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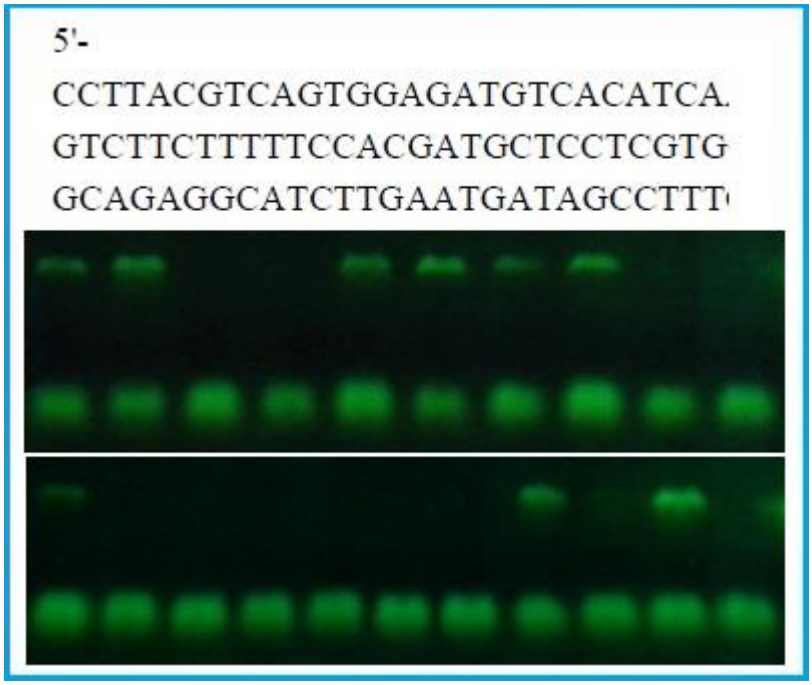
PCR Amplification of Phantom DNA



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PCR Amplification of Phantom DNA Recorded as Potential Quantum Equivalent of Material DNA

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ABSTRACT

In this article, we describe the method and application of PCR amplification of phantom DNA recorded using modulated secondary broadband electromagnetic radiation (MBER) of LHN-303 Laser as potential equivalent of material DNA. As examples, we report two experiments applying the herein described method. We appeal to and invite other research groups to verify our method and results independently.

Keywords: DNA, Phantom DNA, PCR amplification, electromagnetic radiation, audio recording.

I. Introduction

DNA Phantom Effect[1] was discovered in our laboratory led by the author in 1984 using the method of correlation laser spectroscopy. The first publication about this was in 1991 [1].

In 2001, we used DNA phantoms in Canada in the form of secondary radiation from a *LGN-303* laser [2] for the transmission of a pool of active genetic information over a distance of 20 km. In this experiment, pancreases of a few dozen *Wistar* rats were inactivated through alloxan induced diabetes. These rats were subsequently treated with distant phantom genetic information read by the laser from pancreases of newborn Wistar rats of the same genetic lineage. In the control group, 90% of these rats died. However, all rats that received phantom genetic information, survived [3]. Later, these findings were confirmed by the work of *A. Kokaya*, *N. Kokaya*, and *G.G. Tertyshniy's group*.

In 2014, we obtained preliminary data on materialization of DNA phantoms, obtained in the form of spectra of secondary *LGN-303* laser radiation, generated by laser reading of DNA segments of a certain length [4].

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[1]Readers may find out more about the *DNA Phantom Effect* and *DNA phantoms* in the author's monographs *"Wave Genome"'(1994)* and *"Linguistics Wave Genome. Theory and Practice" (2009)* by searching the Internet.

These experimental results have significant potential value. They confirm *A.G. Gurvich's* (1920's - 40's) fundamental idea about genes functioning as wave forms. This means that now we can work in the field of new genetics and, consequently, new biology, medicine, agriculture and computing, and have a new approach to the problem of the origin of life on Earth, and so on.

However, phantom DNA data as equivalents of ordinary material DNA requires independent verification. Therefore, we appeal to and invite molecular biologists, geneticists and other scientists to conduct independent experiments. Following is a full description for the method of detection and materialization of DNA phantoms in a PCR system.

II. Materials & Methods

Step 1. Preparation of the Initial DNA Product

The PCR product, 547bp in length, derived from a synthetic DNA sequence and cloned in a plasmid, was used as the initial DNA product.

The plus DNA strand:

5'CCTTACGTCAGTGGAGATGTCACATCAATCAACTTGCTTTGAAGACGTGGTTGGAA
CGTCTTCTTTTTCCACGATGCTCCTCGTGGGTGGGGGTCCATCTTTGGGACCACTGTC
GGCAGAGGCATCTTGAATGATAGCCTTTCCTTTATCGCAATGATGGCATTTGTAGGA
GCCACCTTCCTTTTCTACTGTCCTTGCGCGCTATATTTTGTTTTCTATCGCGTATTAAA
TGTATAATTGGGGGACTCTAATCATAAAAACCCATCTCATAAATAACGTCATGCATT
ACATGTTAATTATTACATGCTTAACGTAATTCAACAGAAATTATATGATAATCATCG
CAAGACCGGCAACAGGATTCAATCTTAAGAAACTTTATTGCACGCATTAATGGACTG
GATTGGGGCCAACTCCTACCGTACCTGGCATTACCCTTACGCTGAAGAGATGCTCGA
CTGGGCAGATGAACATGGCATCGTGGTGATTGATGAAACTGCTGCTGTCGGCTTTAA
CCTCTCTTTAGGCATTGGTTTGGAAGCGGGCA-3'

For DNA production through PCR amplification the following primer pair was used:

5'-CCTTACGTCAGTGGAGATGTCACATC-3';

5'-TGCCCGCTTCCAAACCAATGCCTAAAGA-3'.

Each PCR mixture with a final volume of 25µL contained: 67mM Tris-HCl pH 8.6 at 25°C; 2.5mM magnesium chloride; 16.6mM ammonium sulfate; dNTPs mix at a total concentration of

300μM; primer mix in 0.5μM each; 2.5 units of Taq DNA polymerase and plasmid DNA-template in amount of 25ng. PCR temperature regime included:

- initial denaturation at 94°C - 3 min.;
- 30 cycles of: 94°C - 30 seconds, 62°C - 30 seconds, 72°C - 40 sec;
- final synthesis 72°C for 5 minutes.

The PCR product was purified from primers and other components of the PCR reaction solution using a set of reagents for purification implementing SiO2 coated magnetic particles *("Sileks", http://www.sileks.com)* according to the manufacturer's recommendations. 10μL of magnetic particles with binding capacity for 10 mg DNA were used. The elution of DNA was performed in 50μL of elution buffer.

Step 2. Preparation: Modulated Broadband Electromagnetic Spectrum of DNA Product

25μL of the aqueous solution of the PCR product was applied to a clean microscope slide and used for probing by the helium-neon *LHN-303* laser beam for 3 and more minutes. The resulting secondary modulated broadband electromagnetic radiation was recorded by a transistor radio at a frequency of 700 kHz and then converted into Waveform audio file format. This is the WAVE audio file we propose to use for DNA information induction (without the use of in this version the *LHN-303* laser) into samples of purified water, considering that sound can carry torsion information [5], including information about DNA (a hypothesis).

In addition, and at the same time the audio recording was made, DNA information induction into purified distilled water was facilitated by way of a stationary tripod with test tubes containing purified distilled water without DNA impurities, RNA and nucleases being placed at a distance of 15-20 cm from the laser. The water was pre-frozen at -20°C and thawed at room temperature (defrost water).

Step 3. PCR Amplification Using Water Samples Treated by the Modulated Broadband Electromagnetic Spectrum of the Initial DNA from which Information Was Read by a *LGN-303* Laser

After laser exposure, water treated by the modulated broadband electromagnetic spectrum, was used for execution of standard PCR reactions, 25μL of this water was used without addition of DNA-template material. Tripod with the tubes was placed at a distance of 20-30 cm from the laser. Preparation of the PCR reactions was performed in a sterile environment treated with UV light that would prevent contamination of samples.

Each PCR mixture contained: 67mM Tris-HCl pH 8.6 at 25°C; 2.5mM magnesium chloride; 16.6mM ammonium sulfate; dNTPs mix at a total concentration of 300μM; primer mix in 0.5μM each; 2.5 units of Taq DNA polymerase. Several temperature regimes were used for PCR, different in duration of the elongation stage (synthesis) of DNA strands at 72°C.

Initial PCR temperature regime included:

- initial denaturation at 94°C - 3 min.;
- 40 cycles: 94°C - 30 seconds, 62°C - 30 seconds, 72°C - 40 sec;
- final synthesis at 72°C for 7 minutes.

Modified PCR temperature regime included:

- initial denaturation at 94°C - 3 min.;
- 40 cycles: 94°C - 30 seconds, 62°C - 30 seconds, 72°C - 2.7min;
- final synthesis at 72°C for 5-7 minutes.

All temperature regimes resulted in synthesis of PCR products of predetermined length, but to varying degrees. The largest number of test specimens with the desired product was obtained when using a seven-minute DNA strand elongation step in each of the 40 PCR cycles.

Step 4. Analysis of PCR Results

After the completion of the PCR reaction, the samples were mixed with gel loading buffer, containing a fluorescent *SYBR* Green I dye *("Sileks", http://www.sileks.com)* and were analyzed on a 1.5% agarose gel by standard methods of gel electrophoresis in a single TBE buffer. The

results were analyzed with a trans-illuminator at a wavelength of 365nm. Samples were considered positive where bands were located at the same distance from the start as the positive control strip, corresponding to a known DNA fragment size of 547bp

PCR positive control samples, samples of the initial DNA product from which the laser reading was made, and the experimental samples were subjected to sequencing. Sequencing revealed that the experimental samples are 99.2-100% identical to the DNA sequence of the initial product from which the information was read by the laser.

To illustrate our PCR experiments, the images of the PCR DNA phantoms are shown. A link for the download of the audio recording of DNA modulated broadband electromagnetic radiation in WAVE format on a carrier frequency of 700kGts is also provided[2].

Our experiments can be reproduced without the use of a laser and without the original DNA-template (as we do too), by using the audio recording. i.e. no need to synthesize the template. This prevents accidental drifts of initial DNA into the working tubes with water, the pipettes, etc. Thus, we avoid contamination. In this case, the working sound player to be set at a distance of 1 to 20 cm from the tripod with the test tubes. The exposure time may vary from 5 minutes or more. The identity of the resulting PCR DNA product and initial DNA can be confirmed by sequencing the obtained DNA. In this type verification, all that is required is the primers and knowledge of the initial DNA nucleotide sequence…

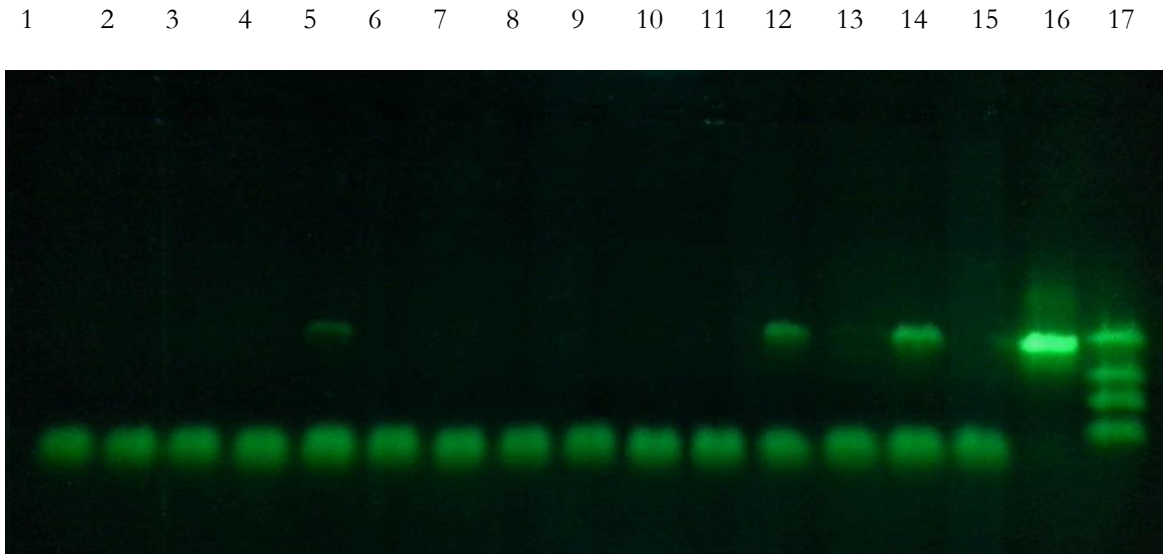
3. First Experiment on PCR Amplification of 12/01/2015 Audio Recording

(1) Control tudy before exposure to the sound *wave* recording as a derivative of DNA (547bp) MBER spectrum

Time of PCR cycle 12/21/2015: from 18:00-01:30 (PCR program with 7-minute elongation (synthesis) of DNA strands)

Electrophoresis from 12/24/2015

[2] A link to download the audio recording of DNA in wave format:
547bp Sound *http://files.mail.ru/A59F39CE29C04CD180132D8885580905*



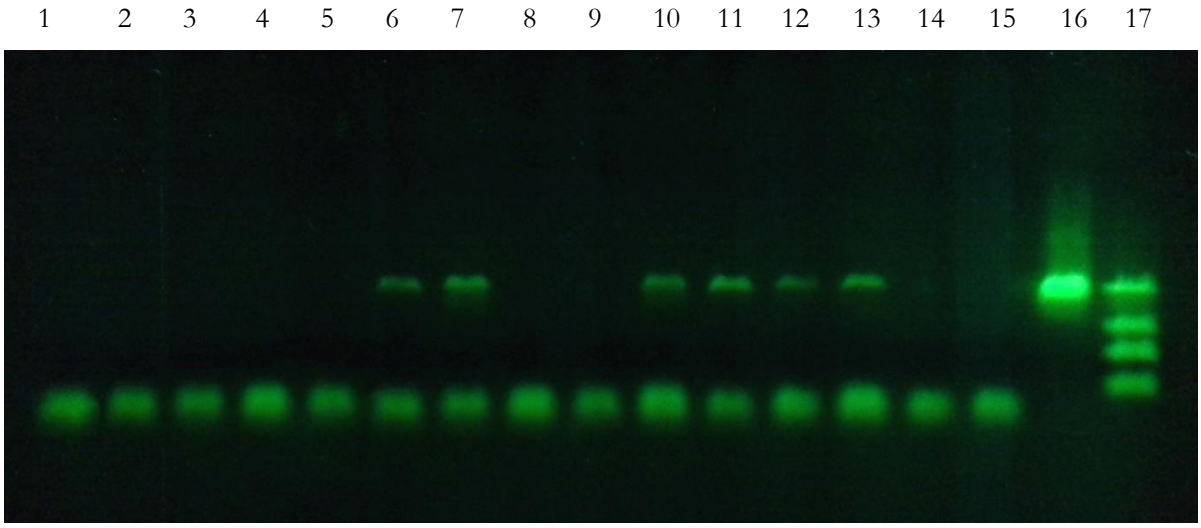
Tracks 1-15: The control (background before exposure to the sound) - purified water, commonly used in PCR reactions as the solvent of reaction components, pre-frozen and thawed. The origin of the water is the same as the water used at the time of laser recording, it was frozen in the laboratory.

