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The Emerging Importance of Consciousness in Physics: Hopeful
Signs of a Convergence of Thinking in Science and Spirituality

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It's not often that human society goes through a radical change in world view. In fact, that last time it happened was about 400 years ago. Then, as now, most people were completely oblivious to the transformation while it was happening but within just a few generations people were looking at the world quite differently.

The revolution began quietly, in an obscure northern outpost of the Catholic Church in Poland. A canon of the Cathedral of Frauenberg, Nicolas Copernicus, took an interest in astronomy, conducting his investigations from a turret on the wall around the cathedral. This was more than 100 years before the invention of the telescope, so his observations and conclusions were all the more remarkable for being done with the naked eye. His dedication was remarkable, too, for it must not have been very pleasant spending those long and bitterly cold nights up on the wall. But the results were worth it. Copernicus became quite dissatisfied with the prevailing geocentric, or earth-centered, theory of the heavens, and when he found that some ancient Greek writers, such as Aristarchus, had suggested a heliocentric model, he compared it to his data and found it more to his liking. He completed his first draft of *De Revolutionibus* in 1530 and circulated it quietly among a few friends. A consummate perfectionist, Copernicus was reluctant to publish his work more widely, feeling that it was incomplete, but was finally released due to the efforts of a young mathematics professor who studied with him for

several years. Copernicus died in 1543 without knowing the effect his work would have on society.¹ It would extend beyond science into every segment of our culture.

Then came Galileo and Descartes

The work of Copernicus remained virtually unknown outside of academic circles until the early 1600's when an Italian mathematician, Galileo Galilei, aided by the newly invented telescope, confirmed his work publically. Galileo had the misfortune to be quite close to Church headquarters rather than in remote Poland, and he didn't share Copernicus' reluctance to publish. These factors led to escalating friction with the religious authorities culminating in his arrest, forced recanting of his beliefs, and house arrest for the remainder of his days.

Most people today believe that the core of this saga was about whether the Earth moved or not, but in reality it was controversial because it challenged Earth's place as a special and unique habitat for a special and unique creation, mankind. In addition, it contradicted the widely accepted doctrines of Aristotle, who taught that the Earth was the center of the Universe, and challenged the prevailing authority system of Scholasticism in which truth was arrived at by citing authority. Willis Harman has described the significance of this change:

Today we know that the transformation in thought...reached far outside of astronomical and philosophical debate..(it changed) the whole way of looking at the world...the new way was empirical: *What is true is what is found by scientific inquiry to be true. Ultimate authority resides in observation and experiment rather than tradition.*²

¹ Peter Landry, <http://www.blupete.com/Literature/Biographies/Science/Copernicus.htm> (Accessed 09-12-2009)

² Willis Harman, *Global Mind Change*, (San Francisco, CA: Berrett-Koehler Publishers, Inc. 1998) , 5.

To us today that conclusion seems obvious, but that's because we've been raised with the scientific inquiry world view which informs the thoughts and actions of us all, scientist or not. In the early 17th century it was revolutionary, and heretical. Fortunately a French philosopher, Rene Descartes, sprang to the rescue with a philosophy of dualism. As Edgar Mitchell summarizes it:

Spirit and matter, Descartes concluded, were of two different, noninteracting realms. Interaction between the two was limited to the transitory indwelling of the "soul" in humans and an occasional "miracle" of supernatural origin. Being a renowned philosopher and mathematician within the Church, his conclusion of dualism legitimized research into physical phenomena without ecclesiastic oversight.³

So in the course of about 100 years, the prevailing world view of Western civilization was transformed from a unitary (albeit primitive) view that included all of mind, body and spirit, into a dualistic view in which science would use observation and experiment to explore matter, and the realm of mind/spirit would be left to the Church. The dualistic view has worked well for most of the last 300 years, but as we shall see it has developed some major problems in recent times.

The Problems in Physics

The approach used by science, observation and experiment, in many cases utilizes a process called reductionism. That simply means "let's take it apart and see what it's made of." In exploring matter, scientists started taking matter apart and as the experiments and measuring equipment got better, they were able to find smaller and smaller pieces. Chemistry and physics allowed scientists to find the mysterious atom that they had predicted, measure electrons, neutrons and protons, find the structure of molecules, and develop the basic periodic table of the elements. Biologists were

³ Edgar Mitchell, *The Way of the Explorer* (Franklin Lakes, NJ: The Career Press, Inc, 2008), 159.

seeking to do the same with living tissue; find the parts and figure out how they fit.

