Article

Why US?
Trespassing on an Anthropic Lawn (Part I)

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ABSTRACT

Mindful reflections upon a metaphysically misguided materialist advertising campaign: *Trespassing on Einstein's Lawn: A Father, a Daughter, the Meaning of Nothing, and the Beginning of Everything* by Amanda Gefter. Gefter, New Scientist book reviews editor, presents a philosophically confused account of current quantum metaphysics because she adheres to an out of date materialist metaphysics and claims that, whilst observers in some way create reality, the process does not involve consciousness. Her claims are shown to invalid, the various quantum metaphysical perspectives she covers are shown to require consciousness as fundamental.

Keywords: Grand design, observers, consciousness, anthropic principle, Darwinism, evolutionary developmental biology, Cambrian explosion, quantum morphogenetic archetypes, buddhanature, nothingness, emptiness, primordial consciousness, timeless awareness, substrate of consciousness.

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> Is it all a Magic Show?
> Is Reality an Illusion?
> What is the framework of the Machine?
> Darwin's Puzzle: Natural Selection?
> Where does Space-Time come from?
> Is there any answer except that it comes from consciousness?[1]
>
> - John Wheeler

> Wheeler thinks that consciousness could be the criterion for an observer, but that's obviously bullshit. I mean, consciousness is just a physical process in the brain. It's not magic.[2]
>
> - Amanda Gefter

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> ..the essence of consciousness can be interpreted as a special type of perception of quantum reality by living beings.[3]
>
> - Michael Mensky

> I regard consciousness as fundamental. I regard matter as derivative from consciousness.[4]
>
> - Max Planck

The recent book *Trespassing on Einstein's Lawn: A Father, a Daughter, the Meaning of Nothing, and the Beginning of Everything* (*TEL)* by Amanda Gefter, a science journalist who writes for *New Scientist*, *Scientific American* and other science journals, has been greeted with some enthusiastic reviews. One reviewer describes it:

> Beautifully written and hugely entertaining, this book is a heartfelt introduction to the many mind-bending theories in contemporary physics.[5]

Gefter's descriptions and explanations of some of the metaphysical conclusions drawn from modern physical theory, derived from her conversations with the physicists she persuaded to grant her interviews, are well written, intriguing and entertaining. The physicist Peter Woit compares *TEL* to another recent work *Why Does the World Exist*, wherein the author Jim Holt interviews various philosophers and scientists on their views on the origin of, and reason for, the existence of the universe. Woit writes that the authors of both books are:

> …lively, entertaining writers with wonderful material about deep questions, and I greatly enjoyed both books. Gefter is the funnier of the two, and I had trouble putting the book down after it arrived in my mail a couple of days ago.[6]

However, Woit also has some severe reservations:

> While I liked the book, at the same time I found the whole project deeply problematic, and would have reservations about recommending it to many people, especially to the impressionable young. The part of physics that fascinates Gefter is the part that has gone way beyond anything bound by the conventional understanding of science. ... The questions being discussed and answers proposed are woolly in the extreme, … Not recognizing that this post-modern way of doing science is deeply problematic and leading the field into serious trouble isn't so much Gefter's fault as that of the experts she speaks to .... Those taking the field down this path are dominating public coverage of the subject, and often finding themselves richly rewarded for engaging not in sober science but in outrageous hype of dubious and poorly-understood ideas. Only the future will tell whether the significance of this book will end up being that of an entertaining tale of some excesses from a period when fundamental physics temporarily lost its way, or a sad document of how a great science came to an end.[7]

In this criticism Woit implicitly indicates that the central problem that he finds with approaches to current interpretations within physics lies in the relationship between what he considers to be 'true' physical theory, which he considers to be "sober science," and the metaphysical

conclusions that are derived from such "sober science." In this indication Woit has inadvertently put his finger on a crucial issue that rarely gets clearly examined or articulated.

However, one significant science writer who has taken on this investigation, in his book *Farewell to Reality: How Fairy Tale Physics Betrays the Search for Scientific Truth,* is Jim Baggott, who writes:

> ...I'm going to accuse a bunch of theoretical physicists of abandoning the scientific method and so betraying the search for scientific truth about the nature of physical reality … I will seek to reject fairy-tale physics as metaphysics.[8]

The proposals that Baggott identifies as "fairy-tale physics" are the stuff of popular science writing: string theory, supersymmetry, M-theory, Many Worlds and the Multiverse, the Holographic Principle and so on. Some of the perspectives that Baggott seeks to chastise are also amongst those enthusiastically and breathlessly expounded by Gefter.

The term 'metaphysics' is, according to many, notoriously difficult to define. Originally the term was used simply to indicate the works of Aristotle which he wrote after his works which purported to deal with purely 'physical' phenomena. The philosopher Peter van Inwagen describes the Aristotelian notion of metaphysics:

> Metaphysics is about things that do not change. In one place, Aristotle identifies the subject matter of first philosophy as "being as such," and, in another, as "first causes." It is a nice—and vexed—question what the connection between these two definitions is. Perhaps this is the answer: The unchanging first causes have nothing but being in common with the mutable things they cause—like us and the objects of our experience...[9]

Thus we see that originally the term 'metaphysics' denoted the exploration and description of the deep, core, fundamental structures of reality, at the very deepest level it has to do with the unchanging 'stuff' of reality which gives rise to the changing phenomena of our experiential world. Furthermore, it is clearly essential that metaphysics also elucidates the relationship between 'pure being' and the phenomena that arise from its changeless essence. In Buddhist *Yogācāra* terminology, as we have seen, 'pure being' is *dharmata*, and the manifested phenomena are *dharmas*.

Today, however, the metaphysical task has been handed over to physics, despite Baggott's mistaken notions. We shall see that Baggott's rigid distinction between physics and metaphysics is mistaken. Indeed, the significant physicist Abner Shimony referred to the experimental investigation of the deepest quantum layer of reality accessible to us, in experiments of Bell-type inequalities, precisely as "experimental metaphysics."[10] In this case, then, wherein physics investigates and describes the deepest quantum level of reality, we see that physics dissolves into metaphysics. Indeed, there is a fuzzy, hazy boundary between physics and metaphysics. And, furthermore, it is important to be cognisant of the fact that originally physics was based on a metaphysical commitment to materialism, a commitment which its own development has now crucially undermined. The notion that physics and metaphysics can be sharply separated is, then, mistaken. Furthermore, the notion that it is invalid to draw metaphysical conclusions, such as that of the Anthropic Principle, on the basis of the evidence of physics and the other sciences is equally misguided.

Baggott's use of the term 'metaphysics' is not of the Aristotelian kind. His use has more to do with the use of the term by the twentieth century 'logical positivists', for whom the meaning of a scientific statement consisted entirely in the predictions it made about possible experience, and any statements which went beyond such statements were asserted to be meaningless 'metaphysical' statements. Baggott claims that:

> There is as yet no observational or experimental evidence for many of the concepts of contemporary theoretical physics, such a super-symmetric particles, superstrings, the multiverse, the universe as information, the holographic principle, or the anthropic cosmological principle. For some of the wilder speculations of the theorists there can by definition *never* be any such evidence.[11]

However, whilst it may be the case that "some of the wilder speculations" are completely devoid of evidential backing, *it can be shown that this is not true of the Anthropic Principle. In fact the opposite is the case, there is overwhelming evidence for an anthropic principle, which asserts that the development of sentience and consciousness is a primary and fundamental feature of the process of reality.*

In his chapter on the Anthropic Principle, Baggott clearly indicates that he rules out the Anthropic Principle purely on the grounds of what is called the 'Copernican Principle', which is the dogmatic assertion that the universe cannot be Anthropic. This assertion is not based on any evidential grounds. Baggott indicates that he is uneasy with the fact that the Anthropic Principle clearly has religious and spiritual implications. But Baggott presents no evidence which counters or undermines the Anthropic Principle, he simply dogmatically rules it out as being unscientific in principle.

The 'Copernican Principle' is named after the Renaissance mathematician and astronomer Nicolaus Copernicus, who realized that the Earth is not the center of the solar system, as was thought at the time, but, rather, the Sun has that central role. It is thought by supporters of the Copernican Principle that the erroneous notion of the Earth being the center was an example of the people at the time overestimating their own importance, rather than just making a mistake based upon the evidence available at the time. Supporters of the Copernican Principle claim that any assertion which seems to privilege human life in any way must be considered anti-scientific, *whatever the evidence*. When applied to the Anthropic Principle, the Copernican Principle has become a dogmatic decision on the part of a large section of the scientific community to disregard, and even suppress by nefarious means, evidence suggesting that consciousness is not only a primary feature of the process of reality, but also has a role in creating what appears to be the 'material' world and the sentient organisms within it.