Track 16: A positive PCR control (plasmid DNA-template 25ng, 30 cycles of PCR)

Track 17: The marker fragments length 139, 268, 450, 613bp

(2) The study of the impact of a sound recording of MBER spectra of DNA (547bp) (*WAVE* file) on purified water.

Electrophoresis from 12/25/2015



Tracks 1-15: Purified water, pre-frozen and thawed, treated with the sound of DNA MBER (*WAVE* file) for 30 minutes prior to the beginning of the PCR cycle.

A tube with purified water was set in a motionless and stationary tripod, while the soundwave was aimed directly at the bottom of the tube with a speaker. The water used was the same as used in the PCR during the study of background before exposure to the sound.

Track 16: A positive PCR control (plasmid DNA template 25ng, 30 cycles of PCR)

Track 17: The marker fragments lengths 139, 268, 450 and 613bp

(3) Observations

1) The new PCR program with a 7-minute DNA elongation (synthesis) step is effective for primary, and for subsequent PCR-analysis of the target DNA-product synthesis after laser exposure. Residual background of laser recording, made on 12/01/2015 remained, however, the amount of the target product was reduced to 3 of 15 tubes, compared with the PCR performed on the sound recording day (6 of 14 tubes). This is logical, given that twenty days passed from the date of recording, and taking into account the distance between the laser recording location and the laboratory, where PCR-analysis was performed (it is located on the opposite side of Moscow in Domodedovo).

2) Sound exposure doubled the amount of the desired product synthesis (6/15 tubes) compared to the background before sound (3/15 tubes). Perhaps, sound can be used as a restorator and repeater of modulated broadband electromagnetic radiation DNA-information recorded by laser in a system of PCR DNA synthesis. However, clearly it is too early to make conclusions just from one experiment, although the results are promising.

3) The genetic information sufficient for reproduction in the PCR system is recorded when the laser is working and there is primary DNA-reading radiation in optical range. Presumably the sound, being a result of the conversion of laser frequency into MBER with concurrent recording of the MBER radio frequency into an ‘audio’ WAVE file format is capable of producing the primary structure of the initial DNA. This makes it possible to materialize the initial DNA in a PCR system. So following this, it is possible to use such a DNA-radio-frequency-recording in the acoustic range for broadcasting onto new water samples

without the requirement of the direct primary impact of DNA modulated broadband electromagnetic radiation.

4) It is necessary to repeat the experiment with the new samples of water minimum of 5-6 times, to facilitate more confident discussion about the abilities of "MBER acoustic waves" as a secondary source of DNA information to produce an impact on water samples of various origins and subsequently use these water samples in PCR to synthesize the material DNA.

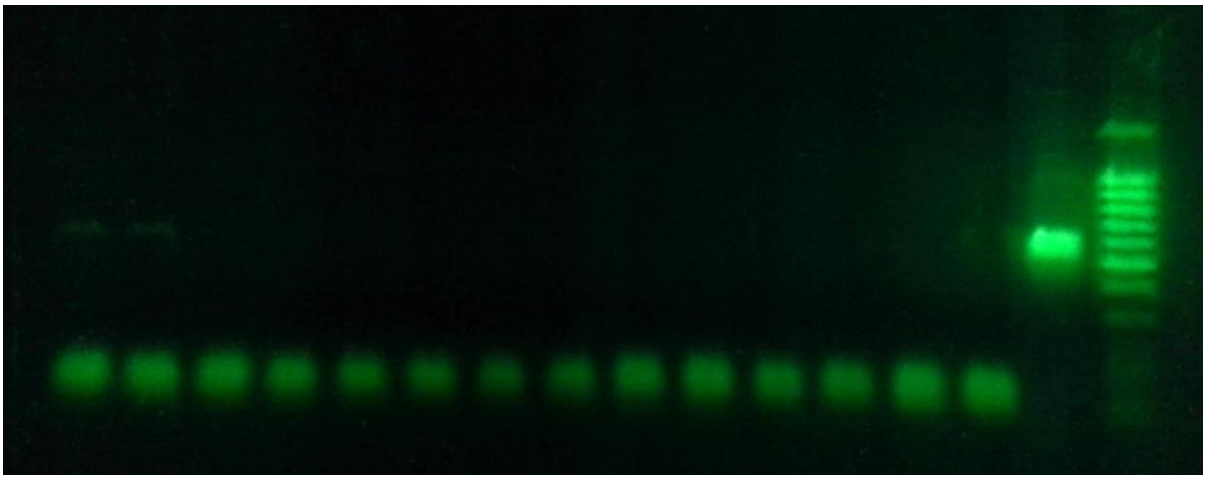
Second Experiment on PCR Amplification of 12/01/2015 Audio Recording

(1) Control study before exposure to the sound *WAVE* recording as a derivative of DNA (547bp) MBER spectrum

Time of PCR cycle 02/03/2016: from 13:10-20:40 (PCR program with 7-minute elongation (synthesis) of DNA strands)

Electrophoresis from 02/05/2016

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16



Tracks 1-14: The negative control (background before exposure to the sound) - purified water, commonly used in PCR reactions as the solvent of reaction components, pre-frozen and thawed.

The origin of the water is the same as the water used at the time of laser recording, it was frozen in the laboratory.

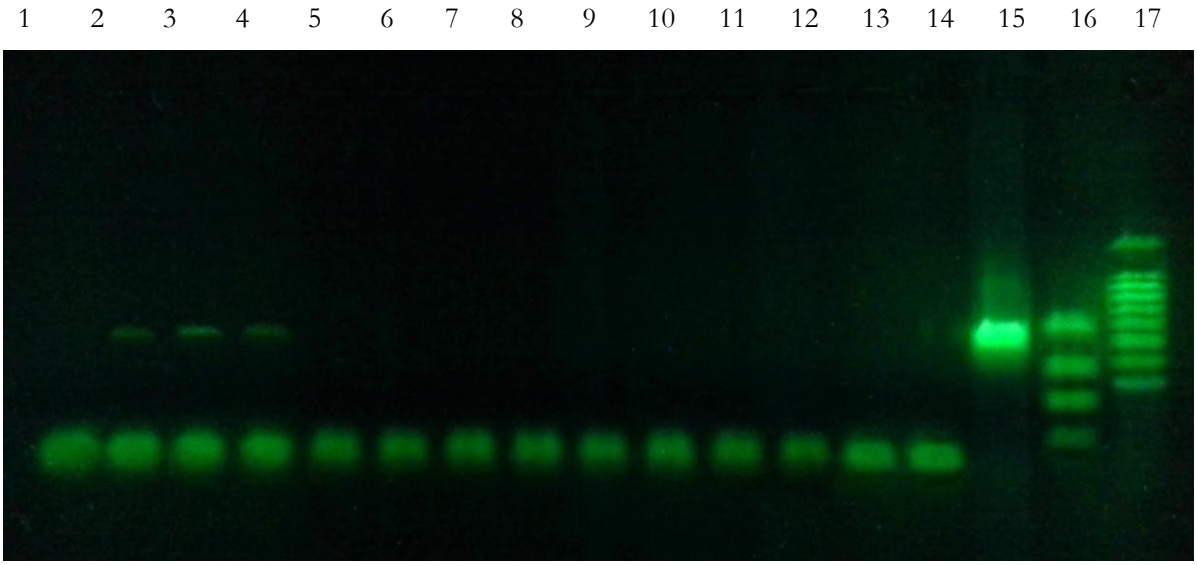
Track 15: A positive PCR control (plasmid DNA-matrix 25ng, 30 cycles of PCR)

Track 16: The marker fragments length 300, 400, 500, 600, 700, 800, 900, 1000, 1500bp

(2) A study of the impact of a sound recording (*WAVE* file) of the modulated broadband electromagnetic spectra of DNA (547bp) on purified water.

Time of PCR cycle 02/04/2016: from 14.20-21.50 (PCR program with 7-minute elongation (synthesis) of DNA strands)

Electrophoresis from 02/09/2015



Tracks 1-14: Purified water, pre-frozen and thawed, treated with the sound of DNA modulated broadband electromagnetic radiation for 30 minutes prior to the beginning of the PCR cycle.

A tube with purified water was sitting in a motionless tripod, while the soundwave was aimed directly at the bottom of the tube with a speaker. The water used was the same as used in the PCR during the study of background before exposure to the sound.

Track 15: A positive PCR control (plasmid DNA-template 25ng, 30 cycles of PCR)

Track 16: The marker fragments lengths 139, 268, 450, 613bp

Track 17: The marker fragments lengths 300, 400, 500, 600, 700, 800, 900, 1000, 1500bp

(3) Observations

1) At the time of the experiment, the residual background of laser recording, made on 01.12.2015 remained, however, it became very low - the amount of the target product was dramatically reduced (2 very low amount of products on tracks 1 and 2), compared with the PCR performed on the sound recording day. This is logical, given that 2 months passed from the date of recording. The background in the previous experiment with sound was stronger, though it was identified in only 2 of 14 tubes. Perhaps, the background of the recording fluctuates, becoming stronger and then attenuates. However, over time it most likely attenuates without a new feed in from the laser or sound recording.

2) In this experiment the sound exposure increased the amount of the desired product synthesis by a factor of 1.5 (3/14 tubes) compared to the background before sound (2/14 tubes). Wherein, the efficiency of information transmission by sound was much weaker than in the previous experiment with the sound (10/14 tubes). This proves that the sound can be used as a restorator and repeater of DNA-information recorded by laser in the PCR system of DNA synthesis, but with a different effectiveness.

3) The effectiveness of the impacting sound may be wave-like in nature, it may be in a peak, as in the previous experiment, or it may be in a trough, as in this experiment. It is also possible that sometimes, the sound does not produce any result at all. This indicates that it is necessary to design and perform a series of experiments, and based on the results, make conclusions about the quality of the acoustic information transmission. In order to understand how the intensity peaks and troughs of the effectiveness of the impacting sound alternate it is expedient to design and perform another series of experiments with a sound recording to this end.

4) The conditions of the impacting sound and PCR in all three conducted experiments were the same. However, the efficiency of the previous transmission was much greater. This suggests the possible influence of the current geomagnetic environment or the influence of other fields of physical nature throughout the sound exposure. It is also possible that the influence of the very point in space, where sound exposure took place had an effect. Perhaps, the tripod with water samples turned out to be in a better point in space in the previous experiment than in this experiment. How to determine the most efficient tripod

placement is not yet known? Luck only applies at the moment! A 'unlucky' possibility is that the experiment may be performed when the location of the experiment falls into a point in space where the transfer would be significantly weaker or completely absent. In any case, a series of experiments is required to confidently speak about the effectiveness of information transmission by means of sound.

References

[1] Gariaev et al, 1991, Holographic Associative Memory of Biological Systems, Proceedings SPIE - The International Society for Optical Engineering. Optical Memory and Neural Networks., v.1621, p.280-291. USA].
[2] http://www.plasmalabs.com/files/products/lgn_303_1.pdf
[3] Gariaev P.P., Kokaya A.A., Mukhina I.V., Leonova-Gariaeva E.A., Kokaya N.G. 2007. The effect of biostructures modulated electromagnetic radiation on alloxan diabetes in rats. Bulletin of Experimental Biology and Medicine, № 2, pp.155-158.
[4] Gariaev et al, DNA Decipher Journal / May 2014 Vol. 4 Issue 1/ pp.01-02 Materialization of DNA Fragment in Water through Modulated Electromagnetic Irradiation.
[5] http://www.efir.com.ua/rus/a.php?r=2&d=69

Article

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

Graham P. Smetham*

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.

> 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?[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:

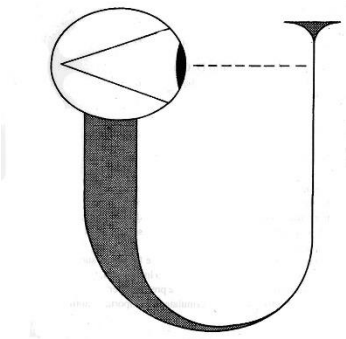

Figure 1

> 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]

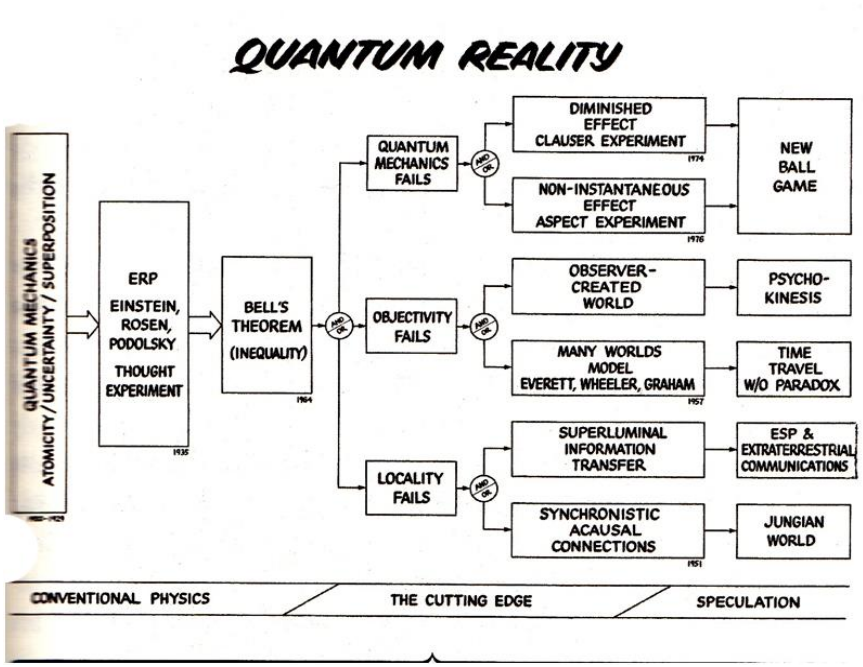

Figure 2. The FFG's 'Roadmap' of quantum possibilities for the paranormal.

