

# The REALL News

The official newsletter of the Rational Examination Association of Lincoln Land

*"It's a very dangerous thing to believe in nonsense." — James Randi*

Volume 10, Number 6

June 2002

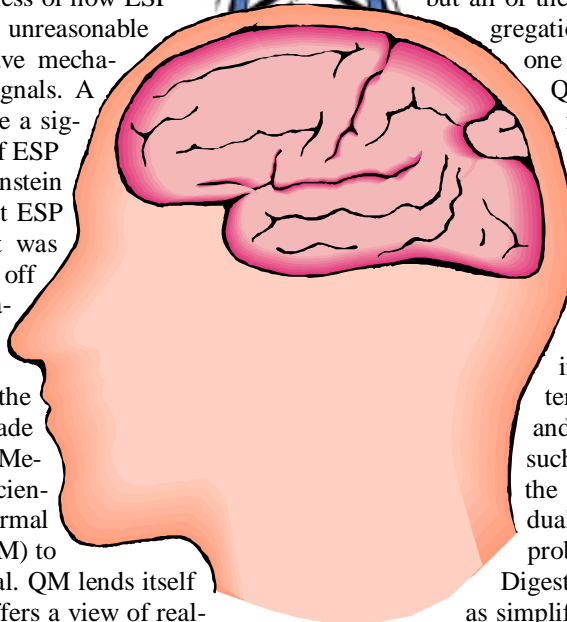
## The Physics of ESP, Part 2

by Robert Novella

In part one of this article I discussed the fundamental forces of nature and examined whether they can account for the claims made for extrasensory perception. It turned out that none could account for it, not gravity, not electromagnetism, nor any of the nuclear forces. Either they are too weak or too short-ranged to be considered as viable explanations.

If the fundamental forces of nature cannot provide a mechanism for ESP, perhaps one of the more bizarre aspects of quantum theory can offer some hope. In part two of this article we will see that certain quantum phenomena seem amenable to ESP, but this is true only until the details of these phenomena are examined. Also, regardless of how ESP signals might be produced, it is not unreasonable to assume that the body would have mechanisms in place to interpret these signals. A lack of any such structures would be a significant problem for the feasibility of ESP.

Earlier this century Albert Einstein said that he had an open mind about ESP but he would be skeptical until it was shown that ESP "energy" dropped off in intensity like all the forces in nature. He also expressed dissatisfaction with what was to become one of the most significant theories of the century, a theory to which he made important contributions—Quantum Mechanics. Many people, anxious for scientific justification for their paranormal beliefs, use Quantum Mechanics (QM) to justify their beliefs in the paranormal. QM lends itself to this type of abuse because QM offers a view of reality that is completely counterintuitive to our everyday experiences. What is this theory all about?



that energy is not continuously variable, like the volume control on your TV, but is discrete like the channel selector. This means that energy does not exist in a perfectly, infinitely smooth progression from low energy to high but in discontinuous jumps from one level to the next. Additionally, matter and energy are both wave-like and particle-like with only one aspect becoming manifest at any one time, depending on which aspect one is attempting to observe. Also, there is an intrinsic limit on how much can be simultaneously known about nature that can never be surpassed. The classical examples are position and momentum. The more precisely we know one variable, the less precisely we know the other. Finally, an unmeasured quantum system (atoms, photons of light, etc.) does not exist in one of its possible states but all of them at the same time. This simultaneous aggregation of states is called a superposition and is

one of the most bizarre realities revealed by QM. A mathematical tool known as a wavefunction describes this superposition, assigning probabilities to the existence of all the states. When the system is measured the wavefunction is said to "collapse" causing one of the possible states to become reality. It should be noted that wavefunction collapse and superposition, although widely believed, is more of an interpretation of QM (the Copenhagen Interpretation) than the direct results of theory and experimentation. So, QM has introduced such bizarre and counterintuitive concepts as the discreteness of energy, the wave-particle duality of matter and energy, and the ultimate probabilistic nature of all reality. This 'Readers Digest' version of Quantum Mechanics is about as simplified as it gets but hopefully it is enough for the discussion of QM and ESP that follows.