Science became materialistic (everything comes from matter) and deterministic (predictable outcomes based on what went before). But when they got to the very small level, strange things started to happen.

The first hint of a problem came in 1803 when an English scientist, Thomas Young, designed an experiment to test the prevailing opinion that light takes the form of particles, and his experiment has since become a classic. What happened was described by the PBS science program, NOVA:

Young aims a beam of light at a barrier that has two slits. If the light is made of particles, he reasons, those particles should travel in a straight line through the slits, projecting two distinct lines of light on the screen beyond the barrier. Instead, Young sees a series of dark and bright lines on the screen, a pattern that could only be produced by waves of light interfering with each other. And yet other experiments...convincingly show the particle nature of light. Physicists are left with the unsettling conclusion that light – and as they later find, matter – has a dual nature. Sometimes it takes the form of particles and sometimes the form of waves.”⁴

So within a short 150 years or so after Descartes had turned science loose from the bonds of theology, scientists were presented with a curious puzzle. Not many recognized its importance, although as science fiction writer Isaac Asimov has perceptively commented, *“The most exciting phrase to hear in science, the one that heralds the most discoveries, is not 'Eureka!' (I found it!) but 'That's funny'”*⁵ And this peculiar property of light and matter was certainly “funny”. But it was only the beginning.

By the beginning of the 20th century many experiments on this dual wave/particle nature of light and matter had been performed, with an even more astounding discovery. The experiment had been slowed down to only project one photon of light or

⁴ Unsigned article, PBS website <http://www.pbs.org/wgbh/nova/manyworlds/time-nf.html> (Accessed 10-24-08).

⁵ Unattributed quote archive http://thinkexist.com/quotes/isaac_asimov/2.html (Accessed 09-22-09).

one electron at a time through the slits, and the interference pattern of waves was still displayed. This meant that the particle was interfering with itself! Even more troubling was the fact that if any effort was made to observe which slit the particle went through, the particle acted like a particle. If it was not observed, it acted like a wave. This astonishing behavior, now called "the observer effect", violated the basic tenet of materialist science that the experimenter is separate from the experiment. Noted Princeton physicist John Wheeler summarized this by saying, "*Nature at the quantum level is not a machine that goes its inexorable way. Instead, what answer we get depends on the question we put, the experiment we arrange, the registering device we choose. We are inescapably involved in bringing about that which appears to be happening.*"⁶ The idea that the mind, or consciousness, of an observer can actually interfere with the results of an experiment was, and is, very upsetting to scientists.

Quantum Physics gets Stranger Still

By the mid 1920's the wave/particle properties of matter had been mathematically formulated by two brilliant physicists, Werner Heisenberg and Erwin Schrodinger, whose combined efforts are called quantum mechanics. The Schrodinger equation, which predicts quantum properties, predicted some strange results, one of which was that matter remains in a state of uncertainty until it is observed. This again brings consciousness into physics at a very fundamental level. The equation also predicted a strange property called "entanglement" in which two photons, or bits of matter, could share a wave equation no matter if they were at the opposite ends of the universe.

⁶ Quoted in Amit Goswami, *The Self-Aware Universe* (NY: Tarcher/Putnam, 1993), 75.

This property seriously bothered Albert Einstein, because he realized that it meant that if you measured one entangled particle, the other particle would instantly know it. In technical terms, the wave would “collapse”. If it really happened instantly Einstein realized it would violate a fundamental tenet of relativity, that nothing can be transmitted faster than the speed of light, a property known as “nonlocality”. In 1935 Einstein along with two other physicists, Boris Podolsky and Nathan Rosen, published a paper now known as the EPR Paradox, showing that quantum mechanics predicted that this could happen, and as a result quantum mechanics had to be incomplete. Einstein called this “spooky action at a distance.” At the time there was no way to test the prediction.