Baggott describes the Copernican Principle (or prejudice):

> The universe is not organized for our benefit and we are not uniquely privileged observers. Science strives to remove 'us' from the centre of the picture, making our existence a natural consequence of reality rather than the reason for it. Empirical reality is therefore something that we have learned to observe with detachment, without passion. Scientists ask fundamental questions about how reality works and seek answers in the evidence from observation and experiment, irrespective of their own personal preferences, prejudices and beliefs.[12]

The problem with this presentation, however, is that it seems to suggest that a failure to "remove 'us' from the centre of the picture" is a result of a lack of detachment, a pandering to "personal preferences, prejudices and beliefs." But nothing can be further from the truth, as Roger Penrose has pointed out with regard to the relationship between quantum theory and consciousness:

> Quantum theory was not wished upon us by theorists. It was (for the most part) with great reluctance that they found themselves driven to this strange and, in many ways, philosophically unsatisfying view of the world.[13]

The early explorers of the quantum realm did not consciously seek to erect some form of mystically inspired physical theory, to begin with they were shocked by their discoveries. However, the evidence moved towards an inescapable endpoint, as master quantum physicist John Wheeler, toward the end of his life, concluded:

> The Question is what is the Question?
> Is it all a Magic Show?
> Is Reality an Illusion?
> What is the framework of the Machine?
> Darwin's Puzzle: Natural Selection?
> Where does Space-Time come from?
> Is there any answer except that it comes from consciousness?
> What is Out There?
> T'is Ourselves?[14]

Physicist Anton Zeilinger has written in appreciation of Wheeler's:

> …realisation that the implications of quantum physics are so far-reaching that they require a completely novel approach in our view of reality and in the way we see our role in the universe. This distinguishes him from many others who in one way or another tried to save pre-quantum viewpoints, particularly the obviously wrong notion of a reality independent of us.[15]

So, whereas Baggott claims that we must keep 'US' out of the scientific picture whatever the evidence, Wheeler and Zeilinger claim that the evidence of quantum physics indicates the central significance of 'US' in the process of reality. And they are not alone, physicist and philosopher Bernard d'Espagnat, for another example, writes that:

> The doctrine that the world is made up of objects whose existence is independent of human consciousness turns out to be in conflict with quantum mechanics and with facts established by experiment. [16]

There is a dramatic amount of evidence that consciousness is fundamentally significant in the process of reality and the evolution of life and the universe. In other words Wheeler and others have drawn the conclusion, based upon quantum theory and the fact of a seemingly miraculous fine-tuning of physical parameters, that 'US' or some form of intelligence is somehow involved in the evolution of life and the universe.

One example of spectacular fine-tuning of the physical constants of the universe is the generation of carbon in the process of stellar nucleosynthesis. The cosmologist Fred Hoyle famously stated in this context:

> Would you not say to yourself, "Some super-calculating intellect must have designed the properties of the carbon atom, otherwise the chance of my finding such an atom through the blind forces of nature would be utterly minuscule? A common sense interpretation of the facts suggests that a superintellect has monkeyed with physics, as well as with chemistry and bio logy, and that there are no blind forces worth speaking about in nature. The numbers one calculates from the facts seem to me so overwhelming as to put this conclusion almost beyond question."[17]

The notion of a "super-calculating intellect," of course, moves us in the direction of theism. However this is not a necessity in the Anthropic context, Wheeler, for instance, thought of the process of the self-production of the universe as being the result of the intersubjective collective perceptual activities of all sentient beings:

> Directly opposite to the concept of universe as machine built on law is the vision of *a world self-synthesized.* On this view, the notes struck out on a piano by the observer participants of all times and all places, bits though they are in and by themselves, constitute the great wide world of space and time and things.[18]

In order to graphically represent this perspective Wheeler employed his 'self-perceiving universe image (figure 1), in this case the self-perceiving U *does* represent '**US**'.

In this context it is worth pointing out that the Anthropic Principle, a term coined in 1974 by the theoretical physicist Brandon Carter, is often misrepresented as being the claim that it is solely human life that is the end point of the anthropic process, rather than sentient life in general. As the philosopher Nick Bostrom has pointed out:

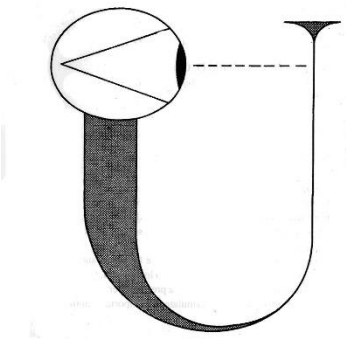

Figure 1

> The term "anthropic" is a misnomer. Reasoning about selection effects has nothing to do with homo sapiens, but rather with observers in general. Carter himself regrets not having chosen a better name.[19]

It is also necessary to point out the distinction between the so-called Weak Anthropic Principle which simply states that the universe we find ourselves in must be anthropic because we exist, but it might have been otherwise, and the Strong Anthropic Principle which asserts that it is the

very nature of the universe to be Anthropic. On this view, life and sentience are the reason for the universe's existence, so to speak, and there is an innate intelligence and fundamental awareness and internal consciousness which unfolds within the process of the evolution of life and the universe.

However, there is a deep reluctance, verging on a dogmatic prejudice, against allowing such evidence to be entertained because the implications, especially in the sphere of spirituality, are significant and important. And this antagonism has been enshrined in the so-called 'Copernican Principle' which has been elevated by some to an inviolable principle of the scientific method. Baggott for example writes:

> I don't think we need to waste time debating whether the strong anthropic principle, or indeed any similarly structured principle, is scientific. Any structure designed to completely overturn the Copernican Principle and restore some kind of privileged status to intelligent observers (be they human or not) goes against the grain of nearly five hundred years of scientific practice.[20]

However, in making such a sweeping and dogmatic statement Baggott is clearly ignoring the most crucial feature of the scientific method which is that, *as Baggott himself writes in his book,* scientists should "seek answers in the evidence from observation and experiment, irrespective of their own personal preferences, prejudices and beliefs."[21] There is, however, absolutely no "evidence from observation and experiment" which supports the Copernican Principle, it is much more akin to "personal preferences, prejudices and beliefs."[22] As Brandon Carter pointed out about the Copernican Dogma:

> Unfortunately there has been a strong (not always subconscious) tendency to extend this to a most questionable dogma to the effect that our situation cannot be privileged in any sense.[23]

The evolutionary biologist Richard Lewontin stated a particularly egregious version of the Copernican Principle which indicates that materialism *must* be adhered to, whatever the evidence against it, in order to further science's supposed intellectual war with religion:

> Our willingness to accept scientific claims that are against common sense is the key to an understanding of the real struggle between science and the supernatural. We take the side of science in spite of the patent absurdity of some of its constructs, in spite of its failure to fulfill many of its extravagant promises of health and life, in spite of the tolerance of the scientific community for unsubstantiated just-so stories, because we have a prior commitment, a commitment to materialism. It is not that the methods and institutions of science somehow compel us to accept a material explanation of the phenomenal world, but, on the contrary, that we are forced by our *a priori* adherence to material causes to create an apparatus of investigation and a set of concepts that produce material explanations, no matter how counter-intuitive, no matter how mystifying to the uninitiated. Moreover, that materialism is absolute, for we cannot allow a Divine Foot in the door.[24]

Lewontin, like Baggott, seems oblivious to the scientific requirement to take observations and evidence seriously.

This antagonism towards any evidence which points towards the fundamental and innate presence of awareness, consciousness, intelligence and design (not necessarily of a theistic nature) in the evolution and development of life and the universe runs very deep in some Western intellectual cadres. It derives from certain political, social and academic forces in the late nineteenth and early twentieth centuries, forces which favoured materialist Darwinism in the face of any contrary evidence. In the most extreme form it manifests in the ridiculous strident and pugilistic assertions of crude materialism and crude Darwinian fundamentalism as displayed by the likes of Richard Dawkins and friends. But the intellectually undermining influence of academic materialism, crude or subtle, permeates and exercises an influence upon a great deal of modern intellectual, academic and popular culture, thus the great popular taste for the writings of Dawkins, even though his many of his metaphysical claims can be shown to be dubious.

Such is the pervasiveness of this fundamentalist materialism that it pervades works such as Gefter's *TEL,* even though the very metaphysical accounts conveyed to Gefter by various physicists are entirely contrary to any materialist account of the process of reality. In Gefter's hands they are sanitised for the materialist cause by Gefter's stubborn refusal to figure out that the notion of an 'observer' without the presence of consciousness is absurdly incoherent. Gefter appears to have a detailed understanding of the groovy, weird and wonderful things that current physics indicates about the nature of reality, yet she fails to appreciate that any moderately metaphysically coherent intellect would consider the perspectives described to her by most of the physicists she interviews to be antithetical to any form of materialism.

Consider for example, the physical-metaphysical perspective proposed by Wheeler as described by physicist Paul Davies, Gefter writes concerning Wheeler's notion of "a participatory universe":

> If measurements built the universe bit by bit, as Wheeler suspected, then observers were somehow implicated in the creation of reality - a radical picture that, if true, would mean ours was a participatory universe. As the physicist Paul Davies wrote, "Wheeler seeks to … turn the conventional explanatory relationship matter→information →observers on its head, and place observership at the base of the explanatory chain: observers→information→matter … could it somehow be that observers turn nothing into something? The idea seemed impossible from the start, because where would the observers come from? What would even count as an observer? Surely it did not have to be conscious or human … but what?[25]

The fact that it appears that "measurements built the universe bit by bit" derives from the quantum situation that prior to a "measurement" being carried out by an "observer" there is only a quantum realm of potentiality, which is not a "nothing" - Gefter, like some others, is very slap-dash with some of her terminology regarding the ground quantum state. This quantum realm of potentiality becomes an experienced, and apparently 'material', reality when a measurement "collapses" the quantum wavefunction of potentiality.