*("Physics of ESP" continued on page 3)*

### Quantum Mechanics Primer

Essentially, Quantum Mechanics describes the behavior and interactions of matter and energy at its most fundamental level. It reveals that the world at the atomic scale is completely unlike the macroscopic world of everyday life. We have learned

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## Purpose

The Rational Examination Association of Lincoln Land is a non-profit, tax-exempt 501(c)(3) educational and scientific organization. It is dedicated to the development of rational thinking and the application of the scientific method toward claims of the paranormal and fringe-science phenomena.

REALL shall conduct research, convene meetings, publish a newsletter, and disseminate information to its members and the general public. Its primary geographic region of coverage is central Illinois.

REALL subscribes to the premise that the scientific method is the most reliable and self-correcting system for obtaining knowledge about the world and universe. REALL does not reject paranormal claims on *a priori* grounds, but rather is committed to objective, though critical, inquiry.

The REALL News is its official newsletter.

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## REALL Contacts

REALL Hotline.....	217-726-5354
Chairman, David Bloomberg .....	chairman@reall.org
Editor, Wally Hartshorn .....	editor@reall.org
Web Site .....	www.reall.org

## From the Chairman

David Bloomberg

### June Meeting: Picnic!

Since the Lincoln Library's annual book sale kicks us out of our regular room every June, we thought now would be a good time to have our second annual picnic meeting! In particular, it will be Saturday, June 8, at 4:00. Once again, Board member Dave McMaster (and his gracious wife) will be hosting it at their beautiful house on the outskirts of Springfield (last year I got in trouble for saying it was in Dawson—that is where the post office considers their address to be, but they aren't actually *in* Dawson).

We will provide the main course, but desserts and side dishes will be potluck. We encourage you to bring your significant others, of course! Please RSVP to Dave at 364-5353 so we'll know how many people to expect. See the back of this newsletter for directions. Last year we had a great time, and I hope to see you all there!

### Notes from the May Meeting

Well, I have to admit, I was less than thrilled about the turnout of May's meeting. Here we had a great chance to make a good impression showing how we support science and education, and it was pretty much the same regulars who showed up. While I certainly would like to thank those regulars and the others who came, I find myself wondering why others did not. Was it a bad night? Is Tuesday in general a bad night? I don't know. But I'd like to. Please feel free to e-mail me any feedback you have, good or bad. The address is easy to remember: chairman@reall.org.

I should note that even with the lower attendance than I would have liked to see, the folks from the Springfield schools who showed up to give the presentation seemed happy enough.

## A Nod to Our Patrons

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(*"Physics of ESP" continued from page 1*)

The quantum weirdness discussed above has been used to justify a host of paranormal phenomena where no real justification exists. Specifically, one of the connections between QM and ESP involves the assertion that QM supports the instantaneous transfer of information over arbitrarily long distances. If this assertion were true, it would offer a viable mechanism for ESP, but the speciousness of the claim reveals itself upon closer examination.

QM has demonstrated that if two particles share a common origin, they become "entangled" in such a way that although they may be separated by light years, they still behave as one system with certain effects on one having an instantaneous effect on the other. This is not mere speculation. Actual experiments have been performed demonstrating this phenomenon. (Browne, 1997) For example, if two particles are created from a single quantum system that has no spin, then in order for total spin to remain zero, the net spin of the two particles must also be zero. (Spin in quantum mechanics is not quite like a spinning

