*; Educashun by *S. Asma*; Myth & Science by *T. Callahan*; Political Extremism by *L. Hyman*. Jr. SKEPTIC Halloween; Autopsy Aliens. Haunt Houses by *B. Friedhoffer*



magv8n2-Skepticism & Religion: Frans de Waal Interview by *M. Shermer*; Agnosticism by *S. Dawson*; Skeptic's Faith? by *B. Wildish*; Scope's Trial Revisited by *T. Riniolo & L. Torrez*; Bible Belt by *G. Sloan*; Influence & Scientology by *D. Martin*; Bible/Nature by *E. Zerir*; Life's Meaning by *D. Naiditch*; Existence by *H. Vahidi & S. Friberg*; Personal Gods by *M. Pigliucci*; Prayer Heals? by *W. Matthews*, *T. Christ & J. Conti*; Randi; TV by *S. Gibson* • Jr. SKEPTIC: Pyramids.



magv9n3-A.I. & Theology of UFOs: Artificial Intelligence by *S. Harris*; Theology of UFOs by *B. Denzler*; Education Doesn't make Skeptics by *W. R. Walker*, *S. J. Hoekstra*, and *R. J. Vogt*; Accelerated Learning by *L. K. Hagan*; How Smart People Sabotage Thinking by *P. Molé*; Neo-Confederates by *C. M. Center*; Peers & influence by *B. Markovsky & S. R. Thye*; Freud, Darrow, & the Leopold/Loeb Trial by *T. C. Riniolo*. Plus Randi, Dumbth, Jr. SKEPTIC.



magv11n1-Medieval UFOs? by *D. Cuoghi*; African Witchcraft by *L. Igwe*; Xhosa Mass Suicide by *S. Kowitz*; Chinese Medicine's Origin by *D. Mainfort*; Puerto Rican Film Flam by *L. Montes-Valentin*; Dogon Mystery by *L. McDaid*; India's Conspiracy Theories by *A. D. Polak*; Gibson's Passion, Who Killed Jesus? & Da Vinci Code Facts by *Tim Callahan*; Berlitz by *L. K. Hagen*; Burden of Proof by *J. Randi*; Jr. SKEPTIC: Loch Ness by *D. Loxton*



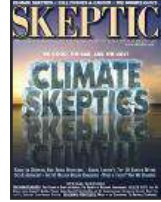
magv11n4-ID, Ernst Mayr: Dembski's Creationism by *M. Perakh*; Intelligent Design gets Peer-Reviewed by *R. Weitzel*; *Supernatural Test* by *S. Shuster*; Conspiratorial Thinking by *G. Case*; Are UFO Alien Faces an Inborn Template? by *F. V. Malmstrom*; Mind as Myth by *H. D. Schlinger*; Randi slams TV Promo of "Healer" John O. Grace Debate; Also: Epicurus, God Code, Race, Ernst Mayr Tribute, Obesity, Gender, Resurrection, Jacques Derrida, Da Vinci Code. Jr. SKEPTIC: Madman of Magic



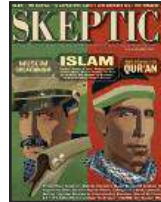
magv13n4-Quirkology: Odd Science of Everyday Life by *R. Wiseman*; Afterlife Debate: *D. Chopra v. M. Shermer*; Dawkins is Wrong About Religion by *D. S. Wilson*; Dawkins Replies; New ET Myths by *Tim Callahan*; Can Apes Learn Language? by *C. Wynne*; Franklin's Kite a Hoax? by *W. D. Stansfield*; Mozart Effect Myth by *W. Dowd*; Consciousness by *H. D. Schlinger*; Reviews: Levitt; Hall; Paranormal. Jr. Skeptic: Alien Astronauts II by *D. Loxton*



magv14n3-New Revisionism: if Hitler Had Won by *M. Shermer*; Skeptical of Evolved Altruism by *K. W. Krause*; Twins Experts Interviewed On Behavior Genetics and Evolutionary Psychology by *F. Miele*; New Look at Out-of-Body Experiences by *J. A. Cheyne*; Germ Theory Denial by *H. Hall*; Near Death Experiences by *S. Dieguez*; ID's Machine-like Flagella a Myth by *M. Perakh*; Wolfram Revisited by *G. Neske*; Reviews: Jr. SKEPTIC: Great American Skeptics.



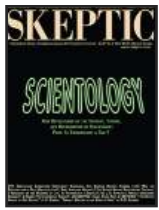
magv15n4-Climate Skeptics by *D. Brin*; Dowsing Rod Bomb Detectors by *Randi*; Cell Phones & Cancer by *B. Leikind*; Fertility, Immune System by *H. Hall*; Longevity by *S. Salerno*; Biology Curriculum by *C. Lindgren*; Magic in Class by *P. Goddin*; Astrology & Sex by *C. S. Reichardt*; Million Dollar Challenge by *G. Thompson*; Atheist Stigma by *T. Arcaro*; Truths by *W. M. Gardner*; More Non-religious by *J. A. Cheyne*; Reviews: Jr. SKEPTIC: Top 10 Myths by *D. Loxton*.



magv16n3-Islam. R. S. Humphreys interview on Islam by *F. Miele*; Qur'an Origins by *T. Callahan*; Muslim Creationism by *M. Carrier*; Aspartame by *Hall*; Automatic Writing by *K. Stollznow*; UFO Artifact by *P. Linse & E. Harrison*; Understanding Evolution by *A. Shtulman*; D. Bem's Precognition by *N. Gauvrit*; Alien Contact OK? by *G. Michael*; Model Dependent Realism by *C. Edwards*; The Kraken! by *Loxton*. Reviews: *G. Taubes*, *S. Harris*, *D.D'Souza*.



magv16n4-Inventing UFOs by A. Simon; Alien Roswell by F. Borzelleri; Antioxidants by H. Hall; Sound Healing by K. Stollznow; \$1,000,000 Prize by Randi; Quakes/Tornados by D. Prothero; Effective Debate by D. Loxton; Creationist Self-Critique by R. M. Barnes & R.A.Church; Daryl Bem by N. Gauvrit; Sleep & Precognition by R. Wiseman; D'Souza by M. Dahlen; William L. Craig by K. Grubbs; Fine-tuned Universe? by C. Sirola. Reviews. Fossil Fakes by D. Loxton.



magv17n1-Scientology: 2 Views by J. Lippard; Scientology A Cult? by M. Shermer; Meaning of Life by D. Zeigler; 9/11 Demolition Science by Chris Mohr; Body Language by K. Stollznow; Scientific Medicine by H. Hall; Educational Reform by C. Edward; Science & Eternal Life? by C. Braun; Resurrection Hallucination by G. Wittenberger; Psychology A Science? by R. E. Silverman; Religion In Harry Potter by A. Armstrong; Reviews. Fossil Fakes 2 by D. Loxton.