On this view, the activity of a multitude of acts of observation are required to build an experiential-material universe over time. This was Wheeler's fundamental view. And it is a view which clearly requires the acceptance that observership, *and therefore consciousness*, is a fundamental and primary aspect of the process of reality. In other words, there must be some kind of internal pressure of "observership," not fully individuated and conscious at the ground

level of course, but having the nature of undifferentiated primordial consciousness. The process of the deeper levels of "observership" eventually produces the multitude of sentient organisms which continue to maintain the universe through their observations. Such a view is clearly strongly anthropic.

Gefter refers to such an anthropic perspective as "top-down" as opposed to the conventional "bottom-up" approach. It is "top-down" in the sense that, like Mensky's notion of a "Life-Principle" operating at the quantum level in order to unfold the potentialities for life which are a fundamentally innate aspect of the quantum realm, this perspective requires that we accept that life and consciousness are internal, and primary, aspects of the ground of the process of reality. Gefter writes about this:

> Anthropic coincidences are problematic for bottom-up cosmology because you are starting with an initial state that's completely independent of observers; the universe evolves forwards in time until observers like us just happen to arise, a fluky by-product of physics and happenstance. Given random initial conditions some 14 billion years ago, of course we're scratching our heads and asking, what were the odds that the universe would just happen to have every minute ingredient to cook up the fragile stew of life? Top-down cosmology, on the other hand, doesn't raise the question … top down cosmology starts with observers … And if you start with life, you are bound to end up with a life-friendly universe. Why an anthropic principle? … Because the universe is observer dependent. Such jewel-toned thoughts about life made me nervous - any theory which relied on humans or consciousness as being some kind of "special" ingredient struck me as crackpot.[26]

So, here we have it, Gefter dismisses the notion of a top-down development of life and the universe, not on the basis of evidence or cogent reasoning, but, rather, she kind of feels in her bones, so to speak, that such a notion must be "crackpot." It does not occur to her that, not only does the evidence support this psycho-metaphysical viewpoint, it is also the only logically coherent possibility. The notion that life and consciousness can emerge from entirely lifeless and entirely blankly non-conscious fundamental aspects of reality is absolutely logically incoherent and therefore definitely "crackpot."

At the same time as Gefter revels in the frisson of an "observer-dependent" reality, she, as we shall see, also, inconsistently, supports the current academic prevalence of crude materialist dogma. Like many others she seems to be incapable of drawing obvious conclusions because of a preformed dogmatic prejudice concerning any viewpoint which draws spiritual conclusions from the modern discoveries on the part of physics. Bizarre and contradictory it may be but, at the same time as she seems to support her father's view that the universe is some kind of illusion generated from a "homogeneous state" of "nothingness" (which itself is a misuse of the term "nothingness" which should mean absolute zilch – not even a glimmer of potentiality), and that the process of reality and the universe is "observer-dependent," she also upholds the materialist worldview, supporting a crude materialist Darwinism.

Gefter also holds to the view that consciousness has nothing to do with the fundamental observer-dependency of the universe. In her worldview consciousness is asserted to be generated by material brain processes:

> Wheeler thinks that consciousness could be the criterion for an observer, but that's obviously bullshit. I mean, consciousness is just a physical process in the brain. It's not magic.[27]

This means that, in her universe, which she asserts is "observer-dependent," observation can take place without the presence or activity of consciousness. According to Gefter:

> It was also clear that we needed to give careful consideration to the meaning and role of "observers" in general. Both relativity and quantum theory had changed the role that observers played in physics – not observers as humans or conscious creatures, but observers as in points of view.[28]

Such bizarre formulations indicate the remarkable philosophical incompetence on Gefter's part. The notion of free-floating "points of view," having no reference to any kind of experiential substrate able to experience and be aware of the "point of view" is incoherent. This claim elevates the notion of a "point of view" to an elementary feature of the process of reality, a claim which is philosophically unacceptable precisely because the concept of a "point of view" requires the experiential medium of consciousness.

However, this attempted objectification of the notion of a "point of view" indicates what is going on here. This move amounts to what Zeilinger calls an attempt to "save pre-quantum viewpoints, particularly the obviously wrong notion of a reality independent of us."[29] In the scientific revolution of the seventeenth century mind and consciousness were removed from the scientific description because of not being amenable to mathematical quantification. Subsequently the notion of consciousness became problematic and, due to the remarkable achievements of the scientific method in investigating, harnessing and controlling the phenomena of material reality, it was assumed that matter was the ultimate substance and consciousness was considered to be derivative. Consciousness, then, was simply assumed to be irrelevant to any ultimate description of the process of reality.

This assumption, however, was overturned within the quantum revolution wherein consciousness was shown to have a subtle interconnection with the quantum realm, interacting with it in order to produce experienced 'material' reality. As physicists Bruce Rosenblum and Fred Kuttner write in their book *Quantum Enigma: Physics Encounters Consciousness*:

> …physics' encounter with consciousness, demonstrated for the small, applies to everything. And that 'everything' can include the entire Universe.[30]

This indicates the primary nature of consciousness. However, resistance to this conclusion is still prevalent amongst a rearguard community of adherents to the metaphysical worldview of materialism, and in order to "save the appearances" of this outmoded worldview adherents simply rearrange language to suit their purposes. Thus "points of view" become active agents on their own behalf, having, according to Gefter's up-side-down and inside-out perspective, no connection with consciousness. Gefter writes:

> "Observers" didn't mean people, and "observer-dependency" didn't mean subjective. But I could imagine how it could all be misconstrued.[31]

But, as we shall see, Wheeler *did* mean "people" (and animals). It might be true that the universe is not entirely subjective, Wheeler's perspective requires us to consider it to be an intersubjective

creation. However, Gefter's absurd misconstrual here is the confident, and mistaken, assertion that "observers" and "observer-dependency" have nothing to do with consciousness.

Gefter has great admiration for Wheeler, praising his poetic approach to exploring some of the deepest mysteries of physics and existence, but at the same time she is wary of his views on the issue of the agency of consciousness. Wheeler asserted that the universe has been built up, bit by bit, from the quantum "smoky haze of possibility" (not "nothingness") by acts of observation made by sentient beings. Gefter observes:

> But what exactly did Wheeler mean by an observer? Without careful clarification *observer* was a dirty word. … Wheeler himself acknowledged the problem. "Any exploration of the concept of 'observer' and the closely associated notion of 'consciousness' is destined to come to a bad end in an infinite mystical morass," he wrote. And yet at times he teetered dangerously on the banks of the morass, his view of observers skewed far more towards minds than rods or clocks.[32]

And it is true that Wheeler did tread a very fine line, it may even be said that at earlier times in his career he hedged his bets, and it is interesting and illuminating to consider why this might have been the case.

In a 1983 article *Law Without Law,* wherein he described the delayed choice experiment, which demonstrates how an observation can determine the nature of reality backwards in time, Wheeler wrote the following observations:

> We are inescapably involved in bringing about that which appears to be happening.[33]

And:

> Many investigators, believing that the greatest insights are to be won from nature's strangest features are … giving fresh coverage of the strange "observer-participancy" forced to our attention by the quantum.[34]

And:

> Useful as it is under everyday circumstances to say the world exists "out there" independent of us, that view can no longer be upheld. There is a strange sense in which this is a "participatory universe."[35]

And:

> Is the term "big bang" merely a shorthand way to describe the cumulative consequence of billions upon billions of elementary acts of observer-participancy reaching back into the past...[36]

And:

> Yes, oh universe, without you I would not have been able to come into being. Yet you, great system, are made of phenomena; and every phenomena rests on an act of observation. You could never even exist without elementary acts of registration such as mine.[37]

And:

> Beyond particles, beyond fields of force, beyond geometry, beyond space and time

> themselves, is the ultimate constituent the still more ethereal act of observer-participancy?[38]

And yet, despite these stirring and repeated assertions of the "observer-participatory" nature of the universe, Wheeler also asserted in this article that:

> We cannot speak in these terms without a caution … The caution: "Consciousness" has nothing to do with the quantum process. We are dealing with an event which makes itself known by an irreversible act of amplification, by an indelible record, an act of registration.[39]

But one must ask in this context: how does Wheeler know this? What possible result or results of quantum experimentation validate this conclusion? None! If observer-participation is clearly required for the manifestation of the universe, and the most natural assumption is that observation is a phenomenon that requires consciousness, then the most obvious conclusion is that consciousness is implicated. So why does Wheeler, in this 1983 article, issue such a stern warning?