In 1964 Irish physicist John Bell, in a famous paper known as “Bell’s Theorem”, proved mathematically that if quantum mechanics’ prediction was true, then Einstein’s prediction of “locality” (nothing faster than light) was false. Meanwhile experimental physics was getting better and better, and in 1981 a team led by Alain Aspect in France was able to test entanglement. They did, and Einstein lost. Since then the tests have been run at higher and higher accuracy, and the principle of instantaneous wave collapse has been verified. This was another blow to deterministic material realism.⁷

Reality Starts to Change

These findings were causing even physicists to question the prevailing view of material reality. They drove British physicist David Bohm to propose a new level of reality beyond the existing universe that he called “the implicate order,” a level that is not subject to space/time limitations.⁸ Michael Talbot has described Bohm’s ideas:

⁷ Goswami, *The Self-Aware Universe*, 113-128

⁸ David Bohm, *Wholeness and the Implicate Order* (London: Routledge and Kegan Paul, 1980)

Bohm, for example, believes Aspect's findings imply that objective reality does not exist...that the universe is at heart a phantasm, a gigantic and splendidly detailed hologram...every part of a hologram contains all the information possessed by the whole...This insight suggested to Bohm another way of understanding Aspect's discovery...(the particles respond) not because they are sending some mysterious signal back and forth, but because their separateness is an illusion...it means that at a deeper level of reality all things in the universe are infinitely connected.⁹

We see that the first challenge to physics is that mind or consciousness seems to have an effect on physics experiments, and appears to be a central causative factor in the quantum world. A second challenge comes from the study of the mind.

The Power of the Mind

A few years prior to Bohm's publication, Edgar Mitchell, agnostic Navy test pilot, MIT PhD and astronaut faced similar questions. Returning from the moon on Apollo 14, Mitchell had an unexpected experience that changed his life. Viewing the Earth from the Apollo capsule, Mitchell said he felt "*an overwhelming sense of universal connectedness. I actually felt what has been described as an ecstasy of unity...there was the sense that our presence...and the existence of the universe itself, was not accidental, but there was an intelligent process at work. I perceived the universe as in some way conscious.*"¹⁰

Another experience on that voyage also fueled Mitchell's curiosity. Before leaving he had arranged with two doctor friends in Florida to conduct an off-the-record ESP experiment, using symbols and random numbers, over the longest distance two human subjects had ever been separated. At preset times Mitchell would randomly select symbols and concentrate on each of them for a short period of time. His associates on

⁹ Michael Talbot, *The Universe as a Hologram*, <http://twm.co.nz/hologram.html> (Accessed 02-05-09)

¹⁰ Mitchell, *The Way of the Explorer*, 16.

Earth would be writing down what they thought the symbols were. The results were positive and showed a correlation with only a 1-in-3,000 probability of chance. The results were analyzed, verified and published by Dr J. B. Rhine of Duke University in *The Journal of Parapsychology*.¹¹ These experiences led Mitchell to found the Institute of Noetic Sciences¹² in 1972 to pursue an interdisciplinary approach to research on consciousness and mind/matter issues. Like David Bohm, Mitchell had found the materialist world view to be incomplete and was seeking a more comprehensive answer.

In IONS he has created an organization of qualified scientists to conduct, compile and publish research on a wide variety of consciousness issues. This is an important resource as surveys of research scientists have shown that there is a strong institutional bias against studies in parapsychology. Dean Radin, Senior Scientist at IONS, who has a master's in electrical engineering and a doctorate in psychology, became interested in the potential of the mind at an early age. He reports, "*The majority (of scientists) who believe that psi (parapsychology) is real are forced to confront the problem of 'forbidden knowledge,' taboo topics that restrict the conduct, funding and publication of certain ideas. An article on this subject in the journal Science in 2005 described the results of a survey on forbidden knowledge from scientists at prestigious academic departments in the United States. It found that 'informal constraints' limited what they could study.*"¹³

Because of this academic prejudice, which carries over into professional journals, parapsychology researchers formed their own association and publish their own journal. In 1969 the Parapsychological Association was finally elected an official affiliate of the

¹¹ Mitchell, *The Way of the Explorer*, 55, 56, 63, 77, 78.

¹² Novelist Dan Brown's latest, *The Lost Symbol*, features a "noetic scientist" heroine and mentions IONS

¹³ Dean Radin, *Entangled Minds*, (NY: Paraview, 2006), 7.