magv17n2-Climate Change Q & A by D. R. Prothero; Foo Fighters by J.A. Lindell; No. 3 by S. Morris; Randi on Hitches; Energy Medicine by H. Hall; Scientific R. Rosen by K. Stollznow; Shroud of Turin by D. Loxton; Depression Treatments by B. E. Levine; Sensory Integration & Autism by C. A. Polenick & S. R. Flora; L. Krauss Interview by A. Z. Williams; Audio Hallucinations by J. E. Buckner V & R. A. Buckner; Sleep Paralysis by H. Love. REVIEWS. Jr. SKEPTIC: The Mighty Moa! by D. Loxton.



magv17n3-Christian Civilization? by T. Callahan; Fetus Food Myth by T. Dupuy; Facilitated Communication by L. K. Hagen; Science/Democracy by B. Vroman; "Nothing" by C. Sirola; "Nothing" by M. Shermer; UFO Physics by M. K. Gainer; Planet Search by A. Narechania; Changing Minds by E. Prichard & S. Christman; Scientific Modeling by A. Woronow; Genesis Unique? by T. Callahan. Flake Equation by M. Shermer; REVIEWS. Jr. SKEPTIC: Mokele-mbembe by D. Loxton



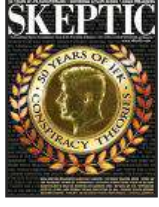
magv17n4-Cancer Cures? by H. Hall; Reality Distortion by M. Shermer; Free Will by V. J. Stenger; Neuroethics by M. Pigliucci; Fact Check by D. L. Halper; Was Jesus Married? by T. Callahan; Earth Grounding by H. Hall; Americans Discover Europe? by J. Colavito; Exorcist Bob Larson by K. Stollznow; Postmodern Nonsense by J. Davies; Howard Bloom Interview by F. Miele; Glossolalia by S. Semenyina et al.; Ancient Mythbuster by D. Loxton



magv18n1-Mass Murder: What Can We Do? by D. Hillshafer, by M. Shermer. Creationists' Dino Claim by P. Senter; Coral Castle by P. Hancock; Expanding Earth by D. R. Prothero; Poltergeist Rain Case by R. E. Bartholomew & J. Nickell; Sense of Being Stared At Test by J. M. Lohr, T. G. Adams, M. Schwarz, & R. E. Brady; Electromagnetic Sensitivity by H. Hall; Almanacs by K. Stollznow; Skeptic in Court I by Randi. REVIEWS. Jr. SKEPTIC: Ghostbuster Girls! by D. Loxton



magv18n2-Gender Differences by H. Hall; Gender & the Paranormal by A. Saide; Science Reporting by H. Hall; Skeptics in Court II by Randi; Scientology Handbook by K. Stollznow; Earth's Magnetic Field Reversal by D. Prothero; Skeptics in Films by R. Martoccia; Napoleon Chagnon Interview by F. Miele; Science & the Soul by S. Cave; Levels of Nothing by R. L. Kuhn; Witch Doctors by J. Chapman. JR SKEPTIC: Alien Invaders! by Loxton. Reviews.



magv18n3-50 Years of JFK Conspiracies by David Reitzes; Origin of Science in Paleolithic Times by L. Liebenberg; Science Denial Threats by D. Prothero; Great Radium Craze by R. Sutura; J. Randi, K. Stollznow and H. Hall on Scientology; Sylvia Browne by L. H. Smythe. Sovereign Citizen Scam by J. Tsidulko; Jr SKEPTIC: Mermaids by D. Loxton. REVIEWS: Media Panics; Earth's History: Amityville Horror; Room 237.



magv18n4-Ancient Aliens Evidence by C. White; Noacian Flood: Myth & Geology by T. Callahan & D. Prothero; Astrology v. Astronomy by Randi; Uncertainty in Medicine by H. Hall; Psychiatric Diagnosis by R. Lewis; Measuring Multiple Personalities by R. Stern & M. McDonald; Bigfoot Hunter by J. Blais; New Satanic Panic by M. Moran; Sean Carroll Interview by H. Trujillo; Medical Error Reduction by P. Levitt. JR SKEPTIC: Velikovsky by D. Loxton. REVIEWS.



magv19n1-Did Jesus Exist? by T. Callahan; Does Religion Make People Healthier? by H. Hall; Inside Faith Healing by D. White. Excerpt: Madalyn Murray O'Hair by M. Stephens; James Van Praagh's Afterlife by I. H. Smythe; Ghost Hunting at Sand Creek Massacre Site by Gregory F. Michno; Whistle-blowing Doesn't Work by F. V. Malmstrom and D. Mullin; Latest on IQ: James R. Flynn Interviewed by L. Traynor. JR SKEPTIC: Sagan by D. Loxton. REVIEWS.



magv19n2-Boston Bombing Conspiracies by G. Michael; Randi on M. Gardner; Faith Healing by H. Hall; Voinich Manuscript by K. Stollznow; Science of Memory by C. Tavis; Multiverse & God by R. Grigg; Soft Theism by M. Jako; Evolving a Soul by J. Harris; Mass Hysteria by R. E. Bartholomew; Probability and Miracles by Alex Boklin; Artificial Intelligence Optimism by B. Ferris; K. Sanders Cartoon. JR. SKEPTIC: Ghost Photos, Part I by D. Loxton. REVIEWS.



magv20n1-Terrorism. Terrorism Guide by R. E. Wackrow; Terrorism Myths by M. Shermer; Terrorism and Religion by K. Krause; Colloidal Silver by Harriet Hall, M.D.; Genius Myth by C. Tavis; Fake Rainmakers by Peter Auloussin; Clever Hans by T. E. Heinzen, S. O. Lilienfeld, & S. A. Nolan; Testing for Demons by R. Ammirati, S. T. Hendrick, & S. O. Lilienfeld; Horror by S. T. Asma; Cow tipping by P. Linse; Quantum Quackery by J. Harris. JR. SKEPTIC: Hollow Earth by D. Loxton. REVIEWS.



magv20n2-Drug Myths: Carl Hart Interview by F. Nogueira; Preventative Medicine by H. Hall; Raising Kid's I.Q.s by C. Tavis; Parenting Myths by S. Hupp & J. Jewell; Calling E.T. by D. Brin; Do Emotions Effect Matter? by N. Gauvrit & S. Francfort; Placebos by J. Brissonnet, trans. by H. Hall; Diet & Heart Health by K. W. Krause; Supernatural? by Shermer; Putin's Dugin by R. Zubrin; Near-Death by C. Markum; Pseudo-Math by E. C. Prichard; Jr. SKEPTIC: Hollow Earth II by Loxton.