In order to appreciate a possible answer it is useful to look into the intellectual climate and expectations within the physics establishment at that time and the years preceding. Rosenblum and Kuttner are physicists who have no doubt about the connection between consciousness and the quantum ground of reality:

> Consciousness and the quantum enigma are not just two mysteries; they are *the* two mysteries; first, our physical demonstration of the quantum enigma, faces us with the fundamental mystery of the objective world 'out there;' the second, conscious awareness, faces us with the fundamental mystery of the subjective, mental world 'in here.' Quantum mechanics seems to connect the two.[40]

They also indicate the intellectual climate of mainstream physics since the 1950's, extending down to recent times:

> In physics departments a conforming mindset increasingly meant that an untenured faculty member might endanger a career by serious interest in the fundamentals of quantum physics. Even today it is best to explore the meaning of quantum mechanics while also working a 'day job' on a mainstream physics topic.[41]

In his excellent book *How the Hippies Saved Physics* David Kaiser indicates that in the 1960's and 70's physics in the United States was a conservative profession not enamored of metaphysical speculation or research. The general attitude amongst working physicists was that of "shut up and calculate," the idea being that it was the practical results of research that mattered, and speculation about exactly what quantum theory implied about the metaphysical nature of reality was to be avoided. The ethos was very different to that which held sway during the early development of quantum theory when discussions between Einstein, Bohr, Heisenberg, Schrödinger and the other 'founding fathers' were replete with puzzled philosophical speculations as to what the weird behaviour of the quantum realm might actually indicate about the nature of reality. Kaiser observes that later in the United States:

> The quarter century during which this Cold War style reigned witnessed an extraordinary buildup of calculating skill. At the same time, an intellectual trade-off slipped by unnoticed, with wide-ranging implications. For every additional calculation of baroque

> complexity that physics students tackled during the 1950's and 1960's, they spent correspondingly less time puzzling through what all of those fancy equations meant, what they implied about the world of electrons and atoms. The fundamental strangeness of quantum reality had been leeched out.[42]

Interest in quantum philosophical and metaphysical issues was a fringe activity.

Later, however, this anti-metaphysical attitude changed. The Fundamental Fysiks Group (FFG) was founded in San Francisco in May 1975 by two physicists, Elizabeth Rauscher and George Weissmann, at the time both graduate students at the University of California, Berkeley. The group held informal discussions on Friday afternoons to explore the philosophical implications of quantum theory. Leading members included Fritjof Capra, John Clauser, Philippe Eberhard, Nick Herbert, Jack Sarfatti, Saul-Paul Sirag, Henry Stapp, and Fred Alan Wolf. According to Kaiser:

> The ways and means of being a physicist came unmoored in a way they hadn't been for two generations. No longer would the attitude of "shut up and calculate" hold sway unchecked. Sitting around the large conference table at the Lawrence Berkeley Laboratory with few other demands on their time, they sought to recapture the sense of excitement, wonder, and mystery that had attracted them to physics in the first place, just as it had animated the founders of quantum mechanics.[43]

Amongst this fringe group an interest in connections between quantum phenomena, consciousness and psychic phenomena was central, figure 2 shows a 'roadmap' drawn out by a member of the group for their research and metaphysical explorations.

Jack Sarfatti was one of the few physicists who was very enthusiastic about Wheeler's metaphysical speculations at that time. He wrote:

> In my opinion, the quantum principle involves *mind* in an essential way …. the structure of matter may not be independent of consciousness. Some component in the quantum probability involves the turbulent creative sublayer of ideas in the mind of the "participator."[44]

Wheeler, however, kept his distance from these wayward fringe physicists. Sarfatti and Wolf were keen to work with Wheeler but Wheeler "politely declined"[45] their requests. So it would seem that Wheeler at that time was keen not to veer too far from academic respectability. It can be seen from the 'roadmap' for explorations based on the important implications of quantum entanglement that the FFG were aware that the new emerging quantum worldview might support the existence of phenomena such as ESP and psychokinesis, phenomena that were dogmatically ruled out within a 'classical' worldview. They saw the possible implications of an "observer-created world."

Wheeler's disavowal of the role of consciousness at this time actually lacks credibility as he also wrote in *Law Without Law*:

> Are billions upon billions of acts of observer-participancy the foundation of everything? We are about as far as we can be today from knowing enough about the deeper machinery of the universe to answer this question. Increasing knowledge about detail has bought increasing ignorance about plan. The very fact that we can ask such a

> strange question shows how uncertain we are about the deeper foundations of the quantum and its ultimate implications.[46]

In the light of such "uncertainty" about "deeper foundations of the quantum and its ultimate implications" it is difficult to see how Wheeler could be so certain at that time that "Consciousness has nothing to do with the quantum process." It seems very likely that such statements were made with deference to academic respectability. As we know he later changed his mind on this issue and he connected up the notion of observership with consciousness:

> Unless the blind dice of mutation and natural selection lead to life and consciousness and observership at some point down the road the universe could not have come into being in the first place...[47]

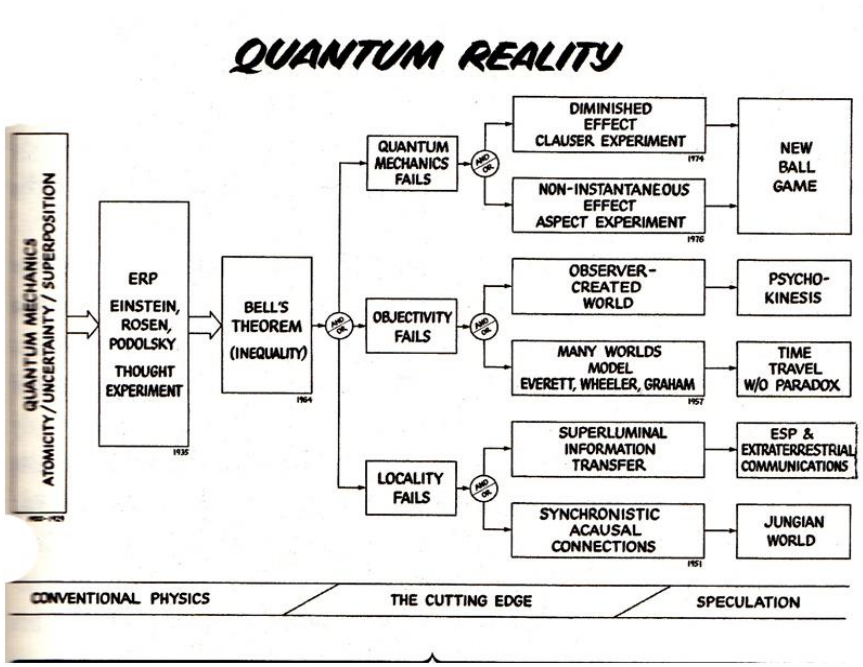

Figure 2. The FFG's 'Roadmap' of quantum possibilities for the paranormal.

In other words the universe could not come into being without the emergence of "consciousness and observership." But what Wheeler failed to see, at least at this point, is that life and consciousness must have been already implicit or potential at the point of the big bang, which was actually a quantum fluctuation in a vast quantum field of potentiality, a field that Mensky terms the 'Alterverse' – the vast pool of possible alternative histories of the universe.

Furthermore, because consciousness is involved in the unfolding of the universe, the process cannot be driven by "the blind dice of mutation and natural selection." The materialist Darwinian worldview is entirely out of place in Wheeler's quantum psycho-metaphysics, as we have seen in a previous Wheeler quote he indicated that "Darwin's Puzzle: Natural Selection … comes from consciousness." And in this case the kind of "natural selection" involved cannot be the random "blind watchmaker" variety, for the unfolding of life requires that consciousness

steers in the direction of life through some sort of quantum 'look-ahead' mechanism such as Mensky's 'postcorrection' mechanism.

Wheeler described the meaning of his "universe as a self-excited circuit" graphic image (figure 1) as follows:

> Beginning with the big bang, the universe expands and cools. After eons of dynamic development it gives rise to observership. Acts of observer-participancy – via the mechanism of the delayed choice experiment – in turn give tangible "reality" to the universe not only now but back to the beginning. To speak of the universe as a self-excited circuit is to imply once more a participatory universe.[48]

And the caption for the image is:

> Starting small (thin U at upper right), it grows (loop of U) and in time gives rise (upper left) to observer-participancy – which in turn imparts "tangible reality" … to even the earliest days of the universe.[49]

Physicist Kip Thorne explained Wheeler's perspective to Gefter as follows:

> From a certain point of view, which Wheeler adopts, systems can become classical only when observed. They behave quantum mechanically … until observed, and the observation collapses the wavefunction. So Wheeler conceives of the universe as having been born and having evolved quantum mechanically until it naturally generates life. Then that life performs the observation that collapses the state of the universe to make it classical. It is self-excited in the sense that the observation comes from within the universe, not from the outside.[50]

Gefter then asks Thorne: "Does it have to be biological life that makes the observation?" and Thorn tells her that this was Wheeler's view.