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]

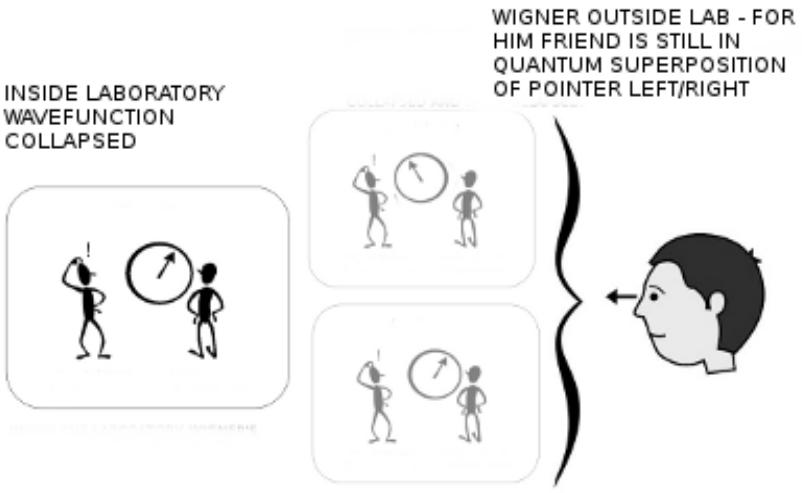

Figure 4. Wigner's friend

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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[1] Sarfatti, Jack 'Wheeler's World: It From Bit?' - Internet Science Education Project, San Francisco, CA.

[2] Gefter, Amanda (2014), 281

[3] Mensky (2010), 15

[4] *The Observer* (January 25th, 1931)

[5] https://www.kirkusreviews.com/book-reviews/amanda-gefter/trespassing-on-einsteins-lawn/

[6] http://www.math.columbia.edu/~woit/wordpress/?p=6532

[7] ibid

[8] Baggott, Jim (2014), 2
[9] http://plato.stanford.edu/entries/metaphysics/
[10] Shimony, A. [1984] "Contextual Hidden Variables Theories and Bell's Inequalities", Brit ish Journal for Philosophy of Science **35**: 25-45
[11] Baggott, Jim (2014), x
[12] Baggott, Jim (2014), 23
[13] Penrose, Roger (1999) p295
[14] Sarfatti , Jack 'Wheeler's World: It From Bit?' - Internet Science Education Project, San Francisco, CA..
[15] Barrow, John D., Davies, Paul C. W., Harper, Charles L. (eds) (2004) p201 – Anton Zeilinger: 'Why the quantum? "It" from bit"? A participatory universe? Three far-reaching challenges from John Archibald Wheeler and their relation to experiment.'
[16] d'Espagnat, Bernard, 'The Quantum Theory and Reality' *Scientific American*, Nov. 197
[17] Fred Hoyle, "The Universe: Past and Present Reflections." Engineering and Science, November, 1981. pp. 8–12
[18] Barrow John D., Davies, Paul C. W., Harper, Charles L. (eds) (2004) p577 – Wheeler, J A (1999) 'Information, physics, quantum: the search for links.' In *Feynman and Computation: Exploring the Limits of Computers*, ed A. J. G. Hey, p309 (314). Cambridge, MA: Perseus Books.
[19] Bostrom, Nick, *Anthropic Bias: Observation Selection Effects in Science and Philosophy*, 6
[20] Baggott, Jim (2014), 278
[21] Baggott, Jim (2014), 23
[22] Ibid.
[23] Carter, 1974, p. 291 - Large number coincidences and the anthropic principle in cosmology. In: Longair, M. (Ed.), Confrontation of Cosmological Theories with Observational Data. Reidel, Dordrecht, pp. 291-298.
[24] http://www.nybooks.com/articles/archives/1997/jan/09/billions-and-billions-of-demons/
[25] Gefter, Amanda (2014), 21
[26] Gefter, Amanda (2014), 209
[27] Gefter, Amanda (2014), 281
[28] Gefter, Amanda (2014), 44
[29] Barrow, John D., Davies, Paul C. W., Harper, Charles L. (eds) (2004) p201 – Anton Zeilinger: 'Why the quantum? "It" from bit"? A participatory universe? Three far-reaching challenges from John Archibald Wheeler and their relation to experiment.'
[30] Rosenblum, Bruce and Kuttner, Fred (2006), 201
[31] Gefter, Amanda (2014), 52
[32] Gefter, Amanda (2014), 101
[33] Wheeler, J, A, 'Law Without Law', 185 - http://www.forizslaszlo.com/tudomany/wheeler_law_without_law.pdf
[34] Ibid.
[35] Wheeler, J., A., 'Law Without Law', 194
[36] Wheeler, J., A., 'Law Without Law', 197
[37] Wheeler, J., A., 'Law Without Law', 199
[38] Ibid.

[39] Wheeler, J., A., 'Law Without Law', 196
[40] Rosenblum, Bruce and Kuttner, Fred (2006), 179
[41] Rosenblum, Bruce and Kuttner, Fred (2006), 139
[42] Kaiser, D (2011), 19-20
[43] Kaiser, D (2011), 23
[44] Kaiser, D (2011), 65
[45] Kaiser, D (2011), 80
[46] Wheeler, J., A., 'Law Without Law', 199
[47] Gefter, Amanda (2014), 101
[48] Wheeler, J., A., 'Law Without Law', 209
[49] Ibid.
[50] Gefter, Amanda (2014), 216
[51] Gefter, Amanda (2014), 101
[52] Barrow, John D., Davies, Paul C. W., Harper, Charles L. (eds.) (2004), 451
[53] http://discovermagazine.com/2002/jun/featuniverse
[54] Lingpa, Dudjom (2002), 95
[55] Dalai Lama, Herbert Benson, Robert Thurman, Howard Gardner, Daniel Goleman (1999), 21
[56] Mensky (2010), 12
[57] Herbert, Nick: 'Holistic Physics -or- Introduction to Quantum Tantra' – Internet document (www.southerncrossreview.org/16/herbert.essay.htm)
[58] Lingpa, Dudjom (2002), 95
[59] Wallace, B. Alan (2008) p192
[60] http://adsabs.harvard.edu/abs/2003APS..APR.b6003W
[61] Davies, Paul (2007), 275
[62] Bohm, David (2003), 180
[63] Longchenpa (2000,2010), 38
[64] Longchenpa (2000,2010), 37
[65] Longchenpa (2000,2010), 36
[66] Longchenpa (2000,2010), 39
[67] Wheeler, J., A., 'Law Without Law', 199
[68] Longchenpa (2000,2010), 36
[69] Guenther, Herbert V. (1984). 33
[70] Wangyal, Tenzin Rinpoche (2000) p181
[71] Thurman, Robert A. F. (1991), 71
[72] McClintock Sara, L. (2010), 31
73 Deutsch, D., (2006) - http://www.abc.net.au/radionational/programs/scienceshow/the-anthropic-universe/3302686#transcript
[74] Gyatrul Rinpoche (trans. Wallace, B. A.) (1998) 19
[75] De Chardin, Pierre Teilhard (2008), 258
[76] De Chardin, Pierre Teilhard (2008), 261
[77] De Chardin, Pierre Teilhard (2008), 30
[78] Zurek Wojciech H.(2002). ' Decoherence and the Transition from Quantum to Classical – *Revisited*' in *Los Alamos Science* Number 27 2002

[79] 'The Evolution of Reality' – www.fqxi.org/community/articles/display/122 (The Foundational Questions Institute) November 10, 2009.
[80] Gefter, Amanda (2014), 227
[81] Gefter, Amanda (2014), 224
[82] Gefter, Amanda (2014), 222
[83] Gefter, Amanda (2014), 225
[84] Campbell, John, 'Quantum Darwinism as a Darwinian Process' - http://arxiv.org/ftp/arxiv/papers/1001/1001.0745.pdf
[85] Wigner, Eugene - 'Remarks on the Mind-Body Question', http://philpapers.org/rec/EUGWRO
[86] Joos – quoted in - http://pilotscholars.up.edu/cgi/viewcontent.cgi?article=1011&context=phy_facpubs
[87] Joos et al., 2003 Ch.2 – quoted in Schlosshauer, M., (ed.) (2011)
[88] Gefter, Amanda (2014), 227
[89] Gefter, Amanda (2014)
[90] Gefter, Amanda (2014), 279-280
[91] Gefter, Amanda (2014), 275
[92] http://www.timeshighereducation.co.uk/features/does-consciousness-emerge-from-quantum-processes/92981.article
[93] http://www.sciencedaily.com/releases/2014/01/140116085105.htm
[94] Gefter, Amanda (2014), 28-29
[95] http://sciencenotes.wordpress.com/2009/03/15/amanda-gefter-how-to-spot-a-hidden-religious-agenda/
[96] Gefter, Amanda (2014), 392
[97] Stapp, H. – 'Free Will' - http://www-physics.lbl.gov/~stapp/FW.pdf
[98] Ibid.

(*Continued on Part II*)

Article

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

Graham P. Smetham*

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.

(*Continued from Part I*)

Mensky's account of quantum "free will" indicates that, because consciousness is a quantum field phenomenon associated with the "separation of alternatives," in some circumstances an individual mind can be in 'two minds'. This situation arises when the individual quantum state of consciousness is in a superposition of possibilities with equal, or close to equal, probability weightings. In this situation it is natural to suppose that an individuated consciousness could have a direct, but constrained, effect upon the alternative possibilities for action:

> If I wish to go to the right and actually go to the right, how (does) this happen? … In the framework of EEC [Extended Everett Concept], if the modification of probabilities is assumed, free will is explained quite naturally. There are two alternatives: in one (of) Everett's world(s) I go to the right, in the other I go to the left. Both alternatives have non-zero probabilities. My consciousness modifies the probabilities, increasing the probability of the first alternative. As a result, with a high probability I go to the right. This is my free will.[1]

Dismissing such evidence-based reasoned accounts of a quantum basis for free will by simply resorting to intellectual abuse will not do, "a book reviews editor at New Scientist" should know better.

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It is worth noting that Stapp, like Wheeler and others, endorses the Anthropic Principle. When, in an interview, Stapp was asked:

> John Archibald Wheeler and John Barrow and Frank Tipler felt that human beings were vital components within the cosmic order. Would you agree with the Anthropic Principle, that humans were brought into existence by the universe to observe it?

He replied:

> Not merely to passively observe it, but to contribute to the actual unfolding of the actual.

And later in this conversation Stapp says: "I do not believe the reality of which we are parts is an accident!"[2]

Some, perhaps, might want to call Goswami's view on the issue of free will as approaching a "New Age" perspective, but does that really make it invalid? According to Goswami:

> What materialists say fundamentally is that we do not have free will to choose; we are just products of Newtonian determinism and in addition Darwinian determinism. Evolution has given us brain circuits, and we are helpless before them. What the spiritual tradition says, that while we have this negative emotional brain circuit of competitiveness, greed, jealousy, anger, and what have you; we also, by listening to this power of downward causation and acting on them; we *can* create our reality in which we make positive emotions for ourselves and in our relationships; and we can create positive emotional brain circuits that will then mollify the negative emotional brain circuit; and so we can overcome our base desires.[3]

As with some other epithets employed by Gefter, the use of the term "New Age" is little more than a term of abuse, as usual Gefter does not use evidence or reason when dealing with non-materialist viewpoints. The crucial point here is that Goswami is talking about the way in which the brain can be rewired through the development of new habits and attitudes. This has been scientifically demonstrated in the work of scientists like Dr. Jeffrey Schwartz, an associate of Stapp, who treats obsessive compulsive disorder:

> Schwartz says mainstream science has yet to come to grips with ... what Schwartz calls "self-directed neuroplasticity," the ability to rewire your brain with your thoughts. This kind of power doesn't only rescue his patients, he says. It rescues free will.[4]

It seems, however, that Gefter is not worried about her negative habit of not bothering to investigate such evidence, she simply uses her position as a reviewer to reiterate mistaken materialist dogma.

The reality of free will, of course is crucial for any spiritual perspective, because the decision to embark on a spiritual "path to enlightenment" requires a free-willed decision and subsequent free-willed ethical and spiritual choices, often in the face of opposing desires. But it is important to understand that free will has limits. As Kyabje Kalu Rinpoche indicates:

> It is very important to understand clearly that although karma conditions our experiences and actions, we still enjoy a certain measure of freedom – what would be called free will in the West – which is always present in us in varying proportions.[5]

Karma-vipaka, cause and effect, is the Buddhist technical term for the mechanism by which actions (*karma)*, leave traces of potentiality which may be triggered to produce effects or perceptions of the same or similar kind at a future point in time (*vipaka*).

The quantum universe is a quantum-karmic universe because, as Stapp has pointed out, the quantum universe is "a universe populated by allowed possible physical actions and possible experienced feedbacks from such actions."[6] Even the appearance of the apparently material world is a karmic appearance because it has been created over vast time periods by the perceptions of uncountable numbers of sentient beings. Such a view is entirely consistent with the quantum perspectives we have been investigating. It follows, therefore, that the great majority of the conditions experienced by any human being are not under their control. This much is obvious and to be expected. Although the material world is 'created' by a quantum "epiontic" process and therefore is a product of the fundamental ground of quantum 'dream stuff', at the point of evolution wherein the containing world solidifies to the extent that it currently has, it functions pretty much like a classically material world. Normal sentient beings cannot walk through walls.