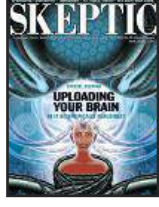
magv20n3-Alfred Russel Wallace: Species by R. Conniff; Consilience by J. T. Costa; Human Cognition by L. Dugatkin; Spiritualism by R. Milner; Flat Earth by R. Milner & Shermer; Heretic Scientist by M. Shermer. Internet Civility by C. Tavis; Good Evidence; by H. Hall; Full Moon Test by J.D. Van Dyke; Non-Fine-Tuned Universe by J. Harris & E. Harris; Science/Theology by D. J. Navarick; Critical Thinking by J. E. & R.A. Buckner. JR. SKEPTIC: Bat-People Hoax by D. Loxton. REVIEWS.



magv20n4-Robert Trivers: Photo Amnesia by Tavis; Incidentalomas by H. Hall; Tanning Myths by A. Becirevic & D. D. Reed; Magic Perception by D. Russell; Moral Values: M. Hauser v. M. Shermer; Richard Paul Tribute by G. Hart; Destiny? by D. Zeigler; Radiation by J. A. Siegel & C. W. Pennington; Ben Carson's Beliefs by D. Prothero; Moving Tomb by G. J. van t Land; Education & Religion by N. M. Baker; God Debate: D. Navarick v. D. Matson; Reviews. Adamski UFOs by Loxton. REVIEWS.



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magv22n3- Hancock's Lost Civilization: Joe Rogan Debate by Shermer; Hancock's Geological Claims by M. Defant; Hancock's Historical Claims by Callahan. CONCEPTUAL PENIS HOAX: Why We Published It-Shermer; Hoax by Boghossian/Lindsay; On Hoaxes by Alan Sokal. Juicing by Hall; Our Angry Era by Tavis; CA Stem Cell Research by Barglow; Homo naledi by Lents; ET Aliens by Callahan; Taming Foxes by Tavis/Dugatkin; Facts by D. Zeigler. JR SK Zombies-Loxton.



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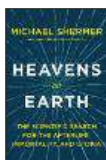


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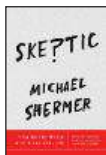


magv23n4-Something Rather than Nothing by M. Shermer; Health Informed Consent by H. Hall; Traits v. Type by C. Tavis; Teaching Evolution by S. Parvatam; Abortion Milestones by G. Whittenberger; Creation/Evolution Debate Styles by R. M. Barnes; Microwave Attacks by R. E. Bartholomew; Adversarial Arguments by A. Cooper-Sansone; Quackery History by M. Tavel; Not-So-New Atheists by M. Cohen; Human Consciousness by C. McGinn; JS: Ouija Boards by Loxton

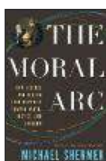
Michael Shermer



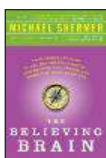
Heavens on Earth: The Scientific Search for the After-life, Immortality and Utopia by Michael Shermer. (b170HB \$30. hardback) What drives belief in life after death, plus scientific attempts to achieve immortality, extraterrestrials, transhumanists, cryonicists, and mind-uploaders. Utopias. Purpose and progress and what we can do in the here-and-now.



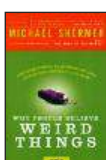
Skeptic by Michael Shermer. (b168HB \$28. hardback) A collection of 75 essays from Shermer's *Scientific American* columns. Features his trademark combination of deep scientific understanding, scientific concepts and theory, and an entertaining writing style.



The Moral Arc by Michael Shermer. (b162HB **SALE! LIMITED NUMBER \$9.95** While they last. hardback) Are we living in the most moral period of our species' history? Extensive data suggest we are. Of the many factors over the centuries that have bent the arc in a more moral direction, science and reason are foremost.



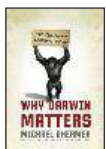
The Believing Brain... How the Brain Constructs Beliefs & Reinforces Them as Truths by Michael Shermer. (b149HB \$28. hardback) (b149PB \$15.95 paperback.) How beliefs are born, formed, nourished, reinforced, challenged, changed, and extinguished. From our superstitions to our politics, and economics. The neuroscience behind our beliefs, real-world examples of belief from all realms of life, and why science is the best tool ever devised to determine whether or not a belief matches reality.



Why People Believe Weird Things by Michael Shermer. (PB062 \$17. paperback) Witty & eloquent. A no-holds-barred assault on mass delusion, prejudice, & gullibility. UFOs, ESP, Near Death Experiences, Alien Abductions, Recovered Memories, Creationism, Holocaust Denial, Race, God, & Science v. pseudoscience. A classic & a best seller.



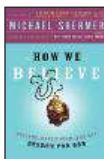
Borderlands of Science by Michael Shermer. (PBB069 \$29.95. paperback. **Hardback on sale at \$10.00 each**) Where does valid science leave off and borderland science begin? Examines the theories, the people and the history involved in areas of controversy where sense is in danger of turning into nonsense.



Why Darwin Matters by Michael Shermer. (b111PB \$13. paperback) An insiders' guide to the evolution/creation debate—what evolution really is, how we know it happened, and how to test it. Why creationism and Intelligent Design theory are not science. Why 50% in U.S. reject evolution—spiritual, psychological and political reasons, such as moral relativism and social Darwinism.



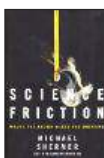
Soul of Science by Michael Shermer. (b109PBB \$5.) Shermer's popular lecture & inspirational essay as a pocket booklet. How can we find spiritual meaning in a scientific worldview? Religion may be the most common source of spirituality, but anything that generates a sense of awe may be a source of spirituality. Science does this in spades.



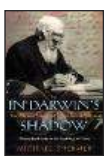
How We Believe (b063PB \$16.00 paperback) by Michael Shermer. An empirical study of 10,000 Americans—why do people believe in God?; science & religion controversies; proofs of God; did religion evolve?; deeper millennial destruction-redemption meanings; finding meaning in life; how people assume that others believe for different reasons than they do.



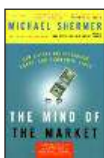
The Science Of Good and Evil: Why People Cheat, Gossip, Care, Share, & Follow the Golden Rule by Michael Shermer. (PB085—paperback \$17.) Broad in scope, deep in analysis, and controversial. Is it human nature to be selfish or selfless, fierce or loving, moral or immoral? Scientific evidence shows that morality is deeply embedded in our being and behavior. Explores how science can address some of our most difficult moral dilemmas.



Science Friction: Where the Known Meets the Unknown by Michael Shermer. (**SALE: \$10. 100HB**) Shermer becomes a psychic for a day, investigates quack cancer & alternative medicine, evolutionary psychology and the mutiny on the Bounty, chaos theory and history, intelligent design creationism, sports psychology, and more. Lively and fun reading.



In Darwin's Shadow: The Life & Science of Alfred Russel Wallace by Michael Shermer (HB081 \$55. hardback) A landmark biography of the co-discoverer of natural selection & the greatest naturalist of his age. Shermer applies modern psychological theories to understand why Wallace also crossed disciplines to become involved in spiritualism, seances, & life after death belief systems.



Mind of the Market by Michael Shermer. (b126PB \$15. paperback) Integrates behavioral economics, neuroeconomics, & evolutionary economics, expanding the application of science & skepticism to reveal that humans are just as irrational when it comes to money & markets as they are in other areas.