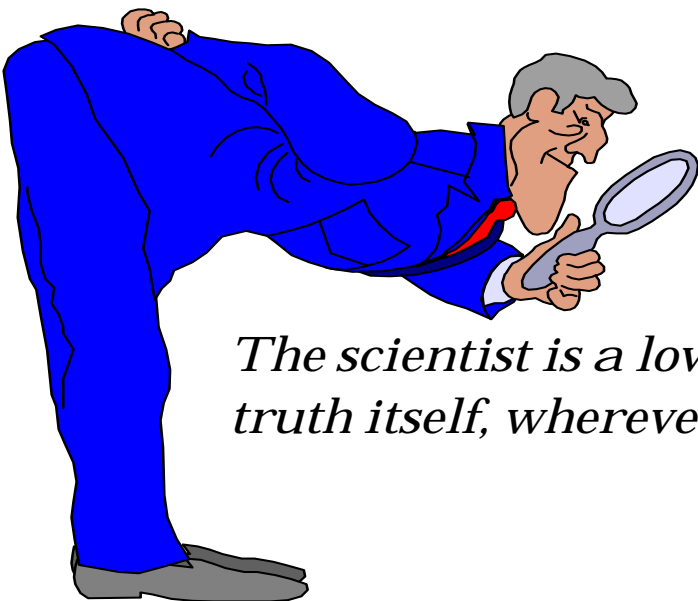
top. For the purposes of this discussion, however, think of "spin up" and "spin down" as different directions of normal everyday spin.) The fact that total spin must be the same is the result of a conservation law, which I will not go into here. Since spin cannot be created from nothing, if one particle is measured to be spin up along any axis (such as the x-axis) then the other particle must be the opposite spin on the same axis. Now remember, the Copenhagen Interpretation of QM tells us that until the particles are measured, they both exist in a superposed state in which all the infinite number of possible spin states exist at the same time along every possible axis. If an x-axis measurement is taken of one particle to determine its spin, then its wavefunction is said to collapse into either spin up or down. No matter in which axis of spin a measurement is taken, the particle will spin in that direction or its opposite. This is taken to mean that the act of measurement forces the particle to choose that direction in which to spin. Theory and experiment also show us, however, that if the twin particle is similarly

(*"Physics of ESP" continued on page 5*)

We had a good discussion and found out about Springfield's science curriculum. If you couldn't attend but would like more information on the Springfield Public Schools Foundation (the group trying to raise money for school science kits), you can call them at 525-3006 or you can talk to me at an upcoming meeting. I was planning to put more info in this column, and I know I have it somewhere, but my basement (along with lots of others around town) got some water during the big rains and so everything got moved around. Luckily, nothing important was ruined, but I have no idea where my stuff from the May meeting is right now.

## Sad News

You've almost certainly heard by now, but it is worth noting anyway. Stephen Jay Gould has died at the age of 60 from cancer he'd been battling for some 20 years. Gould has received many eulogies across the country (you can find many of them on the Web), and I can hardly do him justice. But he was a great science popularizer, not unlike Carl Sagan. But in particu-



*The scientist is a lover of truth for the very love of truth itself, wherever it may lead.*

— Luther Burbank

lar, he often specifically addressed evolution, a topic that should not be controversial but, of course, still is among certain segments of the population. He was able to address it not just as a science writer, but as a scientist – and one who is extremely accomplished in his field.

His theory of punctuated equilibrium is still the subject of intense debate by scientists, and creationists used quotes from some of these debates out of context to make it seem like he somehow supported them – utter rubbish, of course. Yet at the same time they quoted him, they fought him, and some even lied about him. Back in August 1993, we reported in this newsletter that creationist Kent Hovind – before he became a bigger name in creationism circles – had used Gould's name to get some publicity.

The *Peoria Journal Star* of June 25 reported that Hovind claimed he was scheduled to debate Gould; Hovind added, "I suspect Gould will back out." Why did he suspect that? Well, Dr. Eugenie Scott, Executive Director of the National Center for Science Education, wrote to Gould and asked about Hovind. In his response, Gould said, "You really shouldn't believe everything you read ... I have never heard of the man and therefore cannot have agreed to anything with him." Gould went on to comment about "the obvious phony tactic of claiming that he challenged me to a debate when he didn't, and then claiming that I backed out when I didn't appear."

It is probably only a matter of time before creationists make up new stories about Gould now that he can no longer defend himself. Which only adds to the pain of losing such a great warrior in the battle for rational thought. ♡

# Bad Astronomy and Poor Critical Thinking

by David Bloomberg

**M**ost of us probably didn't realize it, but April 20th was International Astronomy Day, an opportunity to bring astronomy to the general public.

Philip Plait, research manager at Sonoma State University in Northern California, wants to do something similar, but on a 365-day-per-year basis.

Plait received his Ph.D. from the University of Virginia in 1994 and worked for NASA contractors on the Hubble space telescope. He soon realized that "being a calibration scientist was not as glamorous as it sounded." Instead, he wanted to focus on public outreach, which he does at Sonoma State, a job that has him looking for ways to get NASA science into the classroom.

But that isn't the only way Plait tries to get science into public hands.