Wheeler, however, did not at this point seem to be aware that "observer-participancy" could not have suddenly sprang into operation from nowhere, it must have been implicit or potential from the beginning. Furthermore, the mechanism of "observer-participancy" must have been operative in some form even when fully organic beings where not yet fully evolved. In other words the mechanism of self-excitation, self-observation, or self-registration must be a fundamental mechanism employed by a deep non-individuated primordial consciousness, and the employment of this mechanism results in the development and evolution of the universe and the sentient beings it contains. In other words, primordial consciousness is able to individuate through a Wheeler-type mechanism of universal internal self-perception. This Wheeler-type mechanism corresponds in an important way with Mensky's psycho-metaphysics, in both perspectives evolutionary choices are made through a quantum mechanism involving consciousness from the reference point of a future point in time. And, as we saw in the first chapter the same is true of the quantum metaphysics outlined by Hawking & Mlodinow in their book *The Grand Design*.

Gefter, however, seems dogmatically predisposed to reject notions of consciousness being at all involved in the development of the universe and the sentient life within it:

> I couldn't see how bringing consciousness into the mix could possibly help - not least of all because scientists don't know what consciousness is. Whatever it is, it's governed by the same laws of physics and composed of the same particles, fields, or information-theoretic bits as everything else.[51]

Here we find Gefter stating her own prejudices, admittedly derived from the deep-seated materialism that pervades so much scientific and academic discourse, as if they were backed by evidence or reasoning, which they are not. Her views on the nature of consciousness are nothing other than materialist dogma. Consciousness cannot be composed of 'particles' precisely because particles come into being when consciousness interacts with quantum wavefunctions of potentiality. So consciousness is more fundamental than particles. It may be possible to consider consciousness as a quantum field, but in this case it would be a fundamental quantum field capable of interacting with other quantum fields in creative ways. This would render consciousness as being an essential creative feature of the 'physical' world. The quantum cosmologist Andre Linde has mused in this context:

> Is it possible that consciousness, like spacetime, has its own intrinsic degrees of freedom and that neglecting these will lead to a description of the universe that is fundamentally incomplete? What if our perceptions are as real as (or maybe, in a certain sense, are even more real) than material objects?[52]

And Linde has also observed:

> The universe and the observer exist as a pair. ... The moment you say that the universe exists without any observers, I cannot make any sense out of that. I cannot imagine a consistent theory of everything that ignores consciousness. A recording device cannot play the role of an observer, because who will read what is written on this recording device? In order for us to see that something happens, and say to one another that something happens, you need to have a universe, you need to have a recording device, and you need to have us. It's not enough for the information to be stored somewhere, completely inaccessible to anybody. It's necessary for somebody to look at it. You need an observer who looks at the universe. In the absence of observers, our universe is dead.[53]

Furthermore, in the absence of conscious observers the universe is only quantum potentiality, no 'classical' world exists. Such a viewpoint, which was accepted by several of the 'founding fathers' of quantum theory, and is accepted today by scientists such as Linde, Roger Penrose, Stuart Hameroff, Henry Stapp, Amit Goswami, Mensky and others, is, it seems, rejected by Gefter without rhyme or reason.

Gefter's claim that most scientists assert that they do not know what consciousness is, on the other hand, true. But the reason for this is that scientists in general approach the phenomenon of consciousness with a ridiculous methodology, expecting to be able to examine it "out there" as if it were some kind of externally existing fluid-like 'stuff'. This, of course, is not possible. If we want to directly know what consciousness *is* there is only one way to know, and that is to experience directly through advanced meditation techniques such as exist in the Buddhist tradition. In Buddhist psycho-metaphysics there are levels or degrees of consciousness, which can be directly experienced by advanced meditation techniques. The basic division is that between *jnana,* which is fundamental nondual consciousness or wisdom-awareness, and *vijnana*

or divided, dualistic everyday consciousness. Everyday consciousness is the "glow of the ground of being" [54] manifesting in the dualistic world. The West's understanding is primitive in comparison to Buddhist psycho-metaphysics.

If we require a definition of consciousness, then one derived from Buddhism will suffice. Here is a description of the fundamental nature of mind or consciousness given by the Dalai Lama:

> The knowing nature, or agency … is called mind and this is non-material … Cognitive events possess the nature of knowing because of the fundamental nature of clarity that underlies all cognitive events. This is … the mind's fundamental nature, the clear light nature of mind.[55]

If we want to know where the "clear light nature of mind," which provides the functionality of knowing and cognizing, arises from then, as Mensky points out:

> …the phenomena of life and consciousness cannot be mechanistically reduced to the action of the laws of science as they are found in the course of exploring [inanimate] matter. The explanation of these phenomena on the basis of quantum mechanics requires [the] addition of a special independent element to the set of quantum concepts and laws. Such a new element of theory should directly connect quantum concepts with the concepts characteristic of life. The simplest way to find this element is to consider the phenomenon of consciousness and compare it with the description of observation (measurement) in quantum mechanics. [56]

The fundamental qualitative aspect of fundamental awareness which manifests as individuated consciousness must reside at the quantum level. As physicist Nick Herbert (one of the members of The Fundamental Fysiks Group) has pointed out:

> ...every quantum system has both an 'inside' and an 'outside', and … consciousness both in humans as well as in other sentient beings is identical to the inner experience of some quantum system. A quantum system's outside behavior is described by quantum theory, it's inside experience is the subject matter of a new 'inner physics'….[57]

As Mensky indicates, the required 'inner physics' actually already exists within Buddhist psycho-metaphysics. Consciousness is, then, the internal qualitative aspect of the quantum functioning of the 'ground of being'. According to Buddhist psycho-metaphysics a continuous *direct* experience of the ground level of awareness is an experience of buddhahood, or enlightenment:

> When the true face of the ground aspect of buddhahood - a state of purity and mastery of the ground of being … timeless awareness - the innate glow of the ground of being - subside into an inner glow whose radiance is directed outwards …[58]

Advanced Buddhist meditation involves the dissolving of the dualistic everyday levels of the functioning of consciousness and the activation of deeper levels of a more universal consciousness. As Buddhist practitioner-writer B. Alan Wallace has pointed out:

> This brings us to primordial consciousness, the ultimate level of mind that Buddhists seek to penetrate. The substrate consciousness can be compared to a relative vacuum. It is relatively empty, but still possesses structure and energy, characterized by such attributes as bliss (spiritual joy or rapture), luminosity (an internal radiance), and a muted

> sense of duality between subject and object. Primordial consciousness - characterized as the absolute ground, the most basic state of consciousness - could then be characterized as the absolute vacuum of consciousness. Like the absolute vacuum of modern physics, it entails the lowest possible state of mental activity but the highest possible potential and degree of freedom. Furthermore, whereas the substrate consciousness is conscious of the substrate - the relative inner space or vacuum of the mind - primordial consciousness is indivisibly aware of the absolute space of all phenomena (*dharmadhatu*), which is beyond the duality of external and internal space. Out of this space emerge all the phenomena that make up all worlds of experience - the whole universe, inside and out, subjective and objective. All appearances of external and internal space, time, matter, and consciousness emerge from the dharmadhatu and consist of nothing other than configurations of this absolute or true vacuum.[59]

Furthermore, final buddhahood, or complete enlightenment with a continuous awareness of the nondual ground of being, is the endpoint of the evolution and development of a sentient being.

Wheeler's quantum conclusions were entirely consistent with Buddhist psycho-metaphysics. He summarized his conclusions in his article '*Thoughts on the Origin of Spacetime*' as follows:

> In what medium does spacetime itself live and move and have its being? Is there any other answer than to say that consciousness brings all of creation into being, as surely as spacetime and matter brought conscious life into being? Is all this great world that we see around us a work of imagination?[60]

Figure 3

In other words we must conceive of a ground level universal energy-awareness-potentiality, also designated within Buddhism as *shunyata*, or emptiness (not nothingness) which, through the medium of "spacetime and matter," "creates" a manifested realm of individuated sentient beings within the apparently material world in order to embody individuated consciousness. Through this process the universe can explore and discover its own meaning (figure 3). Such a viewpoint is suggested by the recent notion of a "self-explaining universe" that the physicist Paul Davies has written about in his book *The Goldilocks Enigma*:

> …a good case can be made that life and mind *are* fundamental physical phenomena, and so must be incorporated into the overall cosmic scheme. One possible line of

> evidence for the central role of mind comes from the way in which an act of observation enters into quantum mechanics. It turns out that the observation process conceals a subtle form of teleology.[61]

Such a universe would necessarily contain organisms that embody the capacity for cognition, which is to say consciousness, precisely because the purpose of 'self-explanation', to use Davies' terminology, or self-cognition, is fundamental to the universe. It is part of the "teleology" of the universe.

Quantum physics seems increasingly to point towards the operation of an infinitely fertile universal "imagination," to use Wheeler's term, which can actually bring into being an extraordinary appearance of a vast 'material' universe containing infinite varieties of consciousness, all of which inhabit an individualized field of meaning-values. As physicist David Bohm pointed out:

> We can say that human meanings make a contribution to the cosmos, but we can also say that the cosmos may be ordered according to a kind of 'objective' meaning. New meanings may emerge in this overall order. That is we may say that meaning penetrates the cosmos, or even what is beyond the cosmos. For example there are current theories in physics that imply that the universe emerged from the 'big bang'. In the earliest phase there were no electrons, protons, neutrons, or other basic structures. None of the laws that we know would have had any meaning. Even space and time in their present well-defined form would have had no meaning. All of this emerged from a very different state of affairs. The proposal is that, as happens with human beings, this emergence included the creative unfoldment of generalized meaning. [62]

Each sentient being is an individualized structure of experiential meaning-values embodied within individualised consciousness, each sentient being embodies a fundamental evolutionary impetus to maximise the overall meaning value of the individualized meaning-matrix, the final endpoint being enlightenment, wherein the limited awareness of a sentient being dissolves into its universal source.