American Association for the Advancement of Science, confirming the acceptance of psi research as legitimate scientific inquiry.¹⁴

To most physicists the study of parapsychology has nothing to do with them, but the evidence suggests otherwise. The leading candidate for the mechanism of psi effects is right out of physics – entanglement. In 1965, the year after John Bell published his famous theorem confirming nonlocality and entanglement, two medical researchers published a startling study of identical twins which showed remarkable correlation in the EEG readings of the twins while distance separated. This result was ascribed to the minds being entangled, a result that one would expect to be especially strong in identical twins.¹⁵

Additional evidence for entanglement comes from the research of Jacobo Grinberg-Zylberbaum at the National University of Mexico. He tested pairs of subjects, some of whom had an existing relationship or whom he had meditate together prior to testing, and some whom had no relationship. He placed the subjects in separate shielded enclosures and stimulated one subject at random intervals with bright flashes of light, sounds or mild electric shocks while monitoring the EEG brain-waves of both subjects. There was no correlation of EEG records in cases where the subjects did not previously interact, but in cases where they did, the transferred potentials appeared consistently in about 25% of the cases. One set, a young couple in love, stood out in that their EEG patterns remained closely synchronized throughout the experiment.¹⁶ Again, entanglement is the most likely explanation for these results.

¹⁴ Radin, *Entangled Minds*, 75

¹⁵ Radin, *Entangled Minds*, 75.

¹⁶ Ervin Laszlo, *Science and the Akashic Field*, (Rochester, VT: Inner Traditions, 2007), 53-54.

Dean Radin provides an extensive history of psi research, similar to the above studies, of many different kinds, including remote viewing studies funded by the CIA to give the reader a feel for the wide variety of testing that has been done. He then performs a meta analysis of the studies, correcting for all the various kinds of errors, such as experimenter bias, cherry-picking of the data, and statistical issues, to compute the results in terms of deviation from pure chance. With over 1,000 studies and 1 billion data sets, the results show the odds against chance are 1.3×10^{104} which is a very large number.¹⁷ Something very real is obviously going on and it's likely that quantum effects such as entanglement are somehow involved.

Global Consciousness

The pioneer in psi research was Dr J. B. Rhine at Duke University, with published studies going back to the 1930's. The Rhine Research Center in Durham, NC is still a center of parapsychological research. The first center to utilize advanced technology as a major research tool was at Princeton University, where Robert Jahn founded the *Princeton Engineering Anomalies Research* lab (PEAR) in 1979. In this lab physics, engineering and psychology were systematically united for the first time in studies of consciousness and psi.

The primary tool developed at PEAR was a quantum device. Yes, physicists, there's that word again. They developed three kinds of random event generators (REG) that use quantum level processes, either thermal noise or electron tunneling, to generate the events. Each one functions as a sort of electronic coin toss in which the processor looks at the event generator to see if the random event has happened. Over time, like a coin

¹⁷ Radin, *Entangled Minds*, 276.

toss, it's around 50% yes and 50% no. This device became the standard tool for measuring the effects of human intention on physical reality. It improves over the physical devices used in the past, such as dice, in that there is no significant mass to be affected which allows the normally small effects of psi to become more apparent. It also provides lots of data points which improves the statistical analysis.

The first small, portable REG was developed in the early 1990's along with the software to record, process and transmit the data. The desire was to go beyond testing individuals and use the REGs to see if there was such a thing as mass consciousness that could be detected. Early limited field trials have expanded into a network of compact REGs around the world, all feeding data back into the computer at Princeton. The worldwide network has now been christened the Global Consciousness Project. Suspecting that skeptics might question the data and methodology, the team has openly published the engineering details and made the software code open source so it can be reviewed by anyone for bias.

Considering the large amount of data collected through this network of continuously running REGs, the team and the software has gotten quite good at separating data anomalies from noise. Review of the data has been done to see if there were measurable shifts at times of important global events. The answer is an unequivocal 'yes!'

The most striking event happened on September 6th, 1997, with the relatively small number of REGs at that time registering a very unusual deviation. It was the day of Princess Diana's funeral, which an estimated one billion people watched or listened to around the world. A similar but smaller effect was noted for Mother Teresa's funeral the

following week.¹⁸ Continuing data collection is building a library of information on the impact of events on mass consciousness.