Plait is better known for having created the "Bad Astronomy" website ([www.badastronomy.com](http://www.badastronomy.com)), where he has tackled everything from science fiction movie reviews to misconceptions to out-and-out pseudoscience. Last month, Plait has branched out from the Web into his new book, **Bad Astronomy: Misconceptions and Misuses Revealed, from Astrology to the Moon Landing 'Hoax'** (John Wiley & Sons, Inc., \$15.95).

The website began in the early 1990s as a personal page that just kept growing. His first article was on a topic that still comes back every year: the claim that you can only stand an egg on its end during the Vernal Equinox.

It is pretty much a given that some local news outlets will report this myth as fact, and while it may not seem to have anything to do with astronomy, Plait notes in his book that it is the supposed link to the equinox—the sun crossing into the northern hemisphere of the sky—that brings about the association. In fact, though, he notes that anybody can stand an egg on end at any time.

But who cares? Is it really that big a deal if some people think you can only balance an egg on a special day? Plait says yes.

For one thing, it is the media that continues to spread this misinformation, and these are the same outlets people trust to give out information on medicine, business, and the day's events. If they can't get something this simple correct, how can we trust them with more complicated information?

On another level, Plait says, "Maybe bad astronomy is not so important, but lack of critical thinking is. People are always trying to sell you something. They can convince you of any-

thing if you don't think critically." The egg effect is simple to test in a scientific manner, so it serves as a good way to teach critical thinking.

Astronomy professor Charles Schweighauser, at the University of Illinois, Springfield, says he gets the egg question once in a while. But other areas more frequently come up, generally by way of honest people asking legitimate questions. "They want to know what an object in the sky was. When Venus is bright I get lots of calls."

Still, he has to deal with his fair share of bad astronomy as well. "Astrology is the most problematic," he says. "People want to believe in some sort of supernatural power."

Although astrology and eggs standing on end may not seem to have much in common, Schweighauser says astrology "reflects sloppy thinking, not scientific thinking."

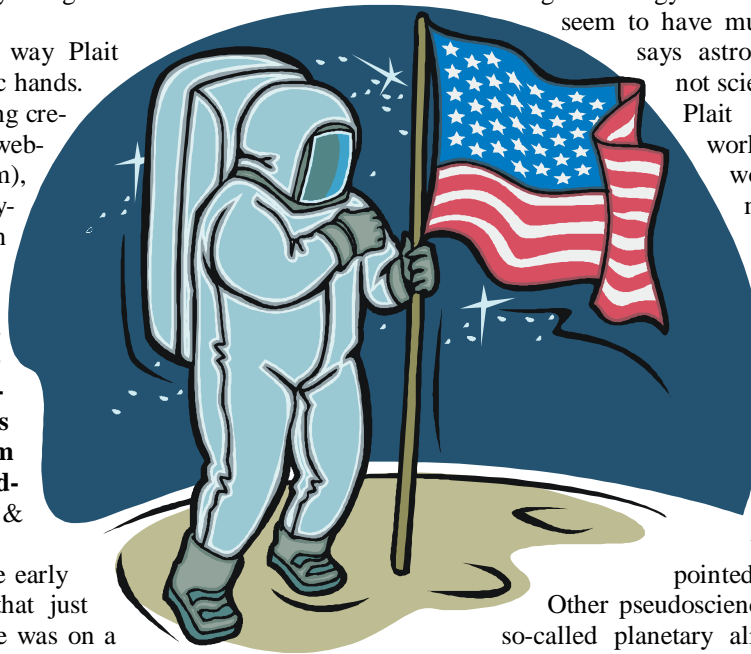
Plait says, "Astrology just doesn't work, and we know why it doesn't work." But that is only one of many pseudosciences. The difference between this and bad science is that bad science can be corrected—it's fine to make a mistake, as long as it is fixed when it has been pointed out. However, pseudoscience is "pernicious." He calls it a "big industry" and has seen numerous cases when promoters continue to say incorrect things even after it has been pointed out to them.

Other pseudosciences covered in his book include so-called planetary alignments that are supposed to wreak havoc on Earth (there have been many already and, well, we're still here), UFOs, and creationism.

"Creationism is the worst, because they are trying to promote their religion as science when it's not. Treating it as real science is as silly as teaching dowsing in a geology class. They are trying to shape the minds of today's youths. I can't say it strongly enough, creationism is just wrong and it turns people against science, and we know science works."