As we have seen, Gefter generally offers no reasoned refutations of opposing accounts, she uses prejudicial descriptions: "nonsense," "bullshit," "fairy dust," and so on in her attempted debunking of the significance of consciousness. She suggests that the only alternative to materialism is the supernatural, but the quantum realm, which Zurek tells us is comprised of "epiontic" (epistemology creates ontology) "dream stuff," is immaterial and yet not "supernatural." She claims that she is "yet to find a definition that characterises non-materialism by what it is, rather than by what it is not." This indicates that she has not looked very far, because Mensky, Stapp, Goswami and some others have produced detailed quantum-psycho-metaphysical accounts of exactly this. She also says that proponents of ID, and both Mensky and Stapp present quantum-psycho-metaphysical accounts consistent with ID, and Goswami is a committed proponent of ID against materialist Darwinism, "never define how non-material forces might work," but Mensky, Stapp and Goswami and others have presented very detailed accounts of how consciousness functions to unfold quantum potentialities, as has Hawking & Mlodinow. The latter have cogently argued the case for the Strong Anthropic Principle:

> The weak anthropic principle is not very controversial. But there is a stronger form that we will argue for here, although it is regarded with disdain among some physicists. The strong anthropic principle suggests that the fact that we exist imposes constraints not just on our *environment* but on the possible *form and content of the laws of nature* themselves. The idea arose because it is not only the peculiar characteristics of our solar system that seem oddly conducive to the development of human life but also the characteristics of our entire universe, and that is much more difficult to explain.[7]

And a crucial chapter of their book is entitled '*Choosing Our Universe'* in which they describe how the collective consciousness of all sentient beings chooses, over time and backwards in time, which of the alternative universes to inhabit.

Gefter indicates her materialist leanings, at the same time as inconsistently holding to a radical conclusion of an "observer-created reality," by her support for the professional "debunker" of quantum-spiritual perspectives Victor Stenger. In his excellent article concerning Victor Stenger's book *Quantum Gods: Creation, Chaos and the Search for Cosmic Consciousness,*

physicist and philosopher David Scharf writes in his abstract:

> ***Quantum spirituality***—the idea that some aspect of consciousness plays a fundamental role in the universe and that advanced physics should be interpreted as having to some extent already incorporated this principle—has had distinguished representation among both physicists and philosophers. It has generated an upsurge of grass-roots enthusiasm because of the widespread sense that science and spirituality, rather than being fundamentally separate or even opposed, are in fact deeply connected and mutually reinforcing. Victor Stenger's purpose in writing *Quantum Gods: Creation, Chaos, and the Search for Cosmic Consciousness* is to "debunk" this idea—but attention to the details shows that it is actually Stenger's arguments that need the debunking.
>
> ***Stenger***—a retired physicist who is leveraging his scientific background to try to discredit anything and everything that smacks of spirituality—doesn't respect his intellectual opponents enough to get their positions right; in some instances he appears to deliberately misrepresent their views; and, most important, his own reasoning is characterized by unremitting carelessness. Moreover, there is a method to his carelessness—it enables him to systematically avoid addressing the tough arguments of his opponents. Hence we find him frequently setting up a straw man by misrepresenting the debate as a simple matter of science and reason versus superstition. Once having defined this as the issue, all he needs to do is assume the attitude of an outraged scientist and heap on the ridicule. But if he had done his homework and taken the trouble to really understand the science and logic supporting quantum spirituality, he would have discovered that it is harder to dismiss than he had imagined. Indeed, the more carefully—and yes, critically—one considers the issues, the more one finds quantum spirituality to be eminently worthy of serious consideration, as a plausible and measured approach to the most long-standing and intractable questions at the basis of science.

To anyone familiar with the physics and philosophical issues involved it is clear that Stenger's work is a morass of misdirection, misinformation, misrepresentation and misleading claims. Scharf, however, is an adherent of Transcendental Meditation so is an interested party and might be thought to have an 'agenda', and for this reason he quickly points us to the philosopher Gordon McCabe's views on Stenger's work, precisely because McCabe is ***not*** an adherent, but rather an opponent, of the 'quantum consciousness' or 'quantum spirituality-mysticism' perspective. McCabe writes:

> Whilst Stenger is correct to debunk this type of quantum mysticism, there seems little evidence that he has a knowledge of either philosophy or the philosophy of science, and this complacency leads him into error. … [Stenger] ... demonstrates an ignorance of the relevant literature in the philosophy of physics … The principles of scholarship dictate that a professional researcher should be acquainted with all of the relevant literature before putting pen to paper, yet Stenger, and for that matter, most of the physicists who write about philosophical subjects, do so with a blithe disregard for this principle. Curious.[8]

McCabe, however, is himself a materialist who believes that, although "a formal theory of the mind doesn't exist as yet," he can, in spite of the lack of evidence or theory, be sure that:

> … the mind *supervenes* upon the brain, and not vice-versa. Arguably, it is precisely this asymmetry which suggests that the mind reduces to, or emerges from the brain…[9]

One has to wonder about McCabe's philosophical abilities, the employment of a pseudo-philosophical term – '*supervenes*' – does not cover over the fact that material 'stuff' defined to have no glimmer or trace of potentiality for consciousness, which is the 'stuff' of mainstream materialism, cannot, by definition and logical coherence, give rise to consciousness. So it is clear that McCabe, who is supposed to be a professional philosopher, is also a stranger to logical coherence.

Scharf points out that Stenger's books:

> … generally get enthusiastic reviews by the "new atheist" crowd, including such like-minded writers as Richard Dawkins, Christopher Hitchins, Sam Harris, and Michael Shermer. Shermer's foreword establishes the polemical tone for the book with its provocative title, "Quantum Flapdoodle and Other Flummery." This foreword refers to "quantum flapdoodle" or "flapdoodlists" four times in four pages, with "New Age nuttiness," "airy fairy deity" and "pseudoscience" thrown in, to make sure we get the point.[10]

So we are again clearly in the midst of the materialist penchant for the use of insults rather than reason.

Scharf's article is available online[11] so there is no reason to outline it in detail, a couple of points will suffice to get a taste. Stenger claims that Goswami's Hindu Vedanta viewpoint is solipsism, which is the view that only one individual mind exists. However, Vedanta is not solipsism because it asserts the existence of a layer of nondual universal consciousness which divides itself into the multitude of individual consciousnesses. So Stenger clearly misrepresents Goswami. Scharf also points out Stenger's astonishing lack of philosophical understanding, Scharf writes:

> In Western thought the primacy of consciousness has had many distinguished representatives, including Plato, Leibniz, Immanuel Kant, Hume, George Berkeley, Hegel, Schopenhauer and Edmund Husserl. In one of the simplest presentations, called idealism, George Berkeley proposed that all material objects exist and interact in consciousness; ultimately they are all ideas in the mind of God. In response, in what must be one of the most famous non-sequiturs in Western philosophy, Samuel Johnson kicked a stone and proclaimed, "I refute [Berkeley] thus!" But, from Berkeley's point of view, Samuel Johnson, the stone and the laws of nature governing their interaction are all embedded in consciousness; so Johnson simply failed to understand the implications of idealism. What's worrisome in the present context is that Stenger also fails to understand the implications, or to consider them in a serious or thoughtful manner:
>
> > I will not take seriously the idealist view that there is only spirit. Samuel Johnson quickly refuted that by kicking a rock. The rock kicked back. (p.64)[12]

The last passage is a quote from Stenger. The important point is, of course, that the kicking of the stone proves absolutely nothing, for Berkeley it is all, stone, Dr. Johnson and his foot, a matter of consciousness, so to speak. This complete lack of philosophical understanding indicates that Stenger is either pretending to be philosophically incompetent, or really is

philosophically incompetent.

Stenger also disregards or misrepresents the views of other physicists, as well as philosophers of mind, and presents his own simplistic views as incontrovertible. Thus he asserts that all phenomena can be reduced to the movement of material particles. This view, of course, does not fit with quantum field theory. Scharf observes that:

> But consciousness is the phenomenon most resistant to a reductive analysis. Today, most philosophers of mind (even those sympathetic to the materialist perspective) have abandoned a fully reductive approach and believe that, even supposing neuroscience will someday provide an exhaustive account of all neurophysiological processes in the brain, consciousness will remain unaccounted for. In other words, consciousness—what it is like to have subjective experience—seems to be irreducible to neurophysiology. Most contemporary discussions in the philosophy of mind acknowledge "the hard problem of consciousness" (Chalmers, 1996), according to which the fact of consciousness will remain unexplained even if—and this is a big *if*—all the functional capacities of the mind could be accounted for in terms of neurophysiological processes. Even Jaegwon Kim, regarded as a leading advocate of a hardcore materialist perspective of mind, has backed away from a fully reductionist approach.[13]

And Stenger's attitude to the phenomenon of quantum entanglement, which Schrödinger considered the "central mystery of quantum physics," is breathtakingly ridiculous. The EPR, or Einstein-Podolsky-Rosen experiment demonstrates quantum entanglement and non-locality, which is the fact of instantaneous quantum interconnection between non-local, or extremely separated, quantum 'particles'. Stenger writes that:

> The EPR experiment results are widely discussed in the literature of quantum spiritualism. Physicists, on the other hand, are underwhelmed. Quantum mechanics has passed yet another empirical test. Ho hum.[14]

This is simply not true. As Scharf points out:

> ...the distinguished physicist David Mermin refers to this as the "sublime mystery of quantum mechanics."[15]

And physicist Brian Greene has remarked that:

> Numerous assaults on our conception of reality are emerging from modern physics … But of those that have been experimentally verified, I find none more mind-boggling than the recent realisation that our universe is not local.[16]

And in a recent book the significant physicist Leonard Susskind writes that:

> Einstein pointed to something so deep, so counterintuitive, so troubling, and yet so exciting, that at the beginning of the twenty-first century to fascinate theoretical physicists. … The phenomenon of entanglement is the essential fact of quantum mechanics, the fact that makes it so different from classical physics. It brings into question our entire understanding about what is *real* in the physical world.[17]

So Stenger's claim that physicists are "underwhelmed" is clearly a falsehood.

Scharf indicates that Gefter is incapable of seeing into Stenger's methodology because of her own materialist worldview. According to Scharf, Stenger made an incorrect claim that the Maharishi Mahesh Yogi claimed that his transcendental field was the same as the SU(5) grand unification, this, apparently, was not the case. Scharf writes:

> … since SU(5) is a discredited theory, a reader who doesn't know any better might get the impression that Maharishi's ideas are tied to discredited science. And, in fact, this is just the impression he gave the hapless *New Scientist* editor Amanda Gefter. Thus she confidently declared in her enthusiastic—"with Stenger in charge … we are on sure ground"— review of *Quantum Gods*:
>
> > Maharishi claimed that transcendental meditation gave practitioners access to the "quantum field of cosmic consciousness." This, he said, was identical to SU(5), the model physicists were then investigating in their search for a grand unified theory. Sadly for cosmic consciousness, real experiments later falsified SU(5).
>
> Nice zinger, Amanda, but the falsification of SU(5) has nothing to do with Maharishi. With Stenger in charge, the spread of misinformation is hard to keep up with![18]

In his conclusion Scharf writes that:

> A fundamental and recurring shortcoming of *Quantum Gods* has to do with the fact that Stenger really doesn't think the point-of-view of his intellectual adversaries is worth taking the trouble to understand and get right. In order to properly evaluate *Quantum Gods* it is important to realize that Stenger is not trying to contribute to the debate—he is trying to shut off debate. He is setting a belligerent tenor, intended to put anyone on the defensive who dares to suggest that quantum spirituality might deserve thoughtful consideration. Indeed, at least two science magazine editors—Michael Shermer and Amanda Gefter—have readily adopted Stenger's tone and, insofar as they can influence the editorial policies of their journals, they will see to it that no articles taking these issues seriously see the light of day. In the history of science this is the way a prevailing paradigm can obstruct scientific progress, hanging on long after it has served any useful intellectual purpose.[19]

Indeed!

In her article '*How to spot a hidden religious agenda'* Gefter writes of James Le Fanu's book *Why Us? How Science Rediscovered the Mystery of Ourselves*:

> Some general sentiments are also red flags. Authors with religious motives make shameless appeals to common sense, from the staid - "There is nothing we can be more certain of than the reality of our sense of self" (James Le Fanu in *Why Us?*) ... It is crucial to the public's intellectual health to know when science really is science. Those with a religious agenda will continue to disguise their true views in their effort to win supporters, so please read between the lines.[20]

How and why Gefter concludes that Le Fanu's remark is either "shameless" or "religious" is a mystery. Le Fanu's claim looks more like a variation on Descartes' certainty of his own existence. Gefter, however, wants to paint Le Fanu as a dangerous and "shameless" fellow with nefarious "religious motives" because of his arguments against materialism and crude materialist Darwinism, and these are perspectives which she is, inconsistently, a champion of. However, as

we shall see, Le Fanu's arguments are worth taking seriously and should not be dismissed out of hand on the basis of Gefter's shameless and crude materialist motives.

Le Fanu begins his exposition by indicating that we live in an age of scientific materialism, or scientism, which is simply the dogmatic assertion that all scientific explanations must be in terms of material causes. Le Fanu focuses on two paradigm examples of scientific materialism exemplified by the so-called Decade of the Brain and the Human Genome Project. Le Fanu writes regarding the supposition that scientific materialism has no limits to its explanatory power:

> The genome project and the Decade of the Brain represent the logical conclusion of that supposition. First, the genome projects were predicated on the assumption that unravelling the Double Helix would reveal 'the secret of life', *as if* a string of chemicals could possibly account for the vast sweep of qualities of the wonders of the living world; and, second, the assumption of the Decade of the Brain that … brain scanning techniques would explain the mind, as if there could be any equivalence between the electrical firing of neurons and the limitless richness of the internal landscape of human memory, thought and action.[21]

Here Le Fanu highlights the simple logical impossibility of the supposed non-qualitative independent 'stuff' of 'matter' magically turning into an entirely alien sphere of the qualitative realm of awareness and experience. As long as matter is defined to be 'stuff' that is entirely devoid of a qualitative dimension of awareness, as it is and always has been, such a transformation is a logical impossibility, although, as we have seen, materialist apologists regularly ignore logical coherence and simply assume that 'matter' can achieve the impossible and materialize consciousness!