Some research already exists that shows the converse, that focused mass consciousness can also influence events. In 1993 a demonstration project was launched in Washington, DC, to explore whether a large group of experienced participants in meditation could increase coherence and reduce the violent crime rate in a large city. Over an 8 week period, as the meditation group grew from around 500 to a peak of just under 4,000 persons, violent crimes decreased by over 23%. Data was controlled to eliminate effects from other variables, and the final analysis showed the probability of the results being a chance variation was less than 2 in 1 billion.¹⁹ These results are again a challenge for physics to explain.

Scientists Propose New World Views

The number of scientists troubled by these contradictions and unanswered questions continues to slowly increase. Some of them even are Nobel Prize winners. In 1981 Roger Sperry of Cal Tech shared the Nobel Prize in Medicine for his work in human split-brain studies. In honor of his accomplishment he was asked to write the lead article for the main journal in his field, the *Annual Review of Neuroscience*. Willis Harman writes: "Sperry's paper did not follow the regular pattern. Instead he wrote of the importance of the previously neglected area of subjective experiences, and noted a profound development, which he describes as follows:

Current concepts of the mind-brain relation involve a direct break with the long-established materialist and behaviorist doctrine that has dominated

¹⁸ Global Consciousness Project, <http://noosphere.princeton.edu/science2.html> (Accessed 09-23-09)

¹⁹ John Hagelin, *Institute of Science, Technology and Public Policy*, http://istpp.org/crime_prevention/ (Accessed 09-25-09)

neuroscience for many decades. Instead of renouncing or ignoring consciousness, the new interpretation gives full recognition to the primacy of inner conscious awareness as a causal reality."²⁰

Sperry's statement was astounding in its direct challenge to one of the foundational principles in materialist science. Since materialism is based on the primacy of matter, it explains the mind as a function that simply arises out of the brain when the brain gets complex enough. The mind is considered to be an *epiphenomenon* in that it "arises from or out of" the brain. By identifying consciousness as a cause rather than an effect, Sperry had signaled a radical shift in understanding of the nature of the mind that will be central to our own "Copernican revolution" in fundamental world view.

Not all neuroscientists have gotten the message, as is demonstrated by a recent article in *Scientific American Mind* entitled "Searching for God in the Brain."²¹ Researchers using functional magnetic resonance imaging (fMRI) have imaged the brain activity of volunteers having intense subjective religious experiences and found particular regions of the brain that light up. They've also found that by stimulating those areas of the brain they can induce similar feelings, and therefore are modestly claiming to have discovered the roots of religious experience. This is an example of the application of *epiphenomenal* thinking to subjective experience.

Here's what this approach seems like to me. Imagine that a team of space alien scientists were to land on Earth, and the first thing they saw was an automobile. They noticed that the vehicle moved forward and stopped. It moved forward again, and it stopped again. They noticed that every time it stopped, two red lights in the rear were illuminated. Every time it moved, they weren't illuminated. So they dug into the car's

²⁰ Harman, *Global Mind Change*, 9.

²¹ David Bielio, *Searching for God in the Brain*, *Scientific American Mind*, October, 2007

systems and announced they had the mystery of moving and stopping solved. They had found a wire that they could energize with a voltage and make the two red tail lights go on and off!

These aliens are no sillier than the neuroscientists, who in their search for "the God spot" in the brain are completely indifferent to what the volunteers are doing to create the experience in the first place. Instead of seeing the brain activity as the bridge between the mind (as causative power) and the physical feelings, they are seeing the activity in the brain as the sole cause of the experience.