This dramatic psycho-metaphysical perspective is articulated within the Buddhist Dzogchen tradition in texts such as *You Are the Eyes of the World*, composed by the remarkable fourteenth century practitioner-yogi Longchenpa:

> Listen, because all you beings of the three realms
> Were made by me, the creativity of the universe,
> You are my children, equal to me.
> Because you and I are not separate,
> I manifest in you.[63]

This "creativity of the universe" can be seen in what Paul Davies indicates as a quantum "teleology," an internal purpose, which brings into existence a vast field of individuated sentient beings all of which partake of the infinite capacity of the ultimate source. According to Longchenpa:

> Out of the state of pure and total presence, the impetus for everything
> From which come the five great elements whose very being is this state,
> I, the creativity of the universe,

> Arise as teacher, in five forms of pure and total presence.[64]

These "five teachers," which are generated by the "creativity of the universe which fashions everything,"[65] are earth, water, fire, wind and space, in other words all the factors which make up the material dualistic world of experience. And:

> If I [the state of pure and total presence which is the creativity of the universe] did not exist, you would not exist.
>
> When you do not exist, the five teachers [i.e. the dualistic and material world of experience] also do not come about…[66]

It is intriguing to compare these observations with some of Wheeler's, such as:

> Yes, oh universe, without you I would not have been able to come into being. Yet you, great system, are made of phenomena; and every phenomena rests on an act of observation. You could never even exist without elementary acts of registration such as mine.[67]

What Wheeler refers to as the "imagination" of a primordial consciousness that "brings all of creation into being," corresponds precisely to Longchenpa's "majestic creativity [of the universe] which fashions everything."[68]

According to another Buddhist Dzogchen philosopher:

> In the human context, intelligence reaches into man's life as his spirituality, constituting itself as human subjectivity. The latter, therefore, is not an immutable essence; rather it is a product of an overall evolutionary force moving in an optimizing direction, thereby enabling the subject to transcend itself by overcoming its limited domains. This force is felt as giving meaning to man's life and is experienced as having existential significance. [69]

In the Buddhist Dzogchen worldview, which is fully in accord with modern physics, we have a remarkable vision of the universe as a meaning-machine, or meaning-organism, using sentient beings both as creative agents and also agents of transcendence reaching towards ever greater vistas of universal meaning-values. This perspective indicates a universal directedness towards ever more universal modes of experience within consciousness, the ultimate experience being 'enlightenment'.

What is enlightenment? It is the direct nonconceptual understanding of the ground of Being by the fundamental cognizant aspect of the ground of Being itself. In other words enlightenment occurs when the ground of Being fully and directly and nonconceptually cognizes, comprehends and understands its own nature through the agency of a sentient human being (assuming that animals cannot become enlightened). This is brilliantly explained in the excellent Dzogchen text *Wonders of the Natural Mind* by Tenzin Wangyal Rinpoche. The ground of Being is characterized within Dzogchen as an 'empty' energy field of potentiality which has an internal spontaneous cognizant quality. The field of potentiality is designated 'emptiness' and the internal spontaneous cognizant quality is designated 'luminosity' or 'clarity'. Tenzin Wangyal Rinpoche writes:

> Who then understands emptiness? There is the self-understanding of emptiness by emptiness itself, by the clarity aspect of emptiness that enables understanding by direct

> perception. Understanding is not separate from emptiness. Emptiness understands itself and illuminates itself, ... Herein lies the inseparability of emptiness and clarity; self-understanding is self-clarity or self-awareness.[70]

In Mensky's terminology we may say that within enlightenment the Alterverse has a direct and full understanding of its own infinite capacity and nature. In Buddhist terminology this is the "ultimate reality intuitive wisdom (*dharmadhatu-jnana*)"[71] by which the *dharmadhatu*, the ultimate space of phenomena – Mensky's 'quantum Alterverse', directly cognizes its own nature. This vision of enlightenment as the final aim of the process of reality, and the evolution of the universe and sentient beings within it, is a natural endpoint of Wheeler's quantum psycho-metaphysics. His self-perceiving universe graphic indicates that as the universe evolves the degree and power of "observership" increases over time. The final and most complete act of observership can only be the omniscient knowledge of the true nature of all phenomena.

In this context it is worth pointing out that the kind of 'omniscience' within enlightenment suggested by Mensky, wherein an enlightened being has "access to the entire set of parallel worlds," which is the entire 'Alterverse', corresponds to what the Buddhist scholar Sara L. McClintock calls "*capacity omniscience*":

> On this model, which we find articulated … by Vasubandhu, one may be omniscient in the sense that one may attain an unlimited capacity to know whatever one wishes simply by directing one's attention to the object in question; omniscience is not a matter of knowing all things simultaneously. According to this model, the Buddha may be called "all-knowing" by virtue of the fact of his unlimited capacity to know any knowable thing to which he directs his attention…[72]

One important aspect of this omniscient capacity is the ability to directly see the rebirth history of any sentient being.

Such a view, that the process of evolution is directed towards an omniscient endpoint, has been called by some the Final Anthropic Principle. Quantum researcher David Deutsch, who views the universe as a vast quantum computer, has speculated that in the distant future mankind will form a kind of supermind that will in some sense unite with the universe, forming a god-like entity. He describes the Final Anthropic Principle:

> In the final anthropic principle or if anything like an infinite amount of computation taking place is going to be true, which I think is highly plausible one way or another, then the universe is heading towards something that might be called omniscience. ... But yes, there's something like that, the concept that we've found that is most like a religious concept is providence. The fine-tuning of the universe, whatever it's due to, is very like providence. But again, the role that this providence plays in physics is very different from the role that religious providence plays in religion, because in religion providence is supposed to be an explanation for why things are as they are. And that's no good, because you've got to explain why providence did this and it just makes matters worse not better. In thinking about fine-tuning and trying to explain it, what we're looking for is something that explains the fine-tuning. In other words, providence is not a proposed solution, it's an interesting problem, which is going to be explained by something else, if at all.[73]

However, the notion that the universe is merely a computational machine is yet again a manifestation of the materialist prejudice which seeks to undermine the notion that consciousness is a primary and the fundamental driving force of the process of reality. As Gyatrul Rinpoche has pointed out:

> Today people tend to spend many hours working on computers rather than gaining the inner quality of experiential realization. A computer may have a tremendous amount of information loaded onto it, but we have yet to see a computer that has obtained liberation or omniscience.[74]

It is the primordial consciousness of the process of reality that becomes omniscient of its own nature with the 'achievement' of enlightenment by a sentient being.

Because, like many scientists, Deutsch has a mistrust of religious metaphysics he rejects the obvious conclusion that the fundamental existence of a primordial field of non-individuated awareness is a "providential" given. Just as we cannot go beyond the fact of the existence of the eternal quantum fields underlying the process of reality, so too, we cannot go beyond the fact of the "providential" existence of primordial awareness or nondual awareness-consciousness. Deutsch's perspective clearly strays into the realm of religion, and it seems to correspond in essence with Buddhist perspectives and it also reiterates the psycho-metaphysical perspective of the great twentieth century French Jesuit theologian Pierre Teilhard de Chardin who postulated that the process of the universe was directed towards a collective omniscient endpoint he called the "Omega Point." In his book *The Phenomenon of Man* he wrote:

> … evolution is an ascent towards consciousness… Therefore it should culminate forwards in some sort of supreme consciousness. But must not that consciousness, if it is to be supreme, contain in the highest degree what is the perfection of our consciousness – the illuminating involution of the being upon itself.[75]

This notion that the "supreme consciousness" results when individuated consciousness directly cognizes its own nature is remarkably close to the Buddhist view. However, de Chardin, similar to Deutsch, suggested that the final endpoint of the process of the universe resides at a distant future point in a super-personal universal collective consciousness:

> The very centre of our consciousness, deeper than all its radii; that is the essence which Omega, if it is to be truly Omega, must reclaim. And this essence is obviously not something of which we can dispossess ourselves for the benefit of others as we might give away a coat or pass on a torch. For we are the very flame of that torch. To communicate itself, my ego must subsist through abandoning itself or the gift will fade away. The conclusion is inevitable that the concentration of a conscious universe would be unthinkable if it did not reassemble in itself *all consciousnesses* as well as all *the conscious*; each particular consciousness remaining conscious of itself at the end of the operation, and even … each particular consciousness becoming still more itself and thus more clearly distinct the closer it gets to them in Omega[76].