One of the central issues that Le Fanu addresses is that of the issue of the origin of *order,* and this means that he is asking about the origin of *design*. A central issue, then, is that of intelligent design (ID). One thing that needs to be pointed out immediately is that in the materialist camp the ID perspective is generally *identified* with Creationism, which is the assertion that some kind of independent 'God' in some way created the universe. However, it is perfectly possible to have a non-theistic ID proposal. Mensky's quantum-psycho-metaphysical account, which asserts the presence of a Life-Principle involving consciousness unfolding quantum potentialities, is an example. And, as we have seen, the Hawking-Mlodinow (H&M) quantum psycho-metaphysical account presented in their book *The Grand Design,* which in essence is similar to Mensky's account, is also a version of a non-theistic intelligent design quantum psycho-metaphysics.

H&M tell us that the universe starts off "in every possible way," this means that all possible histories of the future development and evolution of the universe, including the organisms and the relationships between organisms and other organisms, and relationships between organisms and their environment, 'exist' as quantum potentialities at the dawn of time. In the H&M quantum psycho-metaphysical model the history for our universe is chosen over time and backwards in time by the collective consciousness of all sentient beings inhabiting the universe through time. This means that, if anything like the H&M quantum-metaphysical model, or Menky's or Stapp's, is correct then the absurd claims of materialist Darwinists, such as hippo-like creatures taking to the sea and then transforming, millimetre by painful millimetre, into whales, are clearly and irrefutably seen to be false. It must rather be the case that the patterns for

organic life are potential within underlying quantum fields.

Materialists such as Gefter talk about some kind of creation from 'nothing' or 'nothingness', but such talk is conceptually confused and does not conform to the evidence that the eternal backdrop to the process of reality is provided by quantum fields. As the physicist Lisa Randall tells us:

> Quantum field theory, the tool with which we study particles, is based upon eternal, omnipresent objects that can create and destroy those particles. These objects are the "fields" of quantum field theory. … quantum fields are objects that permeate spacetime … they create or absorb elementary particles … particles can be produced or destroyed anywhere at any time.[22]

The universe did not start off from 'nothing', it began as a quantum fluctuation in an eternally present quantum field of potentiality. As Vlatko Vedral in his book *Decoding Reality* asserts:

> The universe starts empty but potentially with a huge amount of information. The first key event is the first act of symmetry breaking…[23]

In this context it is worth briefly examining a controversy which was prompted by the claim by the physicist Lawrence Krauss, in his book *A Universe From Nothing: Why There Is Something Rather Than Nothing*, that the entire universe could have emerged from "nothing." By "nothing" Krauss is referring to quantum field theory. The physicist and philosopher of science David Albert rightly took Krauss to task for claiming that quantum fields are "nothing." Albert wrote in a New York Times Review of the book:

> The particular, eternally persisting, elementary physical stuff of the world, according to the standard presentations of relativistic quantum field theories, consists (unsurprisingly) of relativistic quantum fields. And the fundamental laws of this theory take the form of rules concerning which arrangements of those fields are physically possible and which aren't, and rules connecting the arrangements of those fields at later times to their arrangements at earlier times, and so on — and they have nothing whatsoever to say on the subject of where those fields came from, or of why the world should have consisted of the particular kinds of fields it does, or of why it should have consisted of fields at all, or of why there should have been a world in the first place. Period. Case closed. End of story. … Relativistic-quantum-field-theoretical vacuum states — no less than giraffes or refrigerators or solar systems — are particular arrangements of *elementary physical stuff*. The true relativistic-quantum-field-theoretical equivalent to there not being any physical stuff at all isn't this or that particular arrangement of the fields — what it is (obviously, and ineluctably, and on the contrary) is the simple *absence* of the fields! [24]

'Eternal' quantum fields are quite clearly not 'nothings' but are fields of potentiality for universes containing sentient beings to come into being. Such fields, which are immaterial fields of potentiality that are 'empty' of substantiality have a remarkable resonance with the Buddhist concept of emptiness – *shunyata*.

In his book *Life Without Genes* the biologist Adrian Woolfson endorses this viewpoint:

> In the beginning there was mathematical possibility. At the very inception of the universe fifteen billion years ago, a deep infinite-dimensional sea emerged from nothingness. Its colourless waters, green and turquoise blue, glistened in the non-

> existent light of the non-existent sun … A strange sea though, this information sea. Strange because it was devoid of location …[25]

Ignoring the apparently endemic misguided notion that a vast realm of the process of reality and experience can magically arise from complete "nothingness," Woolfson's suggestion is that there is a quantum field of potentiality at the inception of the universe. This quantum field of potentiality contains: "…all possible histories … through which the universe could have evolved to its present state…"[26] In the beginning, of course, the quantum potentiality field of the universe contains all future evolutionary possibilities: "The information sea is thus a quantum mechanical sea, composed from infinite repertoires of entangled quantum descriptions."[27] From out of the vast entangled web of infinite possibilities for manifestation only certain potentialities will actually make it into reality, so to speak: "An information space of this sort would furnish a complete description of all potentially living and unrealizable creatures…[28] It therefore follows that there is a "design" woven into the potentialities for evolution; it is a vast complex design of all possible manifestations for organic life written into the quantum field of potentiality. This design, however, is not evidence of a 'Creator' because it is a design written into the potentialities of the quantum ground of reality. Woolfson's suggestion, of course, matches that proposed by Hawking and Mlodinow, and is consistent with Mensky's perspective.

The quantum psycho-metaphysical account, shared by Woolfson, H&M, Mensky, Stapp and others, indicates a new worldview, based on the latest findings of quantum physics, a worldview antithetical to the current ridiculous and dogmatic materialist Darwinian account of evolution. It should not come as a surprise, then, that a great many modern discoveries within the biological sciences, such as the evolutionary-development ('Evo-Devo') revolution, epigenetics and the discovery of non-random directed mutation,[29] are now clearly indicating the completely ridiculous nature of the claims of crude materialist Darwinism. It is absolutely incomprehensible that anyone could hold to what, given what we now know about the deep levels of quantum reality, not to mention the discoveries of evolutionary-developmental biology, that any serious scientist or philosopher would hold such a childishly simplistic world-view, and yet it still remains a central dogma in Western intellectual and academic life. This desperate adherence to a completely nonsensical worldview derives from the equally desperate clinging to a materialist metaphysics which is motivated in large part by a determination not to allow "a Divine Foot in the door" as Richard Lewontin puts it.

The quantum psycho-metaphysical requirement that the structure of the organic world exists in some form as structures of potentiality within deep quantum levels of reality is consistent with viewpoints concerning the origin of organic forms that prevailed prior to the Darwinian highjack of academic biology. As Le Fanu points out, at the beginning of the nineteenth century the "presiding genius of natural history" was Baron Georges Cuvier who:

> ...proposed two laws of … 'formative impulse', the laws of *similarity* (homology) and *correlation*. First homology, Cuvier inferred from a detailed study of the ten thousand specimens in his collection that diverse forms of animals concealed an underlying 'unity of type', the paddle of a porpoise, the horse's legs and the human forearm were all constructed from the same bones, adapted to their 'way of life' – whether flying or swimming, running or grasping. His second law, of 'correlation', asserted that the various parts of every animal … all correlated together, being so fashioned as to fulfil its way of life.[30]

Cuvier's notion of a natural 'formative impulse' can be thought of as a forerunner of Mensky's 'Life-Principle.' Cuvier believed that all organisms must be considered to be functionally integrated wholes, wherein all parts were interdependent. Therefore it was not possible for one part of the structure to change over time whilst the rest remained static, changes to one part of an organism's structure over time would entail repercussions to its integrated system. If an organism's structure were to somehow transform piecemeal and slowly, as his contemporaries Lamarck and Geoffroy Saint-Hilaire suggested, it wouldn't survive in its environment. Cuvier therefore opposed the notion of species changing into new species and suggested a deep level of typological organic forms underlying the species. Of course, Cuvier could not have any idea that the structural similarities and correlations of organic forms are the result of the activation of a sequence of layered structural levels of quantum morphogenetic templates.

Darwin, of course, later asserted that evolution was the result of random variation and natural selection acting gradually over very long time scales. The American philosopher and cognitive scientist Jerry Fodor gives the following summary of the NS (natural selection) 'adaptationist' perspective which is the modern derivative of Darwin's proposal:

> Darwin's theory of evolution has two parts. One is its familiar historical account of our phylogeny; the other is the theory of natural selection, which purports to characterise the mechanism not just of the formation of species, but of all evolutionary changes in the innate properties of organisms. According to selection theory, a creature's 'phenotype' – the inventory of its heritable traits … is an adaptation to the demands of its ecological situation. Adaptation is a name for the process by which environmental variables select among the creatures in a population the ones whose heritable properties are most fit for survival and reproduction. So environmental selection for fitness is (perhaps plus or minus a bit) the process par excellence that prunes the evolutionary tree.[31]

In his book *What Darwin Got Wrong* Fodor (with Massimo Piattelli-Palmarini) refers to these two components as "the genealogy of the species" (GS), which is the recognition of the historical development of species; and "natural selection" (NS) which is the claimed mechanism of random mutation and environmental selection that materialist Darwinians assert to be fundamental. He gives the diagram shown in figure 5 with the caption:

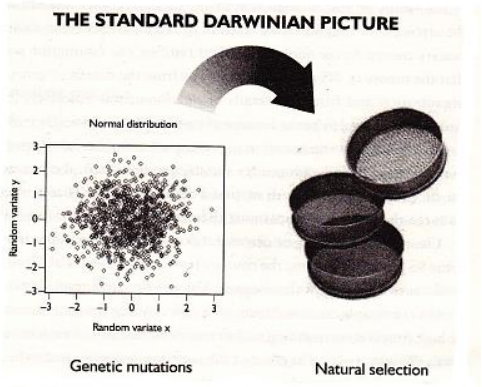


Figure 5

> A schematic representation of the standard neo-Darwinian model of evolution by natural selection. The square on the left represents random genetic mutations, the arrow the expression of those mutations as manifest traits (phenotypes), and the filters the action of natural selection.[32]

Thus we see that 'natural selection' is supposed to function as a kind of environmental 'sieve' supposedly weeding out poor random mutations and allowing 'advantageous' adaptations to survive.

Robert Owen, a British supporter of the Curvier 'typological' perspective (the notion that organic 'types' are potential within a deeper layer of the process of reality), made the obvious criticism that it is very unlikely that one tiny genetic change would produce an advantageous new animal trait which conferred any advantage, it would take a vast number of them. This in itself should indicate the unlikely nature of Darwin's proposal. To take one ridiculous example of the supposed transition of a hippo-like animal into a whale; the nose of a hippo is hardly likely to become the blowhole of a whale due to one genetic mutation. In fact it is hard to imagine the possibility of any sequence of random genetic changes causing such a movement, at the same time as changing blood chemistry in order to allow a hippo-whale to dive to bone crushing depths of the sea. The whole notion is childishly absurd, as absurd as the now discredited notion that giraffes 'evolved' long necks because of stretching for acacia leaves.

The giraffe is an excellent example of the absurdity of the neo- or ultra- Darwinian worldview. The biologists Davis and Kenyon summarize some of the crucial points of a giraffe's remarkable physiology as follows:

> When standing upright, its blood pressure must be extremely high to force blood up its long neck; this in turn requires a very strong heart. But when the giraffe lowers its head to eat or drink, the blood rushes down and could produce such high pressure in the head that the blood vessels would burst. To counter this effect, the giraffe is equipped with a coordinated system of blood pressure controls. Pressure sensors along the neck's arteries monitor the blood pressure and activate contraction of the artery walls (along with other mechanisms) to counter the increase in pressure.[33]

Such intricate details were not known about in Darwin's day, the giraffe's physiology is extraordinarily fine-tuned in order that its head does not explode. Furthermore, there is no fossil evidence of its supposed evolution. The researcher Wolf-Ekkehard Lönnig, an expert on mutation genetics, a researcher in the field for over thirty years, has published a long carefully researched paper entitled '*The Evolution of the Long-Necked Giraffe – What Do We Really Know*' which concludes:

> If, however, the general lineages for almost all modern groups of vertebrates are as uncertain as in the case of giraffes, then we are dealing with only suggestive evolutionary interpretations in most other groups as well, yet without solid scientific proof.[34]

Baron Georges Cuvier

Robert Owen

In this paper he demonstrates the lack of fossil record and the impossibility of the complexly coordinated giraffe physiology being the result of gradual random changes. The coordination required in order to keep its head intact is far too intricate and 'irreducibly complex'. As Goswami says of the Darwinian account of the evolution of the giraffe, it is "too simplistic" (and that is putting it mildly):

> Longer neck vertebrae require many concurrent modifications. As the vertebrae become longer, the head must become smaller, because it becomes more difficult to support the head atop a long neck. The circulatory system has to produce higher blood pressure, valves must originate to prevent overpressure when the giraffe stoops to get a drink. The lung size has to increase so the animal can breathe through a much longer pipe. Additionally, many muscles, tendons, and bones have to change harmoniously; in fact, the entire skeletal frame has to be restructured to accommodate lengthened forelegs. It goes on and on. Clearly, much more than neck-lengthening gene mutation have to be involved – and with what amazing coordination! All this through cumulative step-by-step chance and necessity? It's simply not credible.[35]

To be quite honest when one examines all the evidence available today, materialist Darwinism (Neo-Darwinism or 'Ultra-Darwinism' as Simon Conway Morris calls it) is just stupid. There is no other word to use, for example, for the notion that a random mutation in a giraffe might extend the neck a little and randomly put in a pressure valve in anticipation of future random extensions, random mutations creating further pressure valves and eventually a more powerful heart and so on.

