

## “Weird Science”

a reflection  
by Rev. Bill Gupton

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When I was young, one of my favorite television shows was “Star Trek.” The adventures were fun; the aliens were campy and fantastic. But what I really liked were the *gadgets* – the gizmos – the sort of science fiction toys Captain Kirk and his crew used to help them get by, in that spacious firmament, among all those stars where “no one had gone before.”

One gizmo I remember quite fondly was this thing they called a “communicator.” All someone had to do was tap a button, and they could talk to someone else – even if that person was all the way on the other side of the planet! How cool was that!? It was like magic – no wires or anything...

Well, here I am 45 years later, and I can do the same thing; by simply taking this little thing [*a bluetooth*], sticking it in my ear, and tapping a button, I can be just like Lieutenant Uhuru, one the bridge of the Starship Enterprise. Imagine that!

...Which is exactly what Gene Roddenberry and the writers of Star Trek did – they imagined things – many of them things that today have become taken-for-granted aspects of our everyday life. The characters had what amount to iPads; they dealt on a daily basis with warp drives and anti-matter (both of which, by the way, are being studied, for real, by scientists today) – heck, they even had that Bluetooth thingy called a communicator. All this was the stuff of science *fiction*, not that long ago – but today, it is science fact.

Oh, and by the way – our ability to communicate instantly, with someone on the other side of the planet – someone, say, in Sri Lanka, where my all-time favorite science fiction writer, Arthur C. Clarke, lived most of his life – that is also thanks to science fiction – thanks, in fact, to Clarke himself, who first proposed the idea of geostationary satellites, which make global telecommunication possible, in a 1945 edition of a magazine called “Wireless World.” He wrote that proposal *twelve years* before there was even such a *thing* as a satellite, much less one that remains stationary over a fixed point on the earth, as Clarke’s writings proposed.

Yes, we owe a great deal more than we commonly think, to science fiction. But my reflection this morning is not about science fiction; it is about what you might think of as *science*, that is stranger-than-fiction.

Hardly a day goes by that doesn't bring the news of some important scientific discovery, or at least some new and radical scientific theory, right to our doorstep, or perhaps more accurately, to our laptop, or flat-screen TV. There were two stories in particular, that I noticed *just this week*, which you might find interesting. One was the announcement that an earth-like planet had been discovered, a mere 600 light years away. Such cosmic proximity (and that is proximity, when it comes to these things!) means that whatever we are able to detect about that planet, actually happened not that long ago – around the time of Gutenberg's printing press – rather than millions of years ago, as is the case for more distant stars and, presumably, *their* planets.

The second big scientific announcement this week was confirmation of the existence of water on Mars. This consisted of what one NASA scientist called “slam-dunk” evidence of water; another hailed it as “bulletproof” evidence. Apparently the Mars rover, which has now roamed the surface of the Red Planet for seven and a half years, recently happened upon a bright vein of gypsum roughly 50 centimeters – 20 inches – long. I won't go into why gypsum is evidence of water – it has something to do with calcium sulfate, and I'm sure my son could probably explain it, thanks to his high school chemistry class. But what I want to call to your attention, is the *size* of the deposit. *Twenty inches long. On Mars.* This week, I sat at my computer in Cincinnati, Ohio, and looked at a picture of something 20 inches long, on Mars! – a picture taken by a machine that discovered it, after leaving Earth nearly a decade ago.

Oh – and it just so happens that a new, improved version of the Mars rover was launched about three weeks ago. I wonder what it, will find?

Let me apologize if I'm coming across as a bit geeky today. Believe me, I am anything *but* a science nerd – but I get as excited as a kid in a candy store when I hear about things like this. We are now certain – as certain as we get about these kinds of things – that there was once running water, on Mars. *I love it!*

Of course, it should also be pointed out that we were once certain the earth was flat. That the sun revolved around the earth. That a rock, or a coffee mug – or, say, your *hand* – was solid. We were once sure that  $E$  equals  $M-C$  squared.

Perhaps you hadn't heard that we were now questioning Einstein... Last month, scientists confirmed the second observation in as many months of tiny particles called neutrinos, travelling *faster than the speed of light* – something Einstein and his theories declared impossible. Evidently, this new information puts everything – and I mean everything – we think we know about the universe and how it works, into question. If a neutrino can move faster than the speed of light –

if a neutrino in a 26-kilometer long particle accelerator that we built, can move faster than the speed of light – what then?

What indeed? For the rest of our time together today, I want to share with you just a bit of the weird science that human beings are doing, right here and now, in the early years of the 21<sup>st</sup> century – and offer you at couple of theological impressions about it all as well, since that’s what I’m supposed to do ... although I will say, quite frankly, that simply *knowing about* this stuff, and pondering it – “ponder this in your heart,” as Robert Weston says – is really more than enough wonder and awe for me – a *religious* experience, in and of itself.