The Skeptic Encyclopedia of Pseudoscience by Michael Shermer, Ed./Pat Linse, Con. Ed. TWO VOLUMES, \$129.00. (save over \$50.00 off the library price. Hardback. b082HB) Four parts: (1.) A-Z topic listings. (2.) Case Studies: In-depth analyses. (3.) Pro & Con debate section. (4.) Historical Documents. Bibliography, Illustrated

DVDs

The Atheism Tapes av571DVD. \$29.95 (2-DVD set) A Documentary Extra with Jonathan Miller Neurologist, playwright, filmmaker & self-described atheist. Conversations with six of today's leading men of science and letters: Richard Dawkins, philosophers Daniel Dennett & Colin McGinn, playwright Arthur Miller, theologian Denys Turner, and Nobel laureate physicist Steven Weinberg. These distinguished thinkers discuss their personal intellectual journeys & offer illuminating analyses of belief & disbelief from a wide range of perspectives. Compelling viewing you won't want to miss.

THE ROOT OF ALL EVIL? The Original

TV Documentary av568DVD. \$19.95. (2-DVD set) Two-part documentary ("The God Delusion" & "The Virus of Faith") plus Bonus Features: Commentary, Q&A, and a reading from *The God Delusion*, all by Richard Dawkins. Examines the power of religion, an interview with former Pastor Ted Haggard, novelist Ian McEwan, the former Bishop of Oxford, & others offer insights into the impact & consequences of faith in the 21st century.

Root of All Evil? The Uncut Interviews

av569DVD. \$24.95 (3 DVD set) During the filming of *Root of All Evil?*, Richard Dawkins conducted many fascinating interviews. The footage was edited, and some entire interviews had to be omitted. Here are eight raw and uncut interviews, allowing the viewer a rare vantage point see these revealing exchanges. Interviews with: Jill Mytton; Ian McEwan; Bishop Richard Harries (Watch this interview free online at skeptic.com); Michael Bray; Hell House Pastor Keenan Roberts; Alistair McGrath; Adrian Hawkes; & Rabbi Gluck.

The Great Debate-Does God Exist?

av558DVD (DVD only-\$23.95) Dr. Doug Geivett, Professor of Philosophy at Talbot School of Theology at Biola University v. Dr. Michael Shermer, *Skeptic* magazine, Director, Skeptics Society. Dr. Geivett presents the best theological, philosophical, and scientific evidence for God's existence. Dr. Shermer counters these arguments, then presents the best scientific evidence that God and religion are human creations. Remarkably enlightening and entertaining! Lively Q & A.

Growing Up in the Universe

av570DVD. (2-DVD set) (\$19.95) Richard Dawkins presents a series of lectures on life, the universe, and our place in it. With brilliance and clarity, Dawkins unravels an educational gem that will mesmerize young and old alike. Illuminating demonstrations, wildlife, virtual reality, and special guests (including Douglas Adams) all combine to make this collection a timeless classic. Originally presented as part of the Royal Institution Christmas Lectures for Children were founded by Michael Faraday in 1825.

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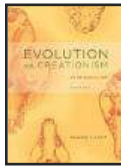
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(av556DVD \$34.98) 4 hours. An examination of the questions raised by theism and atheism seen through the lives of Sigmund Freud & C. S. Lewis, with roundtable discussion by Dr. Michael Shermer & eight other panelists.

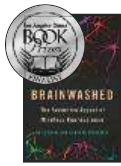
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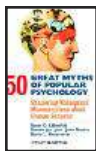
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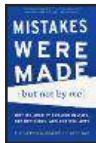
Evolution vs. Creationism: An Introduction by Eugenie C. Scott. The debate over teaching evolution continues in spite of the emptiness of the creationist positions. This accessible resource, now completely revised and updated, provides an essential introduction to the dispute's many facets—the scientific evidence for evolution, the legal and educational basis for its teaching, and the various religious points of view—as well as a concise history of the evolution-creationism controversy. Cat. No. b160PB (\$29.95 Paperback)



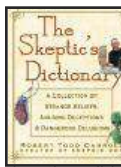
Brainwashed: The Seductive Appeal of Mindless Neuroscience by Sally Satel and Scott O. Lilienfeld. What can't neuroscience tell us about ourselves? Since fMRI was introduced in the early 1990s, brain scans have been used to help politicians understand and manipulate voters, determine guilt in court cases, and make sense of everything from musical aptitude to romantic love. But although brain scans and other neurotechnologies have provided groundbreaking insights into the workings of the human brain, the increasingly fashionable idea that they are the most important means of answering the enduring mysteries of psychology is misguided—and potentially dangerous. Cat. No. b159HB-(\$26.99 HB)



50 Great Myths of Popular Psychology by Scott O. Lilienfeld, Steven Jay Lynn, John Ruscio, and Barry L. Beyerstein. Do we use only 10% of our brains? Of course not, but this, and 49 other myths, have made their way into the brains of millions of people through pop culture. Three world-class psychologists deconstruct the myths, show how they got started, and explain why they're wrong. Includes critical thinking skills; a mythbusting kit; 200 additional psychological myths and an appendix of useful Websites; and last but not least, psychological findings that sound like myths but are actually true. Engaging and accessible. Cat. No. b158PB. (\$29.95 paperback)



Mistakes Were Made (but not by me): Why We Justify Foolish Beliefs, Bad Decisions, and Hurtful Acts by Carol Tavris and Elliot Aronson. Why do people dodge responsibility when things fall apart? Why the parade of public figures unable to own up when they screw up? Why the endless marital quarrels over who is right? Why can we see hypocrisy in others but not in ourselves? Are we all liars? Or do we really believe the stories we tell? Two of the world's greatest social psychologists answer these and other questions. Cat. No. b157PB (\$15. paperback)

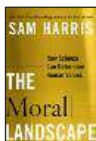


The Skeptic's Dictionary by Robert Carroll. (b086 PB \$19.95) Based on Carroll's website: skeptdic.com, the Dictionary is the definitive short-answer debunking of nearly everything skeptical. Nearly 400 definitions, arguments, and essays on topics ranging from acupuncture to zombies. A lively, commonsense trove of detailed information on all things supernatural, occult, paranormal, and pseudoscientific. It covers such categories as alternative medicine; cryptozoology; extraterrestrials and UFOs; frauds and hoaxes; junk science; logic and perception; New Age energy; and the psychic. Should be on every skeptic's book shelf. An invaluable reference.

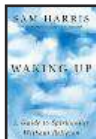


Secret Origins of the Bible by Tim Callahan. b079PB \$19.95 Many otherwise well informed readers will find much of the material in this book quite startling, although Bible scholars and comparative mythologists will be familiar with it. Contains material from many sources: literary analysis, archeology, history and comparative mythology to explain Bible stories that do not make sense when taken literally. Addresses: why is the bible so repetitive and contradictory?; what was ancient Egypt's influence on Christianity?; Is there evidence for the Exodus or Joshua's conquest of Canaan?; What Bible stories were derived from earlier tales?; What ancient myths influenced the Nativity, Passion, and Resurrection narratives?; did the Israelites worship other deities? A great reference book.