Steven Jay Gould famously called many Darwinian accounts "just-so stories." And yet materialist Darwinism is consistently promoted and defended with pugilistic fervour. Why? According to Le Fanu:

> The imperative to believe in the principle of evolution by natural law more than outweighed its obvious deficiencies: 'We accept [the theory of natural selection] not

> because we are able to demonstrate the process in detail, nor because we can with more or less ease imagine it', observed … the zoologist August Weismann, 'but simply because we *must,* because it is the only possible explanation that we can conceive'.[36]

This can be compared with a more recent statement by Lewontin that scientists have "have a prior commitment, a commitment to materialism."[37]

It is clearly apparent that amongst committed materialists it is accepted that 'science' must ignore any evidence which threatens their worldview precisely because they believe any other worldview must be 'supernatural'. But where is the science in such a view? A non-theistic quantum psycho-metaphysical intelligent design perspective, such as Mensky's for example, considers that the internal intelligence is entirely ***natural***.

As Le Fanu points out, the end point of this dogmatic adherence to a materialist worldview is the complete devaluation of the human realm of awareness, culture and qualitative experience in general. In a materialist Darwinian metaphysical worldview all qualitative aspects of existence become devalued because they are asserted to be ultimately and ontologically unreal. This becomes clear in some of the more extreme and silly claims of Dawkins, wherein he asserts his view that 'genes' are the only entities which have ultimate ontological validity:

> Now they [the genes] swarm in huge colonies. Safe inside gigantic lumbering robots [ourselves] sealed off from the outside world, communicating with it by tortuous indirect routes, manipulating it by remote control. They are in you and in me; they created us, body and mind; and their preservation is the ultimate rationale for our existence. They have come a long way, those replicators. Now they go by the name of genes, and we are their survival machines.[38]

As Le Fanu rightly points out:

> Most people might reasonably suppose this to be some sort of playful joke, perhaps an *ad absurdum* argument to expose the folly of an exclusively materialistic view of man. But it is not, and nor is it just Professor Dawkins – for this represents mainstream conventional evolutionary thinking, taught in schools and universities, expounded in textbooks and popular science, the focus of numerous academic papers every year.[39]

And the assumed ontological primacy of the gene was extended, within the field of sociobiology, to aspects of qualitative experience and behaviour such as altruism, love, consciousness and awareness and the religious impulse. The problem with such sociobiological notions is the fact that there is absolutely no evidence for any of them, it's all speculative academic posturing and implausible story-telling in pursuit of ego-enhancement and academic advancement.

But it is not just sociobiology that lacks evidence and plausibility. The entire materialist account of Darwinian evolution also lacks evidence and plausibility. The claimed fossil evidence is sketchy and concocted. Fossils which appear as if they can be in a sequence are appealed to as being a direct material level evolutionary sequence. However, if the ultimate source of organic structure resides at quantum levels then such resemblances are likely to be due to deeper quantum processes rather than material level direct random mutation and natural selection. As Lönnig points out in his paper on the Giraffe "already in Darwin's day Galton warned of such

erroneous constructions when he pointed out, for example, that fire-arms and chinaware can be ordered in a continuous series, and that it is necessary to take care in dealing with the same phenomenon in biology." Figure 6 illustrates:

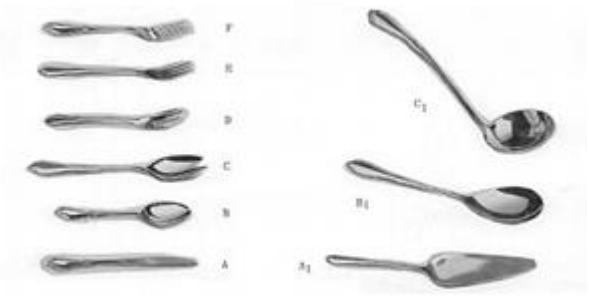


Figure 6

> Derivation of the fork from the knife, through the spoon, and the special evolution of the soup ladle from the cake slicer. One may note especially the stepwise perfection in the fork development from the 2-pronged meat fork (D) through the 3-pronged kitchen fork (E) to the 4-pronged dining fork (F). The salad server is the intermediate link between spoon (B) and meat fork (D) (mosaic evolution!). One only needs to assume that everything is derived from primitive knives.[40]

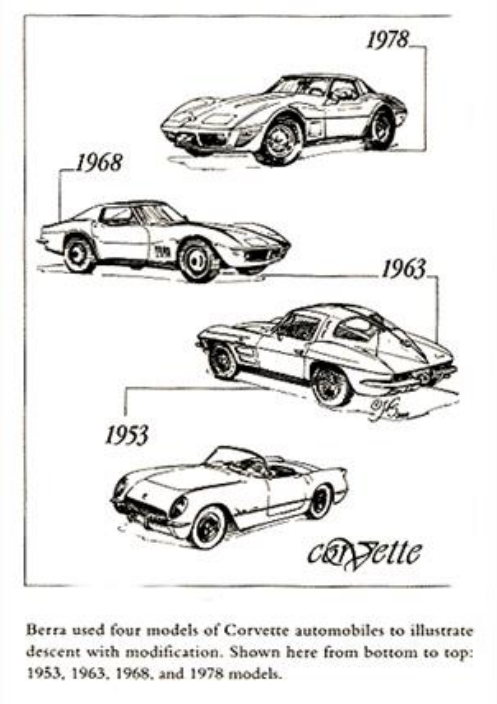
Thinking that there is an evolutionary development sequence underlying tableware of course would only be possible in the absence of significant information, i.e. they are designed by human beings in order to prepare food and eat.

Such is the depth of intellectual incompetence in materialist-Darwinian academic discourse that such idiotic oversights are regularly advanced as support for the Darwinian worldview. One particularly stupid example was concocted by Professor Tim Berra (this is so stupid it is almost impossible to believe the guy is actually a professor) in his book *Evolution and the Myth of Creationism* (figure 7):

> ...if you compare a 1953 and a 1954 Corvette, side by side, then a 1954 and a 1955 model, and so on, the descent with modification is overwhelmingly obvious. ... the evidence is so solid and comprehensive that it cannot be denied by reasonable people.[41]

In his book *Defeating Darwinism by Opening Minds* Phillip E. Johnson writes concerning this:

> Of course, every one of those Corvettes was designed by engineers. The Corvette sequence - like the sequence of Beethoven's symphonies to the opinions of the United States Supreme Court - does not illustrate naturalistic evolution at all. It illustrates how intelligent designers will typically achieve their purposes by adding variations to a basic design plan. Above all, such sequences have no tendency whatever to support the claim that there is no need for a Creator, since blind natural forces can do the creating. On the contrary, they show that what biologists present as proof of "evolution" or "common ancestry" is just as likely to be evidence of common design.[42]



Berra used four models of Corvette automobiles to illustrate descent with modification. Shown here from bottom to top: 1953, 1963, 1968, and 1978 models.

Figure 7

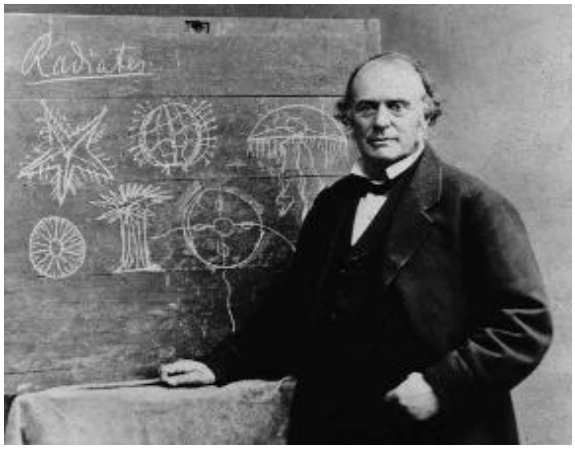
Such concerns also apply to the fossil record, it could perhaps have been the result of materialist evolution, although the mechanism proposed is highly implausible, but it could also have been produced by a creative force acting on quantum potentiality. The most recent evidence indicates the latter.

A lack of significant information contributed to the mistake that Darwin made. He thought that the world was ultimately comprised of 'matter' and that mechanical type explanations were the most appropriate for the phenomena he wanted to explain. However, as the philosopher of science Thomas Kuhn has pointed out:

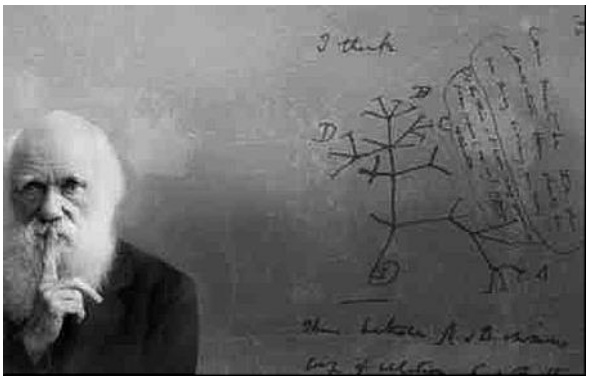
> The similarity of forms was explained by evolution, and evolution in turn was proven by the grades of similarities. That here one has fallen victim to circular reasoning was hardly noticed; the very point that one set out to prove, namely that similarity was based on evolution, was simply assumed, and then the different degrees in the gradation of the (typical) similarities, were used as evidence for the truth of the idea of evolution. Albert Fleischmann has repeatedly pointed out the lack of logic in the above thought process. The same idea, according to him, was used interchangeably as assertion and as evidence. However, similarity can also be the result of a plan, and morphologists such as Louis Agassiz, one of the greatest morphologists that ever lived, attributed the similarity of forms of organisms to a creation plan, not to evolution.[43]

According to the invertebrate paleontologist and translator of some of Agassiz's works, Paul J. Morris, Agassiz was:

> One of the great scientists of his day, and one of the "founding fathers" of the modern American scientific tradition, Louis Agassiz remains something of a historical enigma. A great systematist and paleontologist, a renowned teacher and tireless promoter of science in America, he was also a lifelong opponent of Darwin's theory of evolution. Yet even his most critical attacks on evolution have provided evolutionary biologists with insights.[44]



Louis Agassiz



Charles Darwin

Agassiz was entirely opposed to Darwin's proposals for some very good reasons which have now been validated by the Evo-Devo (evolutionary-developmental biology) revolution which has shown that there are common pre-formed deep morphogenetic templates underlying all organic forms. In his important work on the Evo-Devo worldview, *Endless Forms Most Beautiful*, the evolutionary biologist Sean B. Carroll writes that:

> The first shots in the Evo Devo revolution revealed that despite their great differences in appearance and physiology, all complex animals - flies and flycatchers, dinosaurs

> and trilobites, butterflies and zebras and humans - share a common "tool kit" of "master" genes that govern the formation and patterning of their bodies and body parts. … [This] discovery shattered our previous notions of animal relationships and of what made animals different, and opened up a whole new way of looking at evolution.[45]

The Evo-Devo revolution actually indicates that there are deep pre-formed morphogenetic 'template' potentiality structures underlying all organic forms and it indicates that Darwin got it wrong, and pre-Darwinian biologists such as Georges Cuvier, Richard Owen and Agassiz, who perceived layers of hidden structural form underlying the variety of organic forms, were closer to the truth. Richard Owen considered that the similarities and common structure underlying animal forms were due to a deep layer of 'archetypal' patterning:

> One of Owen's most notable accomplishments was his description of the vertebrate archetype. There he provided a theoretical framework to interpret anatomical and physiological similarities shared among organisms. Owen saw these mutual features as manifestations of a common blueprint. He defined the archetype this way: "that ideal original or fundamental pattern on which a natural group of animals or system of organs has been constructed, and to modifications of which the various forms of such animals or organs may be referred."[46]

However, despite the fact that the Evo-Devo revolution clearly undermines any Darwinian perspective, few biologists seem to have the integrity to face up to the fact that Darwin got it wrong, preferring instead to pretend that Evo-Devo is merely an extension of the Darwinian viewpoint.

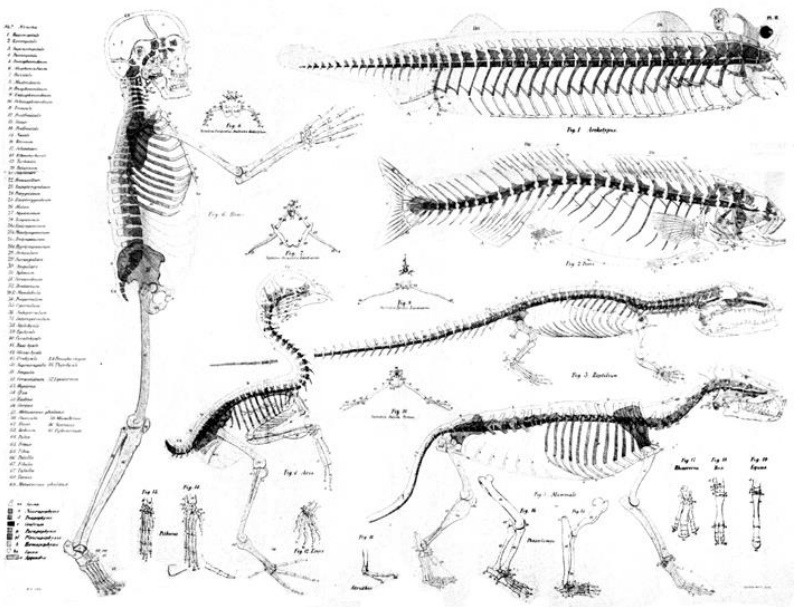


Figure 8. Richard Owen's derivation of animal structures from an archetype (upper right)

Agassiz was a staunch creationist who saw a Divine Plan everywhere in nature, and he could not reconcile himself to a theory that did not invoke design. He defined a species as "a thought of God." Thus he wrote in his *Essay on Classification*:

> The combination in time and space of all these thoughtful conceptions exhibits not only thought, it shows also premeditation, power, wisdom, greatness, prescience, omniscience, providence. In one word, all these facts in their natural connection proclaim aloud the One God, whom man may know, adore, and love; and Natural History must in good time become the analysis of the thoughts of the Creator of the Universe …[47].

However, we do not need to invoke a fundamentalist notion of God to see that that quantum psycho-metaphysical insights and the Evo-Devo revolution have clearly indicated a vast and intricate 'plan' written into the quantum ground of the process of reality. All organic forms are patterned by potentialities within the quantum realm of potentiality-possibility.