I spoke earlier of what I call “non-coincidences.” Well, that Billy Collins poem wasn’t the only non-coincidence I experienced while preparing for this morning’s service. While doing some research, I googled an obscure article by the British physicist Sir Roger Penrose. The article was written in 2008 – three years ago – and was so obscure, in fact, that the website indicated it had been “visited 359 times” since it was written – an average of slightly less than once every three days. But when I noticed how many times the article had been visited that day – the hairs on my arms sat bolt upright. Of the 359 total worldwide internet visits to that article, eight occurred the *same day* I visited. That’s more than 24 times the average number of views in one day. Apparently, seven other people, somewhere in the world, were for some reason interested in that very same obscure article, the very same day I was.

There’s no such thing as a coincidence...

Now the *reason* I was looking into this Penrose article was because of his association with a man named Stuart Hameroff. Together, near the end of the 20<sup>th</sup> century, the Penrose and Hameroff revolutionized scientific thinking about why and how human beings are conscious and self-aware – and, much more controversially, made scientific claims about the “quantum consciousness” of the Universe itself.

Let me see if I can explain – but first, a disclaimer: To do so will take the remainder of my reflection; furthermore, this will be *really weird* science and – since I’m not a scientist – I don’t claim to even begin to understand much of what I will be telling you! But hold on for the ride; I promise you, it’s worth it.

With that said, it is time for us to shift our attention away from the incredibly large – light years and galaxies and such, which we are actually more accustomed to thinking about – to the incredibly small, as in electrons and neutrinos – the particles and energies that compose quantum physics. Our topic, broadly speaking, will be *human consciousness itself*.

It was the French philosopher Descartes who, nearly 400 years ago, famously asserted, “I think; therefore I am.” Ever since, scientists have been fascinated with the unique self-awareness that appears to, literally, make us human.

As a doctor, anesthesiologist, and brain researcher, Stuart Hameroff first joined this ongoing scientific dialogue, as it were, through the back door – by wondering, as he observed his patients on the operating table, what exactly *happens* inside the human brain, when we are un-conscious.

But it wasn't until Hameroff teamed up with renowned quantum physicist Roger Penrose, that things really began to take off. Eventually, the duo discovered that there is a network – or more accurately, there are countless *networks* – of tiny microtubules in the neurons of our brain – and, furthermore, that because those tiny structures are connected to one another, and share information, a landscape of awareness is created that we call consciousness.

So far so good, right? Makes perfect sense.

Now most of us have heard of the idea that we have two sides of our brain, and that our left brain and our right brain communicate and share information. But where it starts getting weird is when Hameroff and Penrose claim they have experimental evidence that our neurons engage in *quantum* computations – and that they do so not only from one hemisphere of our own brain to the other, but also from *my* brain to *your* brain, and from our brains, to the universe itself.

Woah! OK, let's slow down a minute... Without going into the many details of quantum theory that *aren't* relevant to this particular line of discussion – as I understand it, quantum theory (which, you must realize, is now accepted by almost all scientists) includes something very strange known as “quantum entanglement.” The idea is that two sub-atomic particles which are *nowhere near each other* in space, may be somehow mysteriously connected, and affect one another. The whole “there's this particle out in the distant universe, and it is paired with this other particle in my fingernail” thing. Einstein referred jokingly to this phenomenon as “spooky action at a distance” (just imagine Einstein saying that!). Or, as I might put it, “there's no such thing as a coincidence.”

Why – or rather *how* – can this be true? Perhaps because, at some point, in the vast distance of time and space, the two particles, one in my fingernail, and one now is some unnamed galaxy, were right next to each other. In fact, at some point prior to that, they were the same particle.

Is your mind blown yet? I hope not, because we must return to our narrative. As I say, within the scientific community for at least a couple of generations now, it is a given that these kind of quantum entanglements exist – maybe even, that they are *all that exist*. Some scientists describe our universe as one giant quantum entanglement. Take a look, for a minute, at the beautiful blue-and-red drawing on the insert in your order of service. This is a depiction of a specific type of quantum entanglement – one that may be science's best current graphic representation of the structure of our universe.

It is a drawing of something called an E-8 Leif Group – an algebraic equation rendered as a diagram of 248 entangled circles, which mathematician and theoretical physicist Garrett Lisi says is a model of the way *everything* in the known universe is connected. Lisi somewhat immodestly calls his mathematical formula “The Exceptionally Simple Theory of Everything.”

Exceptionally simple? Not a chance! Simple when you consider that it is a unified field theory combining what we know of particle physics, with Einstein’s theory of gravitation? Maybe. But simultaneously both beautiful and mind-blowing? Absolutely!

Now let’s take a look at one particular example of the kind of quantum connections that this lovely drawing is attempting to portray. Penrose and Hameroff’s research has indicated that a given microtubule in a given neuron in, say, the left side of your brain – is *quantum paired* with a similar microtubule on the right side of your brain. Notice I said “quantum paired,” because the two are *connected*, and affect each other, *despite* not being physically connected in any real sense of that word.