According to the psycho-metaphysical perspective presented by de Chardin, then, the Omega endpoint is one in which each individuated consciousness "abandons" its limited ego centered perspective, and in so doing it both becomes more fully "still more itself" whilst at the same time becoming co-extensive with all other consciousnesses. Whilst this view initially appears consistent and coherent with Buddhist psycho-metaphysics, it is in fact far more akin to the

Hindu notion of a substantial universal self (Atman-Brahman). Buddhism, apart, perhaps, for the Jonang school, denies such a *substantialist*-idealist point of view.

De Chardin referred to "the primacy accorded to the psychic and to thought in the stuff of the universe."[77] The *ultimate* dependency upon consciousness of the apparently external material world is also clearly indicated by physicist Wojciech Zurek when he writes that the: "ultimate evidence for the choice of one alternative resides in our illusive "consciousness".[78] But Zurek also tells us that at the level of the everyday world consciousness seems to have little impact. Quantum experimentation has shown without question that at the level of a single quantum state consciousness influences the 'choice' of which alternative reality comes into being. However, at the same time it also appears that on the large scale of the structures of the everyday world individuated consciousness has no choice, the material world seems to exist under its own momentum. This apparently independent weight of the apparently 'external' world of materiality is maintained, according to Zurek, by the phenomenon of 'decoherence'. According to Zurek there is a kind of quantum template of the material world which "advertises" itself by producing a multitude of copies which are accessed by the conscious-nesses of all sentient beings. He likens this vast 'template' as a quantum "advertising billboard" which "decoheres" quantum states under its own momentum.

In his "quantum Darwinism" proposal Zurek suggests that the quantum "advertising billboard" springs into existence advertising classical reality when quantum correlations become "robust enough":

> The main idea of quantum Darwinism is that we almost never do any direct measurement on anything … the environment acts as a witness, or as a communication channel. … It is like a big advertising billboard, which floats multiple copies of the information about our universe all over the place.[79]

In other words there is a kind of quantum 'matrix' of the classical 'material' world which has become resistant to obliteration through the process of observation, it "floats" so many copies of itself all over the quantum environment that it becomes the source of the apparent 'objectivity' of the classical world. Zurek explains the emergence of "objectivity" from "intersubjectivity" to Gefter as follows:

> My view of reality has to do with what philosophers call intersubjectivity. That's what quantum Darwinism is all about. Reality is what we agree on. In that sense it's what's invariant. But that invariance – and hence, quantum reality – is not fundamental, it's emergent and approximate.[80]

And:

> To understand objectivity. In a quantum universe we do not measure anything directly. If I were to make a direct measurement of a system, I could disturb its state. But I never do that, because usually the environment does the measuring for me. It decides on the set of states that get found out and get disseminated, and I never interact with the system directly, I just use the environment as a witness. The observer gets hold of the information that is already advertised all over the place.[81]

In this discussion Zurek makes a distinction between the "advertising billboard," which is the quantum template of the universe that "floats" copies of itself "all over the place," and the

environment which acts as a "communication channel" which conveys quantum information about the template to observers. In this way the original "advertising billboard" does not get disturbed. On this view, 'decoherence' is the way that the "advertising billboard" maintains itself in the quantum environment and the "quantum Darwinism" extra is the notion of the environment acting as a "witness" in conveying information to observers, as Zurek explains:

> Quantum Darwinism goes beyond decoherence. It recognizes that we don't measure anything directly. We just find out from the environment.[82]

As Gefter points out, this view eliminates Wheeler's notion of observer-dependency because the maintenance of the "intersubjective" "objective" world becomes the responsibility of decoherence, the "environment" then conveys the information to the observer, so the observer is isolated from the quantum template of the material world. Zurek replies that:

> Usually the measurement is done for you by the environment. But there are situations in which you deal with quantum systems hands-on. In that case, the choice is up to you how you want to set up your apparatus and decide what you're going to measure.[83]

Thus it appears that Zurek erects a rigid division between the case wherein quantum experiments are performed to demonstrate the "ultimate" dependency upon consciousness, and the case of the everyday material world which appears, in this presentation, to be entirely independent of consciousness. So Zurek's viewpoint does indeed appear to undermine Wheeler's "participatory universe." Although Zurek says that: "the Universe is quantum to the core," he seems hell bent on giving it a fully classical demeanor, by isolating his quantum "advertising billboard" from the tampering effects of conscious observation.

Zurek's approach, then, seems to eliminate the operation of consciousness. As John Campbell, in his article *Quantum Darwinism as a Darwinian process*, says of Zurek's work:

> Hopefully this treatment will finally lay to rest the interpretational confusion around the role of a human observer in quantum measurements that has been prevalent in many treatments and taken to anthropomorphic extremes by some such as Wigner. Zurek's work makes it clear that decoherence takes place whenever there is an information transfer to the environment. No human observer need be in attendance.[84]

Eugene Wigner was a quantum physicist who was entirely convinced of the necessity of the quantum operation of consciousness:

> When the province of physical theory was extended to encompass microscopic phenomena, through the creation of quantum mechanics, the concept of consciousness came to the fore again: it was not possible to formulate the laws of quantum mechanics in a fully consistent way without reference to the consciousness. All that quantum mechanics purports to provide are probability connections between subsequent impressions (also called "apperceptions") of the consciousness, and even though the dividing line between the observer, whose consciousness is being affected, and the observed physical object can be shifted towards the one or the other to a considerable degree, it cannot be eliminated. It may be premature to believe that the present philosophy of quantum mechanics will remain a permanent feature of future physical theories; it will remain remarkable, in whatever way our future

> concepts may develop, that the very study of the external world led to the conclusion that the content of the consciousness is an ultimate reality.[85]

Campbell's desperate rush to dismiss the efficacy of consciousness on the basis of Zurek's treatment is, however, mistaken. Zurek's presentation is only a partial picture. Physicist Erich Joos has pointed out:

> Does decoherence solve the measurement problem? Clearly not. What decoherence tells us, is that certain objects appear classical when they are observed. But what is an observation? At some stage, we still have to apply the usual probability rules of quantum theory.[86]

And Dieter Zeh:

> Decoherence by itself does not yet solve the measurement problem … This argument is nonetheless found widespread in the literature … It does seem that the measurement problem can only be resolved if the Schrödinger dynamics … is supplemented by a nonunitary collapse…[87]

Zurek's account is deficient, it does not, for instance, address the issue of the probabilities within quantum theory. And neither does it give an account of how the quantum "advertising billboard" came into being. At the point of the big bang there was only a vast set of quantum possibilities and no established "advertising billboard," so where did it come from?

If Zurek really considers that his "view of reality has to do with what philosophers call intersubjectivity" and "Reality is what we agree on,"[88] then should not the "advertising billboard" also be intersubjective in true Wheeler-type sense? However, apparently Wheeler had problems reconciling himself with a quantum metaphysics which involved multiple observers. The problem is highlighted by the quantum conundrum of "Wigner's Friend," a thought experiment concocted by Wigner. If 'Wigner's friend' collapses the wavefunction of an atom inside a laboratory, then from the point of view of the friend both atom and friend are not in a state of quantum superposition. But from Wigner's point of view, standing outside the lab, both atom and friend *are* in a state of quantum superposition. So it seems that when we look at the situation involving multiple observers a contradiction arises. As Gefter writes:

> Wigner took the paradox to mean that consciousness plays some special role in physics – that while atoms and photographic plates … could be in superpositions, conscious people could not.[89]

So Wheeler too was forced to accept a special role for consciousness. Gefter writes:

> Wheeler was stuck. The only way to have multiple observers living in the same universe without having to give up the observer's ability to create reality was to afford some special role for consciousness, however reluctant he was to do it. That opened up a host of bizarre but unavoidable questions "What level of consciousness?" "Does a worm qualify?" "What about household appliances?"[90]

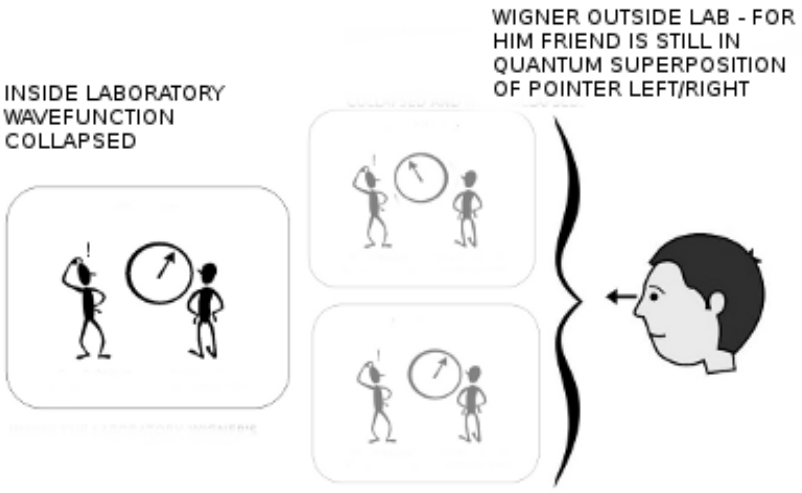

Figure 4. Wigner's friend

Gefter's absurd quip about "household appliances" is irrelevant because they are not sentient beings. Quips such as these simply indicate that the author has given up using coherent reasoning and is resorting to attempted sarcasm. A worm, on the other hand, is a sentient being, although the level of consciousness of such an organism is clearly very low, in fact its level is likely to be virtually unconscious and automatic. This indicates a problem with Western concepts of consciousness and unconsciousness when viewed from a Buddhist perspective. For Buddhist psycho-metaphysics what the West calls the 'unconscious' is still a state of consciousness, although it is not accompanied (usually) by self-awareness. Within Buddhist psycho-metaphysics even dreamless sleep is a state of consciousness, it is the clear light mind. For ordinary human beings this state is a state of blankness, but advanced Buddhist practitioners can achieve self-awareness even within the clear light mind of deep sleep.