There are other serious problems with materialist Darwinism. No one has ever witnessed or demonstrated one species turning into another. The examples often given by Darwinian supporters, Darwin's Finches and Peppered Moths, are examples of variations within a species, not a transformation from one species into another. The geographical evidence, again, can have alternative explanations. The claimed Darwinian gradualism is refuted by the fact that the fossil evidence clearly indicates the sudden emergence of multiple phyla such as occurred in the Cambrian Explosion (542 million years ago), in which all the basic body plans of the major phyla spontaneously appeared in a relatively short evolutionary time period. The paleontologist Stephen J. Gould said of the fossils of the Cambrian Explosion:

> The Cambrian explosion is the key event in the history of multi-cellular animal life. The more we study the episode, the more we are impressed by its uniqueness and of its determining effect on the subsequent pattern of life's history. These basic anatomies that arose during the Cambrian explosion have dominated life ever since, with no major additions. The pattern of life's history has followed from the origins and successes of this great initiating episode.[48]

Furthermore, according to Gould:

> Contrary to Darwin's expectation that new data would reveal gradualistic continuity with slow and steady expansion, all major discoveries of the past century have only heightened the massiveness and geological abruptness of this formative event...[49]

And he also concluded that:

> The Cambrian explosion was the most remarkable and puzzling event in the history of life.[50]

Paleontologist Simon Conway Morris is a specialist and expert in the Cambrian period who has concluded:

> The Cambrian explosion is real and its consequences set in motion a sea-change in evolutionary history. Although the pattern of evolution is clearer, the underlying processes still remain surprisingly elusive.[51]

However, if we understand that evolution takes place within quantum levels before manifesting in the material realm such apparently sudden events wherein new organic forms come into being apparently all at once become comprehensible.

Amit Goswami, in his excellent book *Creative Evolution*, calls the way in which evolving morphogenetic structures develop within quantum levels of possibility a 'tangled hierarchy'; and according to Goswami the evidence of Wheeler's quantum 'delayed choice experiment', wherein a quantum superposition can be 'collapsed' backwards in time, shows that this process can operate backwards in time. Goswami points out:

> The lesson of the delayed choice experiment is profound. It solves the measurement problem for quantum cosmology - how the universe of possibility can be actualized even though no sentient being was present to observe the big bang. The universe remains in a superposition of baby universes that evolves in possibility until, in one of the possible universes, the possibility of sentience arises. The quantum consciousness … collapses the possibilities and the evolved first sentient being observes itself as separate from its environment, where upon simultaneously the universe manifests retroactively, going backward in time from the moment of collapse all the way to the big bang.[52]

This is close to the H&M account, wherein consciousness collapses quantum potentialities backwards in time. And this mechanism can be applied to the Cambrian Explosion, which has been called a biological 'Big Bang'. Goswami writes that:

> …quantum physics demands that biologists give up their materialist prejudice and base biology on the metaphysics of the primacy of consciousness. One of the most important rewards of such a change of paradigm is no less an accomplishment than being able, for the first time in biology, to clearly distinguish not only between the conscious and the unconscious, but also between life and nonlife. So, yes, not only we humans but cats and lizards and even one-celled organisms can collapse possibility waves into actual events of experience. Incidentally, this distinction will make use of the ... characteristic of consciousness introduced above, the characteristic of self-reference.[53]

It is this Wheeler-type ability of consciousness to act upon quantum potentialities through internal quantum 'self-reference' which unfolds the world of biological organisms in a 'top down' manner, starting with the fundamental quantum field of potentiality which has an internal aspect of primordial consciousness.

Thus, we see that Le Fanu's intellectual attack upon crude materialism and dogmatic Darwinism, which still has its fundamental assumptions and worldview stuck in the nineteenth century, is entirely justified. Getfer's claim that Le Fanu's viewpoint is nothing other than concealed religion lacks intellectual integrity. As Le Fanu replied to Gefter's unwarranted assertions:

> Ms Gefter's supposition that there is a genre of science books written by creationists 'disguising their true views' is, I would suggest, a mirage invoked to condemn by association those like myself who draw attention to the limits of science and its exclusively materialist explanations and theories. I believe that the New Scientist should do more to examine such ideas to promote the spirit of open and intellectual enquiry.[54]

Writers who use the intelligent design perspective to advance theistic worldviews, such as

William Dembski, actually do so quite openly and do not attempt to disguise their true views. Le Fanu's book on the other hand, as anyone who reads it with attention and integrity would conclude, simply attempts to, as he says, "draw attention to the limits of science and its exclusively materialist explanations and theories." A similar view has been expressed by the ***atheist*** philosopher Thomas Nagel in his book *Mind and Cosmos: Why the Materialist Neo-Darwinian Conception of Nature is Almost Certainly False*:

> Physico-chemical reductionism in biology is the orthodox view, and any resistance to it is regarded as not only scientifically but politically incorrect. But for a long time I have found the materialist account of how we and our fellow organisms came to exist hard to believe, including the standard version of how the evolutionary process works. The more details we learn about the chemical basis of life and the intricacy of the genetic code, the more unbelievable the standard historical account becomes.[55]

In her *New Scientist* review of Le Fanu's book Gefter concludes:

> I am all for a good mystery, but there is an important difference between revelling in the excitement of the unknown and turning away from knowledge because you simply don't like the facts.[56]

However, when one investigates "the facts" it turns out that it is Gefter who turns away "from knowledge because [she] simply [doesn't] like the facts."

Gefter indicates that her father was to some degree interested in Zen Buddhism in his youth, having read some books by Alan Watts such as *This is It* and *The Way of Zen.* According to Amanda Gefter it was her father's musings on Zen which led him to his notion of the 'H-State', the fundamental and foundational state of homogeneity which he thought must underlie the world of phenomena. In the opening pages of *TEL* the following remarks about "how you can get something from nothing" by her father are recorded:

> ...what if you had a state that was infinite, unbounded, and perfectly the same everywhere? … a 'thing' is defined by its boundaries. By what differentiates it from something else. … The edges define the 'thing'. But if you have a completely homogeneous state with no edges, and it's infinite so there's nothing else to differentiate it from … it would contain no thing, it would be nothing! … Usually people think that to get to nothing, you have to remove everything. But if nothing is defined as an infinite, unbounded homogeneous state, you don't have to remove anything to get to it – you just have to put everything into a specific configuration. … You take a blender to the world – you blend up every object, every chair and table and fortune cookie in this place, you blend it all until everything is just atoms and then you keep blending the atoms until any remaining structure is gone, until everything in the universe looks exactly the same, and this completely undifferentiated stuff is spread out infinitely without bound. Everything will have disappeared into sameness. everything becomes nothing. But in some sense it's still everything, because everything you started with is still in there. Nothing is just everything in a different configuration. … So to get a universe, nothing must become something … they must be two different states of the same underlying thing – the same underlying reality – it's a state of infinite unbounded homogeneity.[57]

Once again we find a strange misuse of language. As noted previously, a homogeneous state or

field, which must ultimately be a quantum field or set of quantum fields, which is "still everything" and is "completely undifferentiated stuff ... spread out infinitely without bound" is not actually a "nothing!" We previously noted David Albert rightly criticised Lawrence Krauss for his assertion that the universe creates itself from "nothing." In an additional preface added to the latest version of his book *A Universe From Nothing* Krauss has attempted to defend his position:

> Can we understand how absolute nothingness, without even the potential for anything at all to exist, does not still reign supreme? Can one ever say anything other than the fact that the nothing that became our something was part of "something", in which the potential for our existence, or any existence, was always implicit? In the book I take a rather flippant attitude toward this convention, because I do not think that it adds anything to the productive discussion … I discount this aspect of philosophy here because I think it bypasses the really interesting and answerable physical questions associated with the origin and evolution of our universe.[58]

Such a misguided "flippant" attitude to conceptual coherence indicates exactly why Steven Hawking's remarks concerning the irrelevance of philosophy are wrong. Speaking to a Google Zeitgeist Conference Hawking claimed that:

> ...almost all of us must sometimes wonder: Why are we here? Where do we come from? Traditionally, these are questions for philosophy, but philosophy is dead ... Philosophers have not kept up with modern developments in science. Particularly physics.[59]

However, a philosophical approach to the metaphysical conceptual systems developed by physicists, and conceptual use in general is vital when physicists and others are so often "flippant," wayward, incoherent and slapdash with their use of concepts and terminology. At some margin of his mind Krauss must be aware of his conceptual imprecision as in a question and answer session included at the end of the book he admits:

> Now, that state of no-stuff may not be "nothing" in a classical sense, but it is a remarkable transformation nevertheless.[60]

It may be a "remarkable transformation," but not as remarkable as an *impossible* transformation from absolute nothingness into lots of things. Krauss is admitting to using the term "nothing" in his own personal sense. This, however, is something that scientists and philosophers should avoid, if, that is, they wish to avoid misleading their audience.

Speaking of everything emerging from 'nothing' or 'nothingness' completely ignores the relevance of consciousness, a move, of course, acceptable to materialists. Stapp, however, describes the ground quantum "H-state" as follows:

> ... given the empirical fact that consciousness eventually did appear, it would seem that some seed of consciousness, or potentiality for consciousness, must have been there all along. In this connection it is worth noting that, as Heisenberg emphasized, the ontological character of the quantum state is like that of an Aristotelian "potentia", which Heisenberg described as an "objective tendency". The quantum state represents a collection of objective tendencies for various physically possible psycho-physical events to actually happen. This notion of "an objective tendency," as best I can conceive it in this quantum context, is something like a contemplated possibility

> coupled to an urge to raise this possibility into an actuality. So it would appear that something like a primordial consciousness was present already at the birth of the quantum mechanically conceived universe. Recognition or acceptance of this notion leads, in a quantum world devoid of even the most rudimentary life forms, to the ancient idea of a cosmic mind, and to the conception of the universe as more like a conscious organism than like a robotic machine. Mentality becomes primordial, not in the individual atoms, but rather at the level of an "over-mind". The emergence of conscious life forms would then become the creation, by this evolving psychophysical structure, of tiny substructures similar to itself.[61]

In other words an "H-state" must contain both potentialities and primordial consciousness. Furthermore, Stapp indicates that this ground state Mind-energy-potentiality operates in order to create "tiny substructures similar to itself." These, of course, are all the sentient beings within the universe. Such a view, of course, reiterates Mensky's assertion of a 'Life Principle' operating upon quantum potentialities.

Stapp and Mensky's accounts stand in marked contrast to that of Amanda Gefter, one of the advantages being that they are logically coherent! Gefter seems to propose that entirely non-conscious "frames of reference" somehow arise from the quantum realm of potentiality, then these "frames of reference," without a glimmer of consciousness, start "observing" an illusory 'material' world into existence, then this "observer-created" 'material' world starts, without recourse to consciousness, materialistically-randomly evolving initially non-conscious organic beings, which then magically produce consciousness. The notion, however, that observing "frames of reference," devoid of any aspect of consciousness or primordial awareness, observe the universe into illusory existence before the emergence of consciousness, is beyond absurdity. The correct perspective, as indicated by Mensky's account and in accordance with Stapp's viewpoint, requires that non-differentiated primordial consciousness unfolds individuated consciousnesses due to the operation of an internal "Life-Principle." And, as Mensky, Stapp, Goswami and others indicate, such a view is suggested by quantum discoveries.

Both Mensky's and Stapp's characterization of the fundamental ground state of the universe, which places primordial consciousness as a fundamental aspect, corresponds more closely to a Zen point of view than that of Amanda Gefter's father. As the Zen master Huang Po declared:

> This pure Mind, the source of everything, shines forever and on all with the brilliance of its own perfection. But the people of the world do not awake to it, regarding only that which sees, hears, feels and knows as mind. Blinded by their own sight, hearing, feeling and knowing, they do not perceive the spiritual brilliance of the source substance. If they would only eliminate all conceptual thought in a flash, that source substance would manifest itself like the sun ascending through the void and illuminating the whole universe without hindrance or bounds.[62]

Huang Po

Another term for this "pure Mind" energy is "Buddhanature." As Tulku Urgyen Rinpoche tells us, the original pure, or nondual, Mind-energy of Buddhanature loses recognition of its own infinite nature when it becomes involved in the manifestation of *samsara*, which is the dualistic cycle of the repeated death and rebirth of sentient beings:

> Buddhanature has lost track of itself and created samsara, but it is also Buddhanature, recognising itself…[63]

Within the cycle of the repeated death and rebirth within samsara, then, sentient beings cycle for vast time scales, taking various forms of embodiment dependent upon actions and intentions, until, that is, a sentient being becomes enlightened and thereby the Mind-energy of the universe recognises its own 'empty' self-luminous nature and becomes a buddha, an awakened or enlightened being.

In the closing pages of her book Gefter tells us that her father gave her a transcript of a talk given by the French astrophysicist Laurent Nottale at a conference at Oxford University on Buddhism and Science (a conference that I attended). The title of the talk was 'Relativity and Emptiness'. 'Emptiness' is the usual translation of the Sanskrit word *shunyata,* which is a Buddhist metaphysical term for the ultimate nature of reality. One modern Buddhist teacher points out that:

> Unfortunately, the word 'emptiness', which is used to translate the Sanskrit term *shunyata*, carries a connotation of a nothingness, or a void. Happily, there is a wonderful definition in Tibetan that captures its true meaning: *tak ché dang dralwa*, which translates as: 'free from permanence and non-existence.'[64]

This is an important point. There is no school of Buddhism which asserts that the ultimate nature of reality is an absolute 'nothingness'.

The *Madhyamaka*, or Middle Way, school asserts that the ultimate nature of reality is neither permanent nor non-existent, in fact according to this Buddhist school of metaphysics the ultimate nature hovers between extremes of existence and non-existence in exactly the same way as a quantum superposition. In other words, the ultimate nature, or *shunyata*, is a quantum superposition of existence and non-existence. This means that all phenomena lack 'intrinsic existence', they are empty of any permanent core of independent existence. They are not

substantial things, but neither are they absolute 'nothings'. They are appearances from the void of quantum emptiness-potentiality. "Form is emptiness, emptiness is form," as the Heart Sutra says. The root of the term *shunyata* is *sunya*, the zero point, the cosmic seed of emptiness which is 'swollen' with potentiality. One meaning of *sunya,* which is the Indian origin of the concept of zero, is 'the swollen', in the sense of an egg of potentiality which is about to burst into manifestation.