It is this kind of quantum connection, multiplied by literally 100 billion brain cells and God-knows how many microtubules within those brain cells – that give us *consciousness*, say the researchers – in other words, that make us human.

Some scientists now believe – and have concocted very cool experiments to prove – that not only does something going on in one side of our brain, affect the other side – but that one *person’s* thoughts can indeed affect another *person’s* thoughts – even if those two people are isolated from one another in separate, soundproof, completely darkened and sealed rooms. I watched one of these experiments on the Science Channel recently, and I must say, it was impressive – and evidently, it was also science *fact*, even though it seemed more like science fiction.

In the case of this particular experiment, the conducting mechanism was believed to be the magnetic field of the earth itself. Though we hardly ever think about it, each of us lives and moves and breathes in the midst of a giant, ever-flowing *electromagnetic field*. It’s the same thing that helps guide migratory birds and dictates the behavior of herd animals. The same electromagnetic field, for all of us – plant, animal, and human alike. Interconnected, interdependent web, indeed!

But, as the television commercial says – *wait, there’s more!* Since 1998, another group of scientists, this time at Princeton University, has been conducting a strange experiment in which a network of computers, located all around the world, is programmed to generate a set of random numbers every second. These numbers are constantly monitored for anomalies – deviations from the statistical norm of randomness. The researchers wanted to know, for instance, do a

significant amount of the random numbers end up being the same, or over time do they begin to show patterns?

In thirteen years, this giant, global, computerized rolling of the dice has yielded some very interesting results. The other graphic I placed on your order of service insert shows one of them – the pattern of random numbers generated by computers on one particular morning: Sept. 11, 2001. The flat, black line at the bottom of the graph would be “normal” – zero deviation from randomness. The red line clearly shows that the worldwide network of random-number generating computers went completely wonky – to a statistically significant degree – that fateful morning. Apparently, this was one of the two most extreme days measured in the past decade; the other was the night of Nov. 4, 2008 – the night Barack Obama was elected President of the United States.

There’s no such thing as a coincidence, right? It would be difficult to deny that those were two of the most globally significant moments of the past decade. But wait until you hear why the Princeton researchers believe the random numbers generated by the computers weren’t nearly as random as usual, at those points in history: Because, they theorize, hundreds of millions, even billions, of human beings around the world, were all intently focused on the same, very emotionally powerful thing, at the same time.

In other words, our thoughts and emotions affected the computers!

To be fair, this particular experiment has more than its share of scientific skeptics – in no small part because the group involved in conducting it is a collective of scientists who call themselves the Global Consciousness Project. But the Princeton researchers have offered equally passionate defenses of their data, and their conclusions. Remember, they say, all this happened within the earth’s electromagnetic field – which *already* connects all of us, and everything else on the planet. Remember, that according to quantum physics, things that are not physically connected are, nonetheless, connected through other, as yet not understood, ways.

The jury, in other words, is still out on this one. I don’t know which side I come down on – but I can say that, because I believe with all my heart and all my mind that there’s no such thing as a coincidence, I am inclined to think there’s at least *something to* all this – and besides, I’ll take all the scientific support I can get for what basically amounts to our seventh Unitarian Universalist principle – the celebration of the interdependent web of all existence, of which we are a part.

Before we call it a day, let’s return one last time to Stuart Hameroff. At his laboratory in Tucson, Arizona, Dr. Hameroff has done brain studies that convince him that all of this stuff – in particular, the apparent quantum nature of tiny parts of our brain cells – points to the possibility of *immortality*. He believes that what makes us, us, may be *saved* – not so much in the doctrinal sense of an orthodox,

religious “salvation,” but rather in the way one might “save” data or a document on a computer . In fact, that all our thoughts might be saved, through quantum entanglement, within the very fiber of the universe itself – the web of existence – thus making that which is uniquely you and me, *eternal* – giving us a different kind of life, after death.

“At the very fine[st] structure of the universe, there is information – *quantum* information,” Hameroff told one interviewer. “There is also quantum information in the microtubules of our brain cells... It cannot be destroyed... [Instead], it gets distributed, dissipated, into the universe at large.”

In essence, he concludes, “*The soul is a quantum computer, hard-wired into the universe.*”

Roll that one around in your mind, for a moment. *Ponder* this thing, in your heart: Out of the stars, we have come – up from the sea we have come – and so evolved, that one of our best and brightest minds can probe and test, study and analyze, experiment and theorize – and then conclude, make the bold statement, a claim just as *religious*, in fact, as it is scientific – that because of the way our brains are structured, and the way the universe is structured, what we might call our soul, is akin to a quantum computer, which is hard-wired into the universe itself.

Ponder this thing – and out of your heart, cry wonder! Sing, that we live!  
May it be so. Blessed be. And amen!