Gefter's quip about the worm, which is clearly an attempt at irony which she thinks indicates the silliness of the notion that consciousness has an important role in the creation of the universe, can be easily defused. All sentient beings, even worms which have barely a glimmer of sentience, are animated by the primordial consciousness of the process of reality. It is this primordial consciousness which creates sentient beings and their environments and then acts through sentient beings to maintain the universe and evolve the sentient beings within it towards greater levels of self-awareness. The phenomenon of the 'collapse of the wavefunction' is not necessarily evidence that all sentient beings are *individually* creating reality by beaming single rays of consciousness, so to speak, at quantum wavefunctions, but, rather, it indicates that a deep level of primordial consciousness is operating through the community of sentient beings of all levels of consciousness in order to "create" the process of reality.

Thus the "intersubjective" creation of the universe is coherently coordinated by a deep level of primordial consciousness. In this way primordial consciousness acts upon the quantum potentialities in order to produce a coherent world of manifestation. This is the origin of Zurek's

quantum "advertising billboard." And from the point of view of individual sentient beings individual consciousness has little individual impact upon the edifice of the apparently material world precisely because it is an intersubjective collective creation generated by primordial consciousness, eventually acting through the agency of all sentient beings. So, although Zurek is correct when he says that "there is every indication that the choice occurs much before" consciousness gets involved, this remark applies to *individual* consciousness. This does not detract from the fact that *ultimately* primordial consciousness, acting through the collective agency of sentient beings, orchestrates the process.

Gefter, however, is antagonistic to such notions:

> Why drag consciousness into it all? I wondered. Wheeler knew it was a mystical morass, and that one gap in understanding couldn't be plugged by another. Observers, sure – but why not stick with Einsteinian observers, just reference frames, coordinate systems, rods and clocks? … the observer, conscious or not, had to be built out of ordinary physics, not fairy dust.[91]

The answer to Gefter's question about why Wheeler was drawn to the notion of the significance of consciousness perhaps lies in the fact that Wheeler was probably aware that "reference frames, coordinate systems, rods and clocks" are not the kind of things which are capable of observing, observations require consciousness. As to the final "fairy dust" remark, the employment of prejudicial language does not count as evidence or reasoning. What *ultimately* is "ordinary physics?" It certainly is not the classical physics of 'matter'. Quantum fields are immaterial fields of potentiality, and evidence and reasoning indicates they are animated by a primordial quantum consciousness.

The tactic of using insulting language rather than coherent argument has a hallowed tradition in the materialist academic camp. It is possible that Gefter took inspiration for her use of the term "fairy dust" from the ardent materialist Patricia Churchland who tried to pour scorn on the Penrose-Hameroff proposal concerning consciousness and quantum coherence in brain microtubules:

> Pixie dust in the synapses is about as explanatorily powerful as quantum coherence in the microtubules.[92]

However, evidence is now emerging that Penrose and Hameroff may be correct to some extent.[93] Churchland, like many ardent materialists, seems to think that concocting insults, without bothering with evidence and reasoning, against viewpoints they dislike constitutes an argument. Gefter seems to have inherited this materialist trait.

Gefter interviews a few other significant physicists and philosophers, there is no need to cover all of them. The crucial issue we are concerned with is Gefter's treatment of the notion of the significant role of consciousness in the creation of the dualistic world and her attitude, as well as the attitude of some others, to the Anthropic Principle and religion. In the second chapter of *TEL* she writes concerning the *Physics and Ultimate Reality* symposium that she gatecrashed, posing as a science journalist, that:

> Throughout the symposium. There had been a giant elephant in the room: the anthropic principle. ... *Anthropic* had become a four letter word because it veered uncomfortably

> close to religion … as if the universe, somehow, were built just for us.[94]

Gefter has little patience with religion, she has pitched her intellectual tent with the anti-religion materialist camp. Thus in a piece published in *The New Scientist* entitled "*How to spot a hidden religious agenda*" she wrote:

> As a book reviews editor at *New Scientist*, I often come across so-called science books which after a few pages reveal themselves to be harbouring ulterior motives. I have learned to recognise clues that the author is pushing a religious agenda. As creationists in the US continue to lose court battles over attempts to have intelligent design taught as science in federally funded schools, their strategy has been forced to… well, evolve. That means ensuring that references to pseudoscientific concepts like ID are more heavily veiled. So I thought I'd share a few tips for spotting what may be religion in science's clothing. Red flag number one: the term "scientific materialism". "Materialism" is most often used in contrast to something else – something non-material, or supernatural. Proponents of ID frequently lament the scientific claim that humans are the product of purely material forces. At the same time, they never define how non-material forces might work. I have yet to find a definition that characterises non-materialism by what it is, rather than by what it is not. The invocation of Cartesian dualism – where the brain and mind are viewed as two distinct entities, one material and the other immaterial – is also a red flag. And if an author describes the mind, or any biological system for that matter, as "irreducibly complex", let the alarm bells ring. Misguided interpretations of quantum physics are a classic hallmark of pseudo-science, usually of the New Age variety, but some religious groups are now appealing to aspects of quantum weirdness to account for free will. Beware: this is nonsense.[95]

This passage clearly indicates Gefter's antagonism to the Intelligent Design (ID) perspective and her adherence to 'scientific materialism'. But how does this endorsement of materialism sit with her *Trespassing* (*TEL*) conclusion that:

> The message was clear: having a finite frame of reference creates the illusion of a world, but even the reference frame itself is an illusion. Observers create reality, but observers aren't real. There is nothing ontologically distinct about an observer, because you can always find a frame in which that observer disappears...[96]

If adopting a "finite frame of reference creates the illusion of a world" then the apparent 'material' in that illusory world must also be illusory, so how can someone holding to such a conclusion coherently preach a crude materialism, which asserts the ultimate ontological primacy of 'matter', conceived of as independent extended 'stuff'. Furthermore, how can "unreal" observers create an "illusory," and yet "material," reality through the mechanism of their observation without being endowed with consciousness? After all, Zurek and other significant physicists state that the "ultimate" "choice" of quantum alternative realities resides within consciousness? Gefter seems to preside over a remarkable morass of contradictory claims, indicating a lack of awareness of logical coherence, or a lack of intellectual integrity. And yet Gefter, as she proudly informs us, is the book reviews editor for *New Scientist*, and in this position she attempts to pour scorn on non-materialist works.

Gefter says that "some religious groups are now appealing to aspects of quantum weirdness to account for free will." But there are also significant quantum physicists such as Mensky, Stapp,

Goswami and others who also claim this. In his paper entitled *Free Will* Stapp writes that:

> A criterion for the existence of human free will is specified: a human action is asserted to be a manifestation of human freewill if this action is a specific physical action that is experienced as being consciously chosen and willed to occur by a human agent, and is not determined within physical theory either in terms of the physically described aspects of nature or by any non-human agency.[97]

And the paper then presents an account of how the "orthodox quantum mechanics that flows from John von Neumann's analysis of the process of measurement in quantum theory" leaves a "causal gap" which is closed by the presence of free will. Stapp's account is far from "New Age" and is detailed and precise.

Stapp points out that the "orthodox quantum mechanics" that derives from John von Neumann's presentation of the process of measurement in quantum theory is in terms of three processes that indicate a fundamental "three-level conception of reality." Von Neumann's "Process 2" is the deterministic evolution of the probabilities of the quantum realm of idea-like potentiality, this is described by the Schrödinger equation. "Process 1" is a "psychophysical probing action whose psychologically described aspect is an increment in the knowledge of a probing agent/observer." "Process 3," is "a choice on the part of nature," which is a "response to such a probing action." In other words, in "Process 1" an experimenter or group of experimenters perform a "probing action" by deciding upon and then setting up a quantum experiment which can have various outcomes which have associated probabilities. Because the choice of experiment determines what the possible outcomes can be, spin up-down or spin left-right for example, this probing action determines what responses "nature" can give. When the experiment is performed "nature" then makes a "choice," and thereby the "probing knowledge-acquiring agents" get their knowledge. This, Stapp says, constitutes "an idea-based quantum triality," and:

> ...the dynamical structure of quantum theory contains certain causal gaps. In particular, the process-1 agent-generated choices of probing actions are determined, within the theory, neither by the physically described aspects of nature, nor by any non-human agency. Thus, within the framework of orthodox quantum mechanics, the process-1 probing actions are, according to the specified criterion, manifestations of human free will...[98]

Stapp has also pointed out that this situation applies not just in quantum experiments but also in everyday life.

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(*Continued on Part II*)