Fortunately there are an increasing number of physicists who have been willing to follow David Bohm's lead and question the prevailing assumptions. One is theoretical quantum physicist Amit Gaswami of the University of Oregon. Although Gaswami was the son of a Brahmin guru in India, he found that mysticism was not very helpful in his chosen career. *"To forge a successful career in physics, you cannot worry too much about such recalcitrant questions as the quantum puzzles. The pragmatic way of doing quantum physics, I was told, is to learn to calculate. I therefore compromised, and the tantalizing questions of my youth shifted to a back burner."*²²

Fortunately they didn't stay there, as after achieving a successful and conventional career, which included writing a popular quantum mechanics textbook, Goswami embarked on a 15 year journey to answer both the recalcitrant questions and the tantalizing questions, which by then he knew were related. One particular question was this: if, as physicists say, all matter is made of atoms which are quantum objects, and consciousness is also made up of quantum objects, then how can consciousness act on matter? His answer forms the theme of his book. *"We can't be sure if all things are*

²² Goswami, *The Self-Aware Universe*, ix.

made of atoms – it's an assumption. Suppose all things, including atoms, are made of consciousness instead!"²³

Following this train of thought, Goswami builds a case for the primacy of consciousness more extensively than many other writers. In his view we have a brain-mind that has both quantum mechanical and classical features. The quantum features explain such non-deterministic abilities as conscious choice and creativity. Without these abilities we would be limited by a deterministic brain to only those choices that emerged from what came before. But we know from experience that humans are quite creative, and quantum physics explains how a completely new idea can emerge.²⁴

We know that quantum objects have both wave function and particle properties, a condition known as complementarity. The wave function is not a wave of matter, it's actually a wave of probabilities that includes a virtually infinite range of results. Not all results are equally probable. Like most probabilities, there are some results that are more likely than others, and in our brain-mind that results in getting similar results in our thinking most of the time. The expected, normal, repeating result or something close to it is the most probable.

Many people have noticed that creative insights often occur when we are otherwise occupied. We can be sleeping, meditating, or working on something completely different when the idea appears. Think of it as a probability wave that by our inattention we have allowed to resolve to one of the much less probable outcomes. The same process under more conscious control allows us to make choices that are new and different. Goswami suggest five ways we can encourage creativity and says, "*The creative*

²³ Goswami, *The Self-Aware Universe*, 6.

²⁴ Goswami, *The Self-Aware Universe*, 162.

*experience is one of the few times when we directly experience the quantum modality.*²⁵

Support for Goswami's quantum mind theory comes from neuroscientists trying to build a computer that emulates the power and self correcting properties of the human brain. A recent article reports:

Digital computers are deterministic: Throw the same equation at them a thousand times and they will always spit out the same answer. Throw a question at a brain and it can produce a thousand different answers, canvassed from a chorus of quirky neurons. "The evidence is overwhelming that the brain computes with probability," says (computational neuroscientist Terrence) Sejnowski.²⁶

It's clear that "computing with probability" is a quantum process and these scientists studying the brain and trying to emulate its behavior have found that out. The ability to come up with multiple creative answers to the same questions requires something completely different than just a more powerful digital computer.

In addition to analyzing the many experimental paradoxes of the quantum world and proposing the quantum brain-mind, Goswami tackles the issue of self-reference using tangled hierarchies and the painting of Escher for illustrations, and suggests a science based theory of ethics founded on the connectedness of all reality. He challenges the materialist paradigm on many levels, very effectively.

Another challenge to the prevailing views came from one of the most respected men in physics, John Wheeler. A contemporary of Albert Einstein and Nils Bohr, Wheeler made substantial contributions to science, from atomic physics to cosmology. He passed away in 2008 at the age of 97, and he was still working on the one problem he wanted to solve – how human consciousness shapes our present, and perhaps our past

²⁵ Goswami, *The Self-Aware Universe*, 226-229.

²⁶ Douglas Fox, *Thinking Machine*, Discover, October, 2009, 75.

as well. In an article reporting on his 90th birthday celebration, Discover magazine summarized his idea this way: *"In the past two decades he has pursued a far more provocative idea, something he calls genesis by observership. To Wheeler we are not simply bystanders on a cosmic stage, we are shapers and creators living in a participatory universe."*²⁷

The Present Creates Its Own Past

One of Wheeler's most famous thought experiments is called the "delayed choice." It's a variation on the double slit experiment that we referred to earlier in the paper, in which photons, or particles, showed the wave behavior of interference patterns when projected through the two slits, but when any attempt was made to measure which slit the photons were going through, the light acted like particles.