One of the central doctrines of the Buddhist *Madhyamaka* is that of the "two truths" or "two modes of reality" or "two modes of perception." This doctrine divides the process of reality into the spheres of the 'seeming', or 'conventional' or 'relative' and the 'ultimate':

> Thus two kinds of world are seen:
> The one of yogins and the one of common people.
> Here, the world of common people
> Is invalidated by the world of yogins.[65]

The 'seeming', 'conventional' or 'relative' mode of perception, which corresponds to the 'classical' realm of physics, is the way that the world of phenomena *appears* within the experiential continuums of unenlightened sentient beings, whilst the 'ultimate' is the mode of reality experienced by enlightened beings, 'yogins' and buddhas. Gefter's father says of this distinction:

> You could say that the origin of the universe comes from a point, but it is infinite in size…Homogeneity is ultimate reality. Patterns are conventional reality…Nothingness cannot exist. It is unstable.[66]

Whilst he is correct that the Buddhist ultimate reality of emptiness can be identified with quantum potentiality and that conventional reality consists of the patterned phenomena of the manifested world, he is wrong in his use of the term "nothingness," and he is incorrect in thinking that it is instability which causes manifestation. Manifestation occurs because of an internal cognitive 'pressure' of primordial consciousness:

> Both faculties and objects arise from the mind.
> The manifestation of sensory objects and faculties
> Is dependent upon an element that has been present
> Throughout beginningless time.[67]

Furthermore, within the Buddhist psycho-metaphysical worldview this fundamental cognitive pressure is ultimately in the direction of awakening and enlightenment. As Master Hsing Yun says:

> A buddha is a human being who has realised that he is a buddha; a human being is a buddha who has not yet realised that he is one.[68]

And this, of course, means that "observers" eventually become buddhas, embodying the most profound type of observership possible, a direct experiential observation of the ultimate nature of the universe.

One appreciative reader sums up the metaphysical implications of Gefter's book as follows:

> Throughout her book, Gefter asks "If observers create reality, where do the observers come from?" The answer is they come from the nothingness itself. Everything is

> ultimately nothing. The nature of that nothingness in its primordial, undifferentiated, unbounded state is pure consciousness, and so everything is ultimately consciousness. Consciousness in its differentiated, bounded state is the observer present at the center of its own world. ... Gefter tells us that "Nothing is ultimately real", which is exactly the same as to say "Ultimately, only consciousness is real." There is no contradiction, since the true nature of consciousness in its undifferentiated, unbounded state is the very nothingness that she acknowledges to be ultimate reality. Even the observer present at the center of its own world is not ultimately real, since the observer is consciousness in its differentiated, bounded state. … This explanation resonates deeply with the wisdom of nondual metaphysics.[69]

But, whereas Jim Kowall draws the necessary conclusion that primordial consciousness is a primary agency within the ground of the process of reality, Gefter, as we have seen, consistently denies this necessary conclusion and supports an incoherent materialist diatribe against any kind of spiritual implications of modern quantum discoveries. However, when we peel away the layers of her delusion it becomes apparent that, as the eighth century Buddhist practitioner-philosopher Shantarakshita wrote:

> All causes and effects
> Are consciousness alone.
> And all … abides in consciousness.
> On the basis of the Mind Alone,
> We should know that outer things do not exist.
> … [and]
> We should know that mind is utterly 'empty'.[70]

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[1] Mensky, Michael: 'Reality in quantum mechanics, Extended Everett Concept, and Consciousness', 11
[2] http://social-epistemology.com/2014/03/22/a-conversation-with-henry-stapp-ryan-cochrane/
[3] http://www.kabbalah.info/engkab/kabbalah-worldwide/interview-with-amit-goswami#.U_x1NWNad9U
[4] http://discovermagazine.com/2013/nov/14-defense-free-will
[5] Kyabje Kalu Rinpoche (1993)
[6] Stapp, Henry (2007)
[7] Hawking, Stephen & Mlodinow, Leonard (2010), 155
[8] http://mccabism.blogspot.co.uk/2009/04/quantum-theology-and-quantum.html
[9] http://mccabism.blogspot.co.uk/2011/06/quantum-mechanics-and-consciousness.html
[10] Scharf, D., Pseudoscience and Victor Stenger's Quantum Gods, 4 - http://www.truthabouttm.org/truth/SocietalEffects/Critics-Rebuttals/StengerRebuttal/index.cfm
[11] Scharf, D., Pseudoscience and Victor Stenger's Quantum Gods, 4 - http://www.truthabouttm.org/truth/SocietalEffects/Critics-Rebuttals/StengerRebuttal/index.cfm
[12] Scharf, 6-7
[13] Scharf, 12
[14] Stenger, Victor J. (2009), 127
[15] Scharf, 13

[16] Greene, Brian (2004), 81
[17] Susskind, Leonard (2015), xii
[18] Scharf, 19
[19] Scharf, 26
[20] http://www.newscientist.com/article/mg20126975.800-how-to-spot-a-hidden-religious-agenda.html?full=true#.U_yTAGNad9V
[21] Le Fanu, James (2009), 22
[22] Randall, L. (2006) 158
[23] Vedral, Vlatko (2010), 211
[24] http://www.nytimes.com/2012/03/25/books/review/a-universe-from-nothing-by-lawrence-m-krauss.html
[25] Woolfson, Adrian (2000), 74
[26] Barrow, D. John & Tipler, Frank J. (1986) p105
[27] Woolfson, Adrian (2000), 83
[28] Woolfson, Adrian (2000), 76
[29] http://www.i-sis.org.uk/Nonrandom_directed_mutations_confirmed.php
[30] Le Fanu, James (2009), 74-5
[31] Fodor, Jerry – 'Why Pigs Don't Have Wings', New York Review of Books – http://www.lrb.co.uk/v29/n20/jerry-fodor/why-pigs-dont-have-wings
[32] Fodor, Jerry & Piattelli-Palmarini, Massimo (2011), 23
[33] Wolf-Ekkehard Lönnig (2006) '*The Evolution of the Long-Necked Giraffe – What Do We Really Know*' Part 1, 9
[34] Wolf-Ekkehard Lönnig (2006) '*The Evolution of the Long-Necked Giraffe – What Do We Really Know*' Part 1, 21
[35] Goswami, Amit (2008), 27
[36] Le Fanu, James (2009), 104
[37] http://www.nybooks.com/articles/archives/1997/jan/09/billions-and-billions-of-demons/
[38] Dawkins, Richard (2006), 20
[39] Le Fanu, James (2009), 165
[40] Wolf-Ekkehard Lönnig (2006) '*The Evolution of the Long-Necked Giraffe – What Do We Really Know*' Part 2, 11
[41] Berra, Tim (1990), 117-119
[42] Johnson, Phillip (1997), 63
[43] Wolf-Ekkehard Lönnig (2006) '*The Evolution of the Long-Necked Giraffe – What Do We Really Know*' Part 1, 20
[44] http://www.ucmp.berkeley.edu/history/agassiz.html
[45] Carroll, Sean B. (2006), 9
[46] http://www.reasons.org/articles/archetype-or-ancestor-sir-richard-owen-and-the-case-for-design
[47] http://www.ucmp.berkeley.edu/history/agassiz.html
[48] S. J. Gould, Of Tongue Worms, Velvet Worms, and Water Bears, Natural History 104 (1995), 15.
[49] Gould, Stephen J., Nature, vol. 377, October 1995, p.682.
[50] Gould, Stephen J., "The Evolution of Life," in Schopf, Evolution: Facts and Fallacies, 1999, 9

[51] Conway Morris, S. The Cambrian "explosion": Slow-fuse or megatonnage? (http://www.pnas.org/content/97/9/4426.full)
[52] Goswami, Amit (2008),119
[53] Goswami, Amit (2008), 43
[54] http://www.newscientist.com/article/mg20126975.800-how-to-spot-a-hidden-religious-agenda.html?full=true#.U_80VWNad9U
[55] Nagel, Thomas (2012), 5
[56] http://www.newscientist.com/article/dn16544-review-why-us-by-james-le-fanu.html#.U_8zdmNad9U
[57] Gefter, Amanda (2014), 6-7
[58] Krauss, Lawrence (2013), xvi - xvii
[59] http://www.telegraph.co.uk/technology/google/8520033/Stephen-Hawking-tells-Google-philosophy-is-dead.html
[60] Krauss, Lawrence (2013), 205
[61] http://www-physics.lbl.gov/~stapp/stappeditedversion.pdf
[62] Addiss, Stephen; Lombardo, Stanley; Roitman, Judith (2008), 39
[63] Schmidt, Marcia Binder (2002)
[64] http://www.rigpawiki.org/index.php?title=Emptiness
[65] Brunnhölzl, Karl (2004), 79
[66] Gefter, Amanda (2014), 384
[67] Thrangu Rinpoche, Kenchen (2001), 34
[68] Hsing Yun, (Master) & Tom Graham (trans.) (2010), 120
[69] Kowall, J. 'The Physicist's Dilemma: Ultimate Reality – The Non-Physical Nature of Consciousness' - *Journal of Consciousness Exploration & Research* | May 2014 | Volume 5 | Issue 4 | 392-396
[70] Shantarakshita, Padmakara Translation Group (2005) 65-66 (I have altered the last line from "devoid of self" to "empty"

(*The End*)

Exploration

On Magnetic Body, Bio-harmonies, Morphogenesis & Epigenetics

Matti Pitkänen [1]

Abstract

In TGD, magnetic body is an intentional agent using biological body as a sensory receptor and motor instrument. TGD also provides various mechanism used by magnetic body for control and communication purposes, and the notion of bio-harmony suggests itself as a correlate for quantum coherence at the level of basic bio-molecules. How magnetic body and bio-harmony could help to understand biology? Can one identify biological phenomena making these notions compelling? In this article some candidates for phenomena of this kind are briefly discussed. The finding that behavioral patterns of planaria can be remembered also by the piece of split planaria without brains is consistent with the idea that replication of magnetic body coding for behaviors is behind biochemical replication. That alleles of the same gene have different expression could be understood if the bio-harmony assignable to gene carries additional information besides the biochemical information. These notions might help to understand the mechanisms epigenetic. Histone modification and DNA methylation are believed to involve geometric locking preventing transcription. They could also affect the frequency assignable to DNA codon or some key unit so that the resonance condition making possible reconnection of U-shaped flux tubes allowing biomolecules to get in contact and for transcription to proceed fails to be satisfied. Epigenetic inheritance could reduce to inheritance of bio-harmony: the magnetic bodies of cells of offspring get in tune with those of parent.

1 Introduction

What TGD can possibly give to biology is the vision about magnetic body [8] as an intentional agent using biological body as a sensory receptor and motor instrument and about various mechanism used by magnetic body for control and communication purposes. A new element is brought in by Zero Energy Ontology: magnetic body is 4-dimensional and thus correlate for a behavioral pattern rather than 3-D state for part of organism. Also the notion of bio-harmony [9] [7] suggests itself as a correlate for quantum coherence at the level of basic bio-molecules. How magnetic body and bio-harmony could help to understand biology? Can one identify biological phenomena making these notions compelling?

In this article some candidates for phenomena of this kind are briefly discussed. The finding that behavioral patterns of planaria can be remembered also by the piece of split planaria without brains is consistent with the idea that replication of magnetic body coding for behaviors is behind biochemical replication. That alleles of the same gene have different expression could be understood if the bio-harmony assignable to gene carries additional information besides the biochemical information.

These notions might also provide a fresh approach to epigenetics. Histone modification and DNA methylation are believed to induce kind of geometric locking preventing transcription. They could also affect the frequency assignable to DNA codon or some key unit so that the resonance condition making possible reconnection of U-shaped flux tubes allowing biomolecules to get in contact fails and transcription cannot proceed. Epigenetic inheritance could reduce to the inheritance of bio-harmony: the magnetic bodies of cells of offspring get in tune with those of parent. To how high degree magnetic body and bio-harmony are inherited? This becomes the key question.

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1.1 The notions of 4-D magnetic body and bio-harmony

Recall first some key ideas of TGD inspired quantum biology.

1. In TGD framework magnetic body extends the pair formed by organism and environment to a kind of holy trinity. Magnetic flux tubes and the realization of genetic code in terms of dark proton sequences has been the key hypothesis. The model for cold fusion (see `http://tgdtheory.fi/public_html/articles/cfagain.pdf`) [**?**] suggests that also more general dark nuclei must be allowed. Dark neutron sequences could correspond to genes separated by dark protons. Dark weak interactions with large value of h_{eff} effectively massless below neuron size scale would play central role and induce large parity breaking effects (chiral selection).

   The chemistry would not be all that matters. DNA-nuclear/cell membrane as topological quantum computer with braided magnetic flux tubes would explain why organisms with virtually identical genomes are so different (we and our ancestors for instance). The hierarchy of magnetic bodies would be responsible for the development of intelligence and for cultural evolution. Flux tubes connecting DNA and mRNA as well as mRNA and tRNA molecules are present but it is difficult to say anything concrete.

2. Ontogeny could be seen as a kind of editing process for the text defined by the DNA. Control of control of... is involved so that situation is very complex. Who performs the editing? Does DNA edit itself and is the editing process defining evolution of genome coded by genome? Or is the editing performed by Darwinian selection at cell level (see `https://en.wikipedia.org/wiki/Cellular_differentiation`)? Or is the magnetic body the editor using genome also as its tool as TGD would suggest? What is important that in TGD framework self-organization in 4-D sense implied by Zero Energy Ontology replaces ordinary self organization leading to asymptotic spatial patterns and select spatiotemporal patterns as asymptotic behavioral patterns defining various biological functions. The role of magnetic body is central in this process.

3. Magnetic body contains cyclotron Bose-Einstein condensates and cyclotron frequencies determined by the strength of magnetic field would give for DNA and other biomolecules additional characteristics. In TGD based model for musical harmony DNA codons would correspond quite concretely to 3-chords but played using dark photons (also ordinary music represented as sounds could be transformed to dark photon music). If one accepts the icosahedral model of bio-harmonies predicting genetic code correctly, there would be 256 fundamental harmonies characterised by the allowed collection of 3-chords and they would add to the information carried by DNA molecules. I