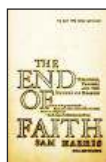
Sam Harris



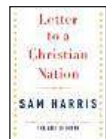
The Moral Landscape: How Science Can Determine Human Values by Sam Harris. (b141HB \$26.95 hardback) Views the experiences of conscious creatures as peaks and valleys on a "moral landscape." Definite facts can be known about where we fall on this landscape, so science can go beyond merely describing morality—it should be able to tell us what we ought to do to live the best lives possible.



Waking Up by Sam Harris. Cat. No. b161HB-(\$20. Hardback) A guide to spirituality without religion. Meditation as a rational practice. Important truths from Jesus, the Buddha, Lao Tzu, Rumi, and other saints and sages. Waking Up is part memoir. Only Harris—a neuroscientist, philosopher, and famous skeptic—could write it. **AUTOGRAPHED.**



The End Of Faith: Religion, Terror, and the Future of Reason by Sam Harris. (b139PB \$13.95 paperback). Harris' first book was an instant bestseller because of its cogent arguments & literary clarity, in which the author argues that because of weapons of mass destruction the world can no longer tolerate violent religions, & that in fact even moderate religious believers only encourage extremists by enabling their supernatural beliefs.

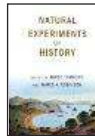


Letter to a Christian Nation by Sam Harris. (b140HB \$12. hardback) In this tightly reasoned commentary on the state of religion in America, Sam Harris pulls no punches in his arguments to members of the Christian Right on all matters moral and political, noting Old Testament law (death for adultery, homosexuality, disobedience to parents etc.), and contrasts this with, for example, the complete non-violence of Jainism. Harris argues that the reliance on dogma can create a false morality, which is divorced from the reality of human suffering and the efforts to alleviate it. Quite a bargain for only \$12.

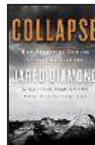
Jared Diamond



The Third Chimpanzee: The Evolution and Future of the Human Animal by Jared Diamond (b049PB \$15. paperback) The evolution of human sexuality and science of adultery. How we pick our mates and sex partners. Why do we grow old and die? The animal origins of art. Why do we smoke, drink, and use dangerous drugs? The golden age that never was.



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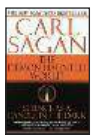


Collapse: How Societies Choose to Fail or Succeed by Jared Diamond. (88PB \$18. paperback) What caused some of the great civilizations of the past to collapse into ruin, and what can we learn from their fates? Diamond traces the fundamental patterns of social catastrophe.



Guns, Germs and Steel by Jared Diamond (b054PB \$15.95 paperback) Why did Eurasians conquer Native Americans, Australians, & Africans, instead of the reverse? Diamond dismisses racially-based theories of human history by revealing the environmental factors responsible for history's broadest patterns. A work rich in dramatic revelations that challenges conventional wisdom.

Carl Sagan



The Demon-Haunted World (b045PB \$15.95 paperback) by Carl Sagan. The great astronomer and science writer challenges New Agers & explains social phenomena like UFOs, alien abductions, recovered memories, satanic cults, witch crazes, hallucinations. How to detect baloney. A classic!



The Varieties of Scientific Experience: A Personal View of the Search for God

by Carl Sagan, Ed. by Ann Druyan. (B114PB \$17. paperback) Sagan's prestigious Gifford Lectures on Natural Theology. Considers: psychology of belief; possible chemical nature of transcendence; creationism & intelligent design; life on other planets; science as "informed worship." Humorous, wise, and at times stunningly prophetic. Sagan at his best.

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THE BALONEY DETECTION KIT

This 16-page booklet is designed to hone critical thinking skills. What questions to ask, what traps to avoid. Specific examples of how the scientific method is used to test pseudoscience and paranormal claims. Includes a how-to guide in developing a class in critical thinking. Includes: Sagan's Ten Tools for Baloney Detection; Shermer's Ten Questions For Baloney Detection; How Thinking Goes Wrong: The 25 Fallacies of Thought; Eight Sample Syllabi: How to Teach a Course in Science & Pseudoscience; Most Recommended Skeptical Books; Skeptical Manifesto. Baloney Detection Kit. Cat. No. PB075 16 pages, 8 1/2 x 11 booklet.



HOW TO DEBATE A CREATIONIST

PART I: BACKGROUND: Science on Evolution; Science & Religion; Debating a Creationist: Duane I. Gish; Creation myths. PART II: OLD & NEW CREATIONISM: 25 Creationist Arguments & 25 Evolutionist Answers. Philosophically based arguments: 1-12; Scientifically based arguments: 13-25 PART III: THE NEW NEW CREATIONISM: Creationist strategies to get into schools; Why creationism is not science. U.S. Supreme Court ends new creationism. • The Rise of Intelligent Design Theory: Ten I.D. arguments including: The Nature of the Designer; Methodological Supernaturalism; Irreducible Complexity; Inference to Design; Fine Tuned Universe; Conservation of Information. How to Debate A Creationist Cat. No. PB007. 28 pages, 8 1/2 x 11 booklet.



A Skeptic's Guide To Global Climate Change

by Don Prothro (148PB \$5. paperback) See skeptic.com for multiple copy discounts! The Scientific Background & Evidence for Climate Change; M. Shermer on why he changed his mind; Skepticism v. Denialism; Answers to 25 Climate Denier Arguments; Are We the Cause?; Forces Behind Science Denialism; A Skeptical Scientist Looks at Climate Data; Consequences. 28 pages 8 1/2 x 11 inches.

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Reality Check

by Don Prothro (b151HB \$35. hardback) Describes how major scientific ideas that are accepted by the entire scientific community (evolution, anthropogenic global warming, vaccination, the HIV cause of AIDS, and others) have been attacked with totally unscientific arguments and methods, and argues that science denial has resulted in widespread scientific ignorance, increased risk of global catastrophes, and deaths from disease.



Catastrophes! Earthquakes, Tsunamis, Tornadoes, and Other Earth-Shattering Disasters

(b147HB \$30. hardback) A fascinating read. Describes historic catastrophic events and the forces that cause them in gripping detail. These tales of geologic history and human fortitude & folly will stay with you long after you put the book down & leave you with respect for the mighty power of the earth.



Greenhouse of the Dinosaurs: Evolution, Extinction, and the Future of Our Planet

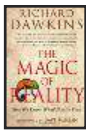
(b137HB \$29.95 hardback) Dr. Donald Prothro discusses the latest findings and controversies in geology and paleontology, using a personal narrative style and examples from his own career. A must read for anyone interested in these professions. A section of the book covers the possible reasons for past radical climate changes and extinctions—from jungles in the Arctic to the frozen snowball earth—and what this could mean for us and our current changing climate.



Evolution: What the Fossils Say and Why It Matters

by Donald Prothro. (b127HB \$30. hardback) Rave reviews! "Best damn evolution book, period!" A great introduction to the field or get up to speed on the latest discoveries in the incredibly rich fossil record, with an emphasis on transitional forms. Includes a no holds barred critique of the claims of creationism and Intelligent Design. Over 200 illustrations.