Wheeler proposed using light from a distant stellar source with an obstacle, such as a galaxy, providing two paths for the photons. In essence, the measurement would be made millions of years after the photons had made the choice of one path or both. Wheeler predicted that it wouldn't make any difference; the light would behave as it did in the laboratory. If measured, it would show one path. If not measured, it would show wave interference from taking both paths.

This sounds pretty far out, but it has since been verified in the laboratory. Experimenters used a setup with a network of mirrors providing a number of possible paths for the photons, and high speed measuring equipment that could measure the light after it had begun its journey. They were able to verify that the paths the photons took were not fixed until the measurements were made, at which time the path all the

²⁷ Tim Folger, *Does the Universe Exist if We're Not Looking?*, Discover, June 2002, 46.

way back to the source was established. One explanation for this is that quantum events create their own past! Wheeler thought that a lot of the universe was still nothing but probability due to the lack of an observer and as a result did not have a past yet, either.²⁸

Wheeler's colleague, Stanford physicist Andre Linde, says, "*You may ask if the universe really existed before you started looking at it. And my answer would be that it looks as if it existed before I started looking at it...When we look at the universe, the best we can say is that it looks as if it were there 10 billion years ago.*"²⁹

Wheeler believed that although conscious observers were important, regular matter and radiation could have more important roles overall in the conversion of the universe from probability to tangibility. Linde agrees with most of Wheeler's suggestions but he strongly disagrees with this point. Linde says,

"The universe and the observer exist as a pair. You can say the universe is there only when there is an observer who can say, Yes, I see the universe there...I do not know any sense in which I could claim that the universe is here in the absence of observers. We are together, the universe and us...I cannot imagine a consistent theory of everything that ignores consciousness...You need an observer who looks at the universe. In the absence of observers, our universe is dead."³⁰

Linde's position is referred to as the Participatory Anthropic Principle, the idea that the universe needs conscious observers to bring it into form from a cloud of probabilities. There are various versions of the Anthropic Principle, but all are based on explaining why the universe we live in seems fine tuned to support life. The version supported by most mainstream materialist scientists is the Weak Anthropic Principle,

²⁸ Tim Folger, *Does the Universe Exist if We're Not Looking?*, 46-47.

²⁹ Tim Folger, *Does the Universe Exist if We're Not Looking?*, 48.

³⁰ Ibid.

which simply says that if the universe were not the way it is, we wouldn't be here to analyze it.³¹ This isn't a challenge to anyone's belief's, so they can ignore it.

Information, or Just Data?

The significance of the observer principle and related issues such as wave collapse and complementarity hint at the idea that at a very fundamental level, it may be that information is what is important. Physics professor Hans Christian von Baeyer develops this concept in a 2003 book in which he seeks to demonstrate that information is the appropriate language of science. In it he reports that physicist Niels Bohr came to the conclusion that the task of physics was not to describe ultimate reality, but to establish what we can say about nature, the sum total of our information, and that, in fact, science is about information.³²

The book is an interesting exposition of the importance of information in all areas of science from cosmology to biology to the quantum, and he has a good discussion of the limits of reductionism.³³ However I found one important distinction lacking. Von Baeyer treats all *data* as *information* with no real effort made to identify the factor that differentiates them. In fact, data is not information until it is assigned meaning. The meaning arises both from the data, properly interpreted, and from the context in which the data is referenced. The only way that meaning can be assigned is when data is processed by intelligence, or mind. Not necessarily human intelligence, I'm sure, but some form of conscious awareness that finds the meaning in the data stream and the context. So even though von Baeyer seems to be a satisfied materialist, he has

³¹ Jennifer Bresee, *The Anthropic Principle*,
http://www.physics.sfsu.edu/~lwilliams/sota/anth/anthropic_principle_index.html, (Accessed 07-23-09)

³² Hans Christian von Baeyer, *Information* (UK: Weidenfeld & Nicolson, 2003), 65.

³³ von Baeyer, *Information*, 54-57.

presented another effective case for the importance of consciousness in physical science.