While Professor Schweighauser has not gotten many inquiries related to creationism because, in his experience, the creationists mostly attack biology, Plait says he has seen it in his field. "Creationism is a horrible offender of astronomy. They have grossly inaccurate web pages, they talk about theories of the solar system that were dropped decades ago. They are teaching it like it's true, but it's false."

Another area that recently received more attention that it deserved was the claim that man has never landed on the moon—NASA hoaxed the whole thing. The Fox network aired a "special" in February of last year, and then re-aired it in March, providing conspiracy buffs with a platform to put forth their claims without any fear of rebuttal in the show.





Plait says a lot of people saw the show and wondered about it—he received ten to twenty thousand e-mails on that topic alone. Schweighauser also received a lot of calls locally, to the point that he had to give a public lecture on the topic to point out all the flaws. “TV is so impoverished,” he says, “they’ll do anything to make a buck.”

He certainly won’t find any disagreement from Plait, who says those who promote such things “took one of the greatest achievements of the Twentieth Century and tossed it aside.” He uses this as yet another example of uncritical thinking, noting, “They have been shown exactly why they are wrong and they continue to believe it. I think that is disingenuous at best.”

There is at least one other area of bad astronomy that had quite an impact on people. In fact, it killed them. Plait discussed the Heaven’s Gate cult suicide, which was brought about at least in part because “one guy didn’t understand his telescope.” He saw something when looking at a comet and since he didn’t know what it was, many started to believe it was a UFO (a belief fueled by Art Bell’s radio show and website). The cult took that claim at face value and committed suicide to catch a ride. If the guy who took the picture had asked somebody knowledgeable, it would all have been explained as it was “very simple,” according to Plait. But he didn’t. While the cult may very well have found some other excuse to kill themselves, they might also have broken apart. “In the end,” Plait says, “those people died at that time because of bad astronomy.”

Many more people believe the myth about standing eggs on end than that the moon landing was a hoax, and certainly more than believed there was a UFO trailing the comet. But Plait’s website and book have shown that bad astronomy is everywhere. Indeed, on the very day he was interviewed for this story, one of the local news stations advertised that an asteroid was headed on a collision course for Earth—details at 10.

Those details told us we didn’t have to worry just yet, as there is only a one in 300 chance of collision, and it won’t happen until the year 2880 in any case. But it does relate to Plait’s point, which is that people need to understand the good science from the bad. If Congress, which relies on outsiders for most of their science advice, were to go by what has been seen in the media, we would be sending up nuclear weapons like those used in several recent movies. However, that might be the absolute worst way to handle the situation.

Hopefully, in the 878 years before that asteroid becomes a danger—and before we notice one that might strike sooner—people will be less inclined to believe bad astronomy. And they might even stop balancing eggs on their ends during the Vernal Equinox, too. The real question is: Which comes first, the asteroid or the egg?

*[A shorter version of this article appeared in the State Journal-Register. It is reprinted with the author’s permission.]*



*(“Physics of ESP” continued from page 3)*

measured, it will spin in the opposite direction of its partner. How did it know which spin direction the first particle was measured in so that it could “choose” the opposite? Did it somehow communicate this information instantly, apparently disregarding the speed limit of light? It is this apparent instantaneous transfer of information that many proponents of ESP have latched onto as the mechanism for ESP. If science has shown that nature can communicate information instantly with no real energy being transferred, why can’t people do the same thing?

People cannot do the same thing for two reasons. First of all, these experiments show that there are certain correlations between particles that are entangled. Postulating that a signal was exchanged at superluminal (faster than light) speeds, however, is one interpretation, but it is an interpretation that has a lot going against it, such as Einstein’s Relativity. A better interpretation would consider that quantum phenomena are ill suited for description by human language, which evolved in a classical (Newtonian) environment. Even if signals were sent, it is not possible to exploit this process to send information, ESP or otherwise. At its heart Quantum Mechanics is a statistical science. The behavior of a quantum system can never be predicted precisely. All that is possible are statements of probability. For example; scientists cannot tell you when an atom will decay, only that a certain percentage of like atoms will decay over a certain amount of time. Therefore, it is impossible to know beforehand which spin a particle will have before it is measured (unless, of course, you measured its entangled partner first). If you can not know what it will be, then it is impossible to encode a message you want to send instantly. Regardless of the mechanism, be it a computer or a brain, the only thing that can be sent are random bits of data with nothing for anyone to interpret.

If this isn’t enough there is another good reason why entanglement can not explain ESP; a phenomenon called quantum decoherence. This principle is a description of what happens to quantum systems when many of them interact. Any of the inevitable interactions with other particles destroy any special connection between entangled particles, creating new entangled particles which then interact with other particles, and so on. The result is no special relationship between the original entangled particles and no possible message for an ESP signal. Related to this is the fact that the human brain itself is not a quantum system (although it is made up of many of them) Any entangled particles produced by the brain would quickly decohere preventing any ESP message from being sent.

## Physiological Perspective

Many people will unfortunately disregard modern science’s view of the feasibility of ESP. Let us take another approach, therefore, and examine the sensory mechanisms that humans have evolved. If an ESP sense exists then there must be structures designed to intercept and interpret this information.

There are many structures in the human body that feed the brain information about the world both outside the body and within. Specialized cells, called receptors, change the energy they receive into nerve impulses that are sent to the cerebral

*(“Physics of ESP” continued on page 7)*

# A Different Kind of Creationism

by Clark Olson

In contrast to institutionally sanctioned and promoted young earth creationism (Six days of Genesis and the reality of the Noachian flood) by some Protestant churches, the Dominicans and other groups within the Roman Catholic church embrace modern cosmology and, in fact, even sacralize it. For several months my wife and I have been watching videos presenting modern cosmology at the Dominican mother house and joining in the discussion afterward. On Saturday, April 8, we were guests for an all-day presentation by a visiting priest (Wessels) and nun of the order on the theological implications of modern cosmology. They both have advanced academic degrees beyond basic seminary training and both have taught at the college level. A book by the priest was available (see bibliography, below).

The day started with a ritual using a line across the room showing the history of the universe. Candles were lit at major milestones along the path, starting with the Big Bang, and going on to the origin of the solar system and the origins of earth, life, and evolution of life. Thus creation was seen as a continuing, ongoing, unfinished process, not a short, one time event. The science was accepted at least in broad outline, without any apparent reservations as a basis for what followed.

The rest of the day was spent with the priest and the nun alternating short talks, study periods, and discussions groups on various religious extrapolations and implications. The audience of about 30 people consisted mainly of Dominican and Franciscan nuns. These women are mainly the teachers for the church schools and adult classes and, of course, are well educated. Presumably, they were already familiar with the material, but this day provided some additional depth and encouragement for their ongoing education. It would be necessary to get encouragement since many Catholics are fundamentalist when it comes to the Bible, even though a papal encyclical accepts evolution.

One of the practical implications of this view of creation is that the environment should be protected and so one of the projects of the local community is to practice environmentally friendly living and teach about it at their farm west of town. I have the impression that a lot of religious conservatives are only interested in getting to Heaven and are not necessarily very concerned with the state of the earth!

This presentation seems to be an activity within a movement. The videos mentioned above are done by Brian Swimme, who is a physicist in the San Francisco area. In the videos he waxes eloquently about cosmology, like Carl Sagan, and barely mentions God. Swimme has written several books and has worked with Matthew Fox, a former Dominican priest and published scholar. Another prominent figure is Thomas Berry, who is also a Catholic priest (not Dominican). However, there are Protestants also involved and the Gaia idea, which is not otherwise especially related to any religious group, is invoked.

Different religious groups, denominations, etc. have different approaches to Biblical literalism. The following is an introduction to just a few of these. The Roman Catholic Church is not literalist and in this movement is actively promoting a nonliteralist reading. My denomination, Presbyterian (PCUSA), has some statements about nonliteralism, but otherwise seems to be laissez faire since there are ministers and lay persons who apparently are literalists. The Lutheran Church, Missouri Synod, seems to be aggressively literalist with Eugene Sattler as a spokesperson, and they had a creationist information booth at a town festival/street fair, according to my brother in Elmhurst. Jehovah's Witnesses distribute creationist tracts to the public.

Usually in public discussions, evolutionists present the science and creationists try to knock it down, but I personally feel more should be said on the untenability of the religious side of the debate. That is, it should be pointed out that Genesis was written by people (at least two), not God, at different times and under different circumstances, and that even if it is granted that it was inspired by God (i.e., expressing the

religious beliefs of the writers) there is no reason to think one would get much science from 3000-year-old texts. Also the ridiculous scientific conclusions that one must derive from a literalist account should be pointed out—such as the impossibility of Adam naming all the one million-plus creatures, or Noah getting them all on the ark. Therefore, religious leaders should be speaking out. The dilemma is that religious leaders are most

likely to be in a religious setting which is comfortable for them and have no motivation to speak out. At the same time scientists and other rationalists who do have the motivation don't necessarily have the authority to speak about religion. At certain times in court hearings and school board hearings some religious leaders will speak out, but in general there does not seem to be a regular forum as there is for scientists in *American Biology Teacher*, *Bioscience*, *Science* and skeptics magazines. I realize a religious based approach is not necessarily comfortable for some REALL readers, but I would appreciate starting a conversation in this area. For one thing I'd appreciate anyone sending along information about what specific religious groups are doing—pamphlets, web sites, talks, etc.

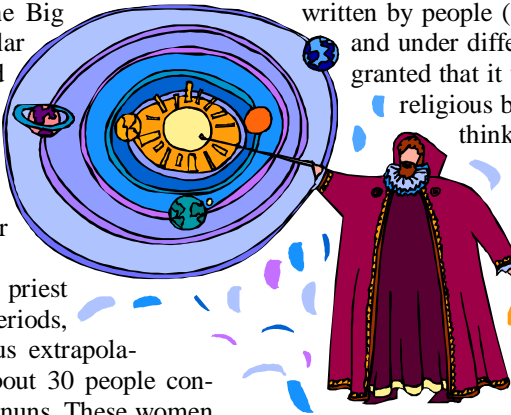
You may bring such information to REALL meetings or e-mail me at [bolson@springnet1.com](mailto:bolson@springnet1.com).

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Berry, Thomas 1988. *The Dream of the Earth*. Sierra Club Books, San Francisco

Swimme, Brian 1996. *The Hidden Heart of the Cosmos*. Orbis Books, Maryknoll, NY; (don't have reference for video series, but this would give one an idea of approach)

Wessels, Cletus 2000. *The Holy Web. Church and the new universe story*. Orbis Books, Maryknoll, NY; 237p



(“Physics of ESP” continued from page 5)

cortex of the brain, which interprets the information, telling us if it is the beat of a drum, a scratch on our skin or a sunset. Without such structures the brain would be completely insensate, unaware of anything going on around it. Sight, touch, taste, smell and hearing are the canonical examples of the human senses but scientists have identified receptors for no less than nine senses including ones informing us about the internal state of the body. One example is proprioception, which tells us the orientations of our limbs and where we are in space.

The one hundred and fifty million rod and cone receptor cells in our retina transform the energy of light into electrical signals for our brain’s visual cortex to interpret. The twenty five thousand hair-like receptors in the inner ear’s cochlea change the mechanical energy of sound waves into signals the auditory nerve can send to the brain. Our touch receptors are divided into four different types which are dispersed with varying distributions throughout our skin. Other receptors provide us with information such as heat, cold, and pain.

As sophisticated and marvelous as our senses are, other animals put us to shame with the subtlety and precision of their sense organs. Buz-zards can see small rodents from three miles away. Moths can hear frequencies twelve times higher than we can and cockroaches can detect movement as small as two thousand times the diameter of a hydrogen atom. Some animals do not simply have keener versions of our own senses. Some have receptors that provide information unlike anything we can sense. The shark, for example, has electro-receptors that allows them to perceive the weak electric fields emitted by the muscles of their prey.

All of the receptors responsible for such capabilities have been extensively studied. There are no mysterious receptors with unknown functions, receptors that might respond to unknown and elusive energies and thereby account for ESP. Such candidate receptors for ESP are conspicuous by their absence. This lack of receptors is not definitive proof against the feasibility of ESP, but is yet another mark against it. Some ESP proponents contend that the human brain itself is the receptor of ESP signals. Doesn’t the average human use only 10% of his brain? Couldn’t the rest be devoted to extra-sensory perception? Contrary to this popular and pervasive myth, healthy humans use all of their brains. (See the article, “90% of a Brain is a Terrible Thing to Waste” an earlier issue for a more thorough discussion of this topic.) Although there is much we still do not know about the human brain, there are no vast areas with unknown capabilities. If this were true we would be able to remove eighty to ninety percent of our brains with no loss of ordi-

nary function. Further, from an evolutionary perspective, this myth is preposterous. Our brain weighs only four percent of our body weight but consumes close to twenty percent of its resources 2. Evolutionary pressures could not select for an organ that consumes so many resources and is devoted to a function that only apparently benefits a few of us.

## Conclusion

In part one we saw that nature does not provide for any known force which can account for ESP. Now we see that the weirdness of Quantum Mechanics provides no refuge for those seeking scientific plausibility for this failed theory. Just because a theory like Quantum Mechanics seems bizarre, it does not necessarily mean that it can be used to justify bizarre claims.

On the surface, certain quantum phenomena may seem to support ESP but this support vanishes upon closer examination. Additionally, if ESP exists there should be receptors in the body evolved to send and receive these signals. None have ever been found. Modern science, therefore, offers no plausible mechanism, and no direct evidence for ESP, which should increase skepticism to very high

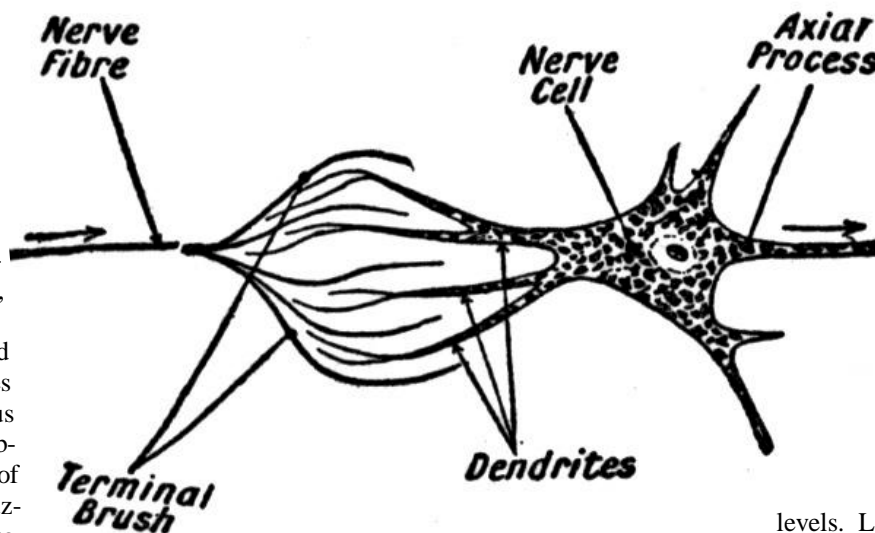
levels. Lack of a possible mechanism for a phenomenon is not enough to conclude that such a phenomenon does not exist, or is impossible. It does mean, however, that before the existence of the phenomenon is accepted as true, reproducible and compelling evidence should exist, which is lacking for ESP. Unfortunately, interest in ESP is far more widespread than the scientific literacy which is necessary to judge the feasibility of such paranormal phenomena.

In part three of this article I will discuss the feasibility of other types of ESP such as telekinesis and precognition.

## References:

- 1) “Signal Travels Farther and Faster Than Light,” M.W. Browne; New York Times, July 22, 1997: Science Times section
- 2) Principles of Neural Science, 3rd Edition, by Kandel, Schwartz and Jessell, 1991, New York, Elsevier.

[This article originally appeared in The New England Journal of Skepticism, Vol. 2 Issue 1, and is reprinted with permission.] ♡



Second  
Annual!

## Our Next Meeting

*Potluck Picnic!*

Join us for our second annual picnic meeting! We'll provide the main course, you provide the desserts and side dishes. This will be at Dave McMaster's house on the outskirts of Springfield, so please RSVP by phone at 364-5353.



**Directions:** From Springfield, take I-72 to Exit 104 (just East of the K-mart on Clear Lake). Turn right at the exit stop sign, and go 5 miles to the Whispering Woods subdivision (it's on the right—there's a big sign—can't miss it), then to 401 Blane Court (there are only two streets).

Dave McMaster's House  
401 Blane Court, Springfield, IL  
Saturday, June 8, 4:00 PM

**Special Date  
and Location!**

[www.reall.org](http://www.reall.org)

Rational Examination Association  
of Lincoln Land (REALL)  
P.O. Box 20302  
Springfield IL 62708