Richard Dawkins



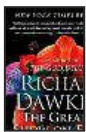
The Magic of Reality: How We Know What's Really True by Richard Dawkins

For years people have wanted the renowned evolutionary biologist to write a book for kids on evolution. He has done that—and much more—with this highly engaging and well-illustrated work that will also enlighten adults who read it. Filled with clever thought experiments and jaw-dropping facts, *The Magic of Reality* explains a stunningly wide range of natural phenomena. This is a page-turning detective story that not only mines all the sciences for its clues but primes the reader to think like a scientist as well. **Cat. No. b166PB (\$16, paperback)**



An Appetite for Wonder: The Making of a Scientist

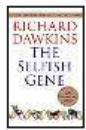
by Richard Dawkins. Cat. No. b167PB. (\$15.99 paperback) A memoir covering material from Dawkins' childhood in colonial East Africa through the publication of his world-changing bestselling book *The Selfish Gene*. Told with frankness and eloquence, warmth and humor. An entertaining and enlightening read.



The Greatest Show on Earth by Richard Dawkins. (b143PB \$16.99 paperback) A fierce counterattack against Intelligent Design. Rich layers of scientific evidence: living examples of natural selection; fossils; natural clocks; developing embryos; plate tectonics; molecular genetics—all make an airtight case for evolution by non-random selection. A master vision of life's splendor.



The God Delusion by Richard Dawkins. (b113PB \$15.95 paperback) Dawkins' most important book to date, his definitive statement on the God question, the origins of morality & religion, the best arguments for and against God's existence, the dangers of religious extremism, and why science offers the best hope for humanity.



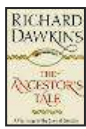
The Selfish Gene

by Richard Dawkins. (b123PB \$15.95 paperback) Changed the nature of the study of social biology. This brilliant reformulation of the theory of natural selection explains how the selfish gene revolves around savage competition and exploitation—yet acts of apparent altruism do exist in nature.



The Blind Watchmaker: Why the Evidence of Evolution Reveals a Universe Without Design

by Richard Dawkins. (b087PB \$15.95 paperback) Perhaps the most influential work on evolution written in this century. Natural selection—the unconscious, automatic, blind, yet essentially nonrandom process—has no purpose in mind. If it can be said to play the role of watchmaker in nature, it is the blind watchmaker. Engaging and accessible.



The Ancestor's Tale by Richard Dawkins. (b092PB \$16.95 paperback) A masterwork: an exhilarating reverse tour through evolution, from present-day humans back to the microbial beginnings of life. Entertaining, insightful stories. Sheds light on topics such as speciation, sexual selection, and extinction. An essential education in evolutionary theory and a riveting read.



A Devil's Chaplin by Richard Dawkins. (b122PB \$14, paperback) Diverse topics examined through the lens of natural selection: education, ape rights, jury trials, the vindication of Darwinism; memes; religion, academic obscurantism; Stephen Jay Gould; Douglas Adams; pseudoscience; & his awe at the marvelous complexity of the universe. Written with clarity & passion.



Climbing Mount Improbable by Richard Dawkins. (b121PB \$16.95, paperback) The Mount Improbable metaphor symbolizes the improbability that seemingly perfectly designed living things evolved. In a breathtaking journey through the mountain's passes and up its many peaks, Dawkins demonstrates how the improbable path to perfection merely takes

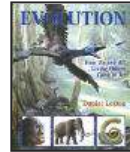
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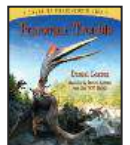
Daniel Loxton



Evolution: How We and All Living Things Came to Be by Daniel Loxton. (b136HB \$18.95) Ages 8–13. Winner of multiple awards. Easy to understand, spectacularly illustrated introduction to the theory of evolution. How the evidence for evolution was discovered, the basic mechanics of how it works. Answers to common questions and misunderstandings about evolution. Written with warmth and enthusiasm. Outstanding science content.



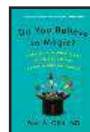
Ankylosaur Attack (Tales of Prehistoric Life) by Daniel Loxton. (b145HB \$16.95) Ages 4 and up. A mind-blowing feast for the eye that uses photorealistic images along with an exciting, natural history-inspired story. Pre-school children will enjoy a story that features a young hero. A young ankylosaur (a plant-eating, heavy-plated dinosaur) saves the day when a T. rex attacks. A surefire hit with young dinosaur lovers.



Pterosaur Trouble (Tales of Prehistoric Life) by Daniel Loxton. (b149HB \$16.95) Ages 4 and up. A dramatic paleofiction tale inspired by real fossil discoveries. The mighty pterosaur Quetzalcoatlus—perhaps the largest flying animal ever to exist—finds himself on the menu for a pack of small feathered Velociraptor-like dinosaurs. This photorealistic adventure will delight and astonish.



Plesiosaur Peril (Tales of Prehistoric Life) by Daniel Loxton. (b153HB \$16.95) Ages 4 and up. A group of plesiosaurs, ocean-dwelling cousins of the dinosaurs, keeps safe by swimming in a family pod. But when one baby plesiosaur swims too far from its mother it attracts the attention of something large and very hungry and the struggle for survival is on.

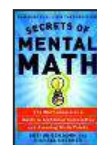


Do You Believe in Magic? Vitamins, Supplements, and All Things Natural by Paul A. Offit, M.D. Medical expert Offit offers a scathing exposé of the alternative medicine industry, revealing how even though some popular therapies are remarkably helpful due to the placebo response, many of them are ineffective, expensive, and even deadly. He concludes: "There's no such thing as alternative medicine. There's only medicine that works and medicine that doesn't."

Cat. No. b156PB (\$15.99 paperback)

CHILDREN'S BOOKS

Secrets of Mental Math: The Mathemagician's Guide to Lightning Calculation and Amazing Math Tricks



(12 to adult) (b112PB \$12.95) By Arthur Benjamin & Michael Shermer. Renowned "mathemagician" Benjamin shares his secrets for lightning-quick calculations & amazing number tricks. Learn to do math in your head faster than you ever thought possible & make math fun.



Sasquatches From Outer Space by Tim Yule. (Ages 10-15) (b072PB \$15.) Chatty cheerful style. Covers Astrology, bigfoot, ESP, the Bermuda triangle, crop circles, Loch Ness Monster, Vampires, and UFOs and aliens. Glossary, bibliography. "Try This" sections encourage critical thinking skills.



Test Your Science IQ by Charles Cazeau (b073PB \$20.00, 368 pages, paperback. 12 to adult) Hundreds of addictive questions & answers covering both science & pseudoscience. Clear, well written, yet sophisticated enough for adults. Very strong on why science is important. A book you will enjoy experiencing with your child. Fascinating and fun.



The Magic Detectives

Written and illustrated by Joe Nickell (b070PB \$15. 115 pages. Paperback. 9 to 14 yrs) 30 mysteries—encourages readers to think for themselves before the solution is offered. Historical ghost incidents, Lock Ness, UFO aliens, Mummy's Curse, Holy Shroud, and more.

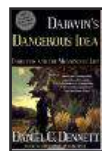


Maybe Yes, Maybe No by Dan Barker (b071PB \$16.00, 128 pages, paperback. 7-10 years) Adventures of Andrea, a skeptic. Cartoon strip style. How to check out extraordinary claims. Simple straightforward text. How to listen and ask questions; how to seek a simple explanation; what tools and rules a scientist uses to check things out.



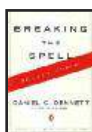
Wonder Workers! How They Perform the Impossible Written and illustrated by Joe Nickell (b099PB \$17.00, 94 pages, paperback. 9 to early teens) Detective Nickell investigates and reveals the secrets of the Fireproof Man, the bullet trick, levitation, the Human Magnet, a psychic, the Man Who Walked Through Walls, X-ray Vision, mind reading, Edgar Cayce & Peter Hurkos. With suggestions on how to use the stories to encourage critical thinking.

Daniel C. Dennett



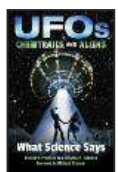
Darwin's Dangerous Idea: Evolution and the Meanings of Life

by Daniel C. Dennett. Both groundbreaking and accessible. Focuses unerring logic on the theory of natural selection, showing how Darwin's great idea transforms and illuminates our traditional view of humanity's place in the universe. Dennett vividly describes the theory itself and then extends Darwin's vision with impeccable arguments to their often surprising conclusions, challenging the views of some of the most famous scientists of our day, including Stephen Jay Gould. **Cat. No. b155PB. (\$18, paperback)**



Breaking the Spell: Religion as a Natural Phenomenon

by Daniel C. Dennett. In this definitive work on religion by one of the "Four Horsemen" and world-famous philosopher Daniel Dennett asks "Is religion a product of blind evolutionary instinct or rational choice?" "Is it truly the best way to live a moral life?" Ranging through biology, history, and psychology, Dennett charts religion's evolution from "wild" folk belief to "domesticated" dogma. **Cat. No. b154PB. (\$18, paperback)**



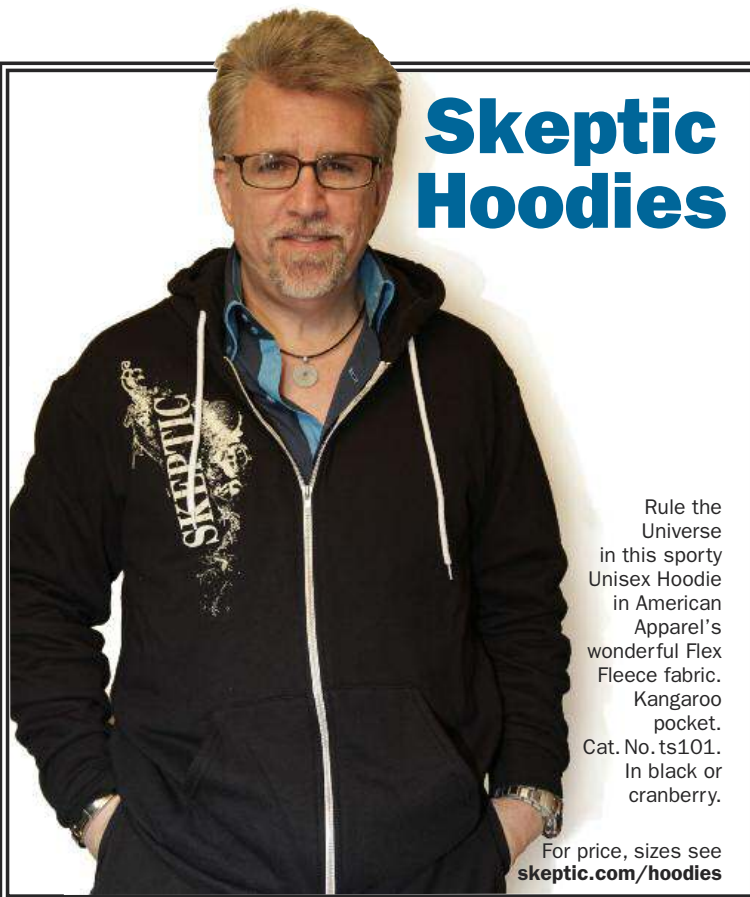
UFOs, Chemtrails, and Aliens: What Science Says

(b171HB \$28.00) Donald R. Prothero and Tim Callahan Explores why demonstrably false beliefs—UFOs. Aliens. Strange crop circles—thrive despite decades of education and scientific debunking. Employs the ground rules of science and the standards of scientific evidence and discusses a wide range of topics including the reliability of eyewitness testimony, psychological research into why people want to believe in aliens and UFOs, and the role conspiratorial thinking plays in UFO culture. Callahan and Prothero examine a variety of UFO sightings and describe the standards of evidence used to determine whether UFOs are actual alien spacecraft. Finally, they consider our views of aliens and the strong cultural signals that provide the shapes and behaviors of these beings. While their approach is firmly based in science, the authors also share their personal experiences of Area 51, Roswell, and other legendary sites, creating a narrative that is sure to engross both skeptics and believers.



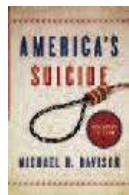
Abominable Science!: Origins of the Yeti, Nessie, and Other Famous Cryptids by Daniel Loxton and Donald Prothero. (b150HB \$29.95 hardback) An entertaining, educational, and definitive text on cryptids, presenting the arguments both for and against their existence. Takes on Bigfoot; the Yeti, or Abominable Snowman; and its cross-cultural incarnations; the Loch Ness monster; the evolution of the Great Sea Serpent; and Mokele Mbembe, the Congo dinosaur. Analyses the psychology behind the persistent belief in paranormal phenomena, and discusses the cryptozoology subculture.

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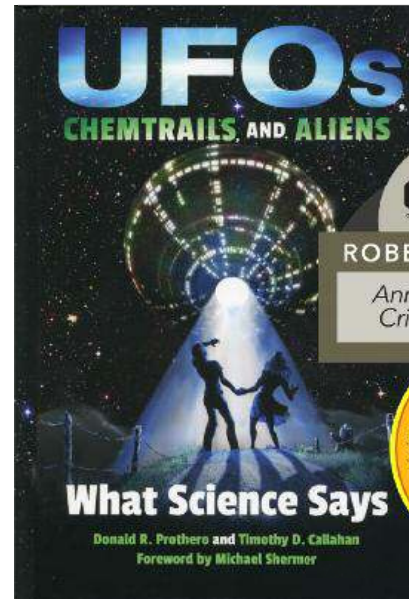
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AMERICA'S SUICIDE, 2nd Ed by Michael H. Davison
Major themes expanded in this book:

- The human race cannot survive without moral principles.
- The religious foundation of morals in the United States has crumbled. In consequence our nation flounders in a great moral crisis.
- Crumbled especially but not only by science, the religious foundation of morals cannot survive the advance of thought. Into the no man's land vacated by the retreat of traditional religion has rushed a secular religion masquerading as liberal, progressive, compassionate and just.
- This allegedly new but in reality ancient doctrine has all the characteristics of the theistic religions it strives to displace: the same intolerant dogmatism, the same adherence to undemonstrable principles, the same persecution of doubters and infidels, the same proselytizing of the true faith, the same presumption of moral superiority and righteousness. Earlier faiths rested their claims to power on beliefs in God or gods, the current ones on socialist pretentiousness. Either ideology can only extend our term of ignorance and lethal conflict, and the beliefs trump truth.
- Our political problems are not at root political and cannot be resolved by politicians or political and social theorists no matter how well intentioned. They are psychological, rooted in the human condition and poor self awareness, and addressable only by difficult, painful and abhorrent individual self examination.
- We desperately need a rational secular foundation for morality and that, tragically, we do not have. I propose that we initially set our moral principles on the premise of not trying to defeat evolution as we are now doing. As we gain more knowledge of ourselves and genetic engineering, we should very gradually over many generations improve the human species toward ever greater intelligence, self awareness and longer, healthier, happier and more fulfilling lives. For the first time in history we would free ourselves from pretentious, arbitrary and oppressive religious and political authority.
- The last chapter opens a window to a view of what a rational and minimally contentious nation would look like.

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- SKEPTIC Magazine:** The top left shows the magazine's masthead and a featured article titled "9/11 Was There a Conspiracy?" by Kenneth Krause. The article's subtitle is "The Truth Behind the Growing Truth Movement, Denimition Experts on Why the Buildings Fell, Ball Lightings, Is it Real?, Big Bang Defense of Intelligent Design Fails, Real Mind Reading Why People Say They Were Kidnapped by Aliens, and more..."
- BEFORE THE DAWN:** A book cover by Kenneth Krause, subtitled "In the Beginning". The description reads: "In this week's eSkeptic, Kenneth Krause reviews Nicholas Wade's book, *Before the Dawn: Recovering the Lost History of Our Ancestors*."
- Letting Go of God CD:** A CD cover by Julia Sweeney, subtitled "The Weather Makers (Outside) by Tin Flamingo". The description says: "The Weather Makers (Outside video) by Dr. Tin Flamingo".
- www.SKEPTIC.com:** A screenshot of the website's homepage, showing a search bar, a Google search button, and a list of links including "SIGN UP for eSkeptic", "BROWSE the fascinating and provocative eSkeptic archives", "STAY INFORMED of upcoming lectures", "ORDER back issues", and "SUPPORT us with a donation".



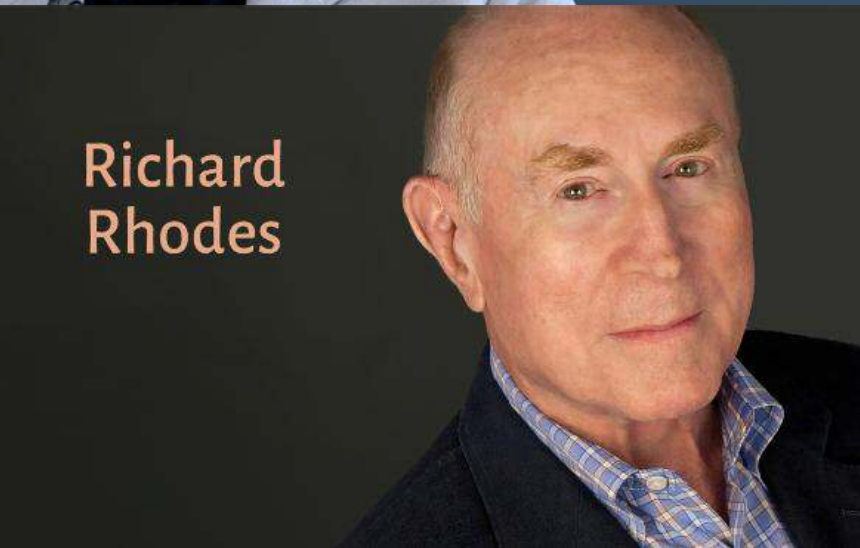
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Dr. Leonard Mlodinow: Elastic—Flexible Thinking in a Time of Change

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Dr. Carol Tavis talks with Dr. Michael Shermer on his book *Heavens on Earth: The Scientific Search for the Afterlife, Immortality, and Utopia*

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Bill Nye the Science Guy Saves the World on Netflix

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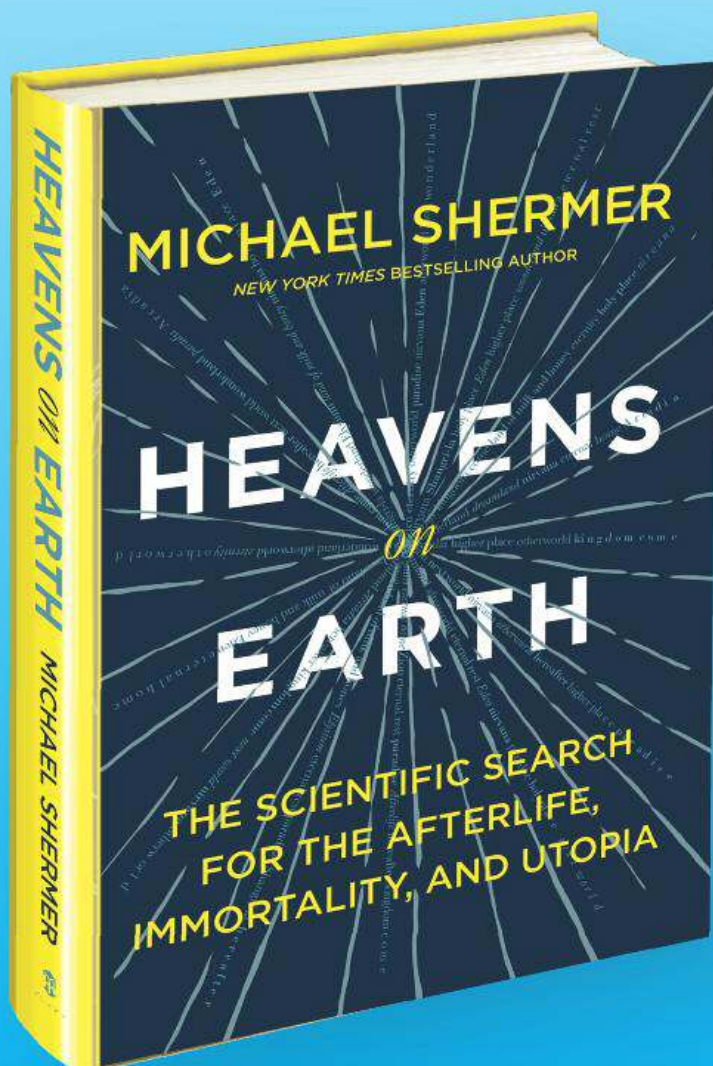
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