The Latest Entry is Hard to Ignore

The most recent blow to the materialist view occurred in May of this year with the publication of a book coauthored by top level biologist and stem cell researcher Dr Robert Lanza, and popular astronomer Bob Berman. Entitled *Biocentrism*, the theme is clearly stated in the subtitle, *How Life and Consciousness are the Keys to Understanding the True Nature of the Universe*. The book launch was accompanied by a front page story in the May, 2009 Discover magazine, and the book lives up to its advance buzz. Not because the book’s conclusions are extraordinary; most of them have been covered in other publications cited in this paper; but because the book is unusually clearly written, making it very accessible for non-scientists. The authors managed to do this without noticeably “dumbing down” the science, making it an excellent resource for anyone interested in the subject. They develop seven principles of biocentrism that summarize their conclusions:

First Principle: What we perceive as reality is a process that involves our consciousness...space and time are not absolute realities but rather tools of the human and animal mind.

Second Principle: Our external and internal perceptions are inextricably intertwined. They are different sides of the same coin and cannot be divorced from one another.

Third Principle: The behavior of subatomic particles – indeed all particles and objects – are inextricably linked to the presence of an observer...

Fourth Principle: Without consciousness “matter” dwells in an undetermined state of probability. Any universe that could have preceded consciousness only existed in a probability state.

Fifth Principle: The structure of the universe is explainable only through biocentrism. The universe is fine-tuned for life, which makes perfect sense as life creates the universe, not the other way around...

Sixth Principle: Time does not have a real existence outside of animal-sense perception. It is the process by which we perceive changes in the universe.

Seventh Principle: Space, like time, is not an object or a thing. Space is another form of our animal understanding and does not have an independent reality. We carry space and time around with us like turtles with shells. Thus, there is no absolute self-existing matrix in which physical events occur independent of life.³⁴

As you notice in this list, Lanza and Berman come down strongly on the side of Andre Linde in support of the Participatory Anthropic Principle. In fact, the authors appear to have some concerns about how the radical nature of their conclusions might be interpreted, and so they included a disclaimer:

Some of the conclusions of biocentrism may resonate with aspects of Eastern religions or certain New Age philosophies. This is intriguing, but rest assured there is nothing New Age about this book. The conclusions of biocentrism are based on mainstream science, and it is a logical extension of the work of some of our greatest scientific minds.³⁵

That the book challenged the prevailing world view in a serious way could be seen in the tone of some of the letters received by Discover magazine. It was called "a product of simplistic ideas of both quantum physics and religious creation myths," a "religion-based cosmology," and "an answer that works only if reality is a dream."³⁶ From the timing it's likely that these people had not read the book. It's clear that to provoke such an emotional reaction these concepts must be powerful enough to shake the foundations of the prevailing world view, and the disclaimer quoted above was quite appropriate.

³⁴ Robert Lanza with Bob Berman, *Biocentrism* (Dallas, TX: BenBella Books, Inc., 2009), 159-160.

³⁵ Lanza and Berman, *Biocentrism*, 2.

³⁶ Mail, *Discover*, July/August 2009, 4.

Conclusions

We have seen that the array of challenges to dualism and materialism have been building for 200 years since Thomas Young performed the first double slit experiment and the observer effect was revealed. Quantum experiments have since shown that observation can change not only the present but the past as well. We've reviewed an array of qualified scientists – David Bohm, Edgar Mitchell, Dean Radin, Roger Sperry, J. B. Rhine, Robert Jahn, Amit Goswami, John Wheeler, Andre Linde, Hans Christian von Baeyer, Robert Lanza and Bob Berman – who have come to similar conclusions that the dualism of Decartes is dead, and that mind/consciousness/information is central to not only the functioning of the universe, but perhaps to its very existence. I believe that in the future humanity will look back at this time, as we look back at Copernicus and Galileo, and see it as the time the world changed.

New ideas go through four stages in the process of acceptance. They are ignored, then ridiculed, then violently opposed, and finally reluctantly accepted. We can see the ridicule and opposition to the primacy of consciousness as a positive sign – we're making progress!

Seventy three years ago Charles Fillmore wrote, *"Divine Mind is the one and only reality,..Everything that appears in the universe had its origin in mind...Mind evolves ideas...The idea is the most important factor in every act...All is mind. Then all the things that appear must be expressions of mind."*³⁷ Fillmore would be pleased, but not surprised, to see consciousness finally getting the attention that it deserves.

³⁷ Charles Fillmore, *Prosperity*, (Unity Village, MO: Unity Books, 1936), 9, 26-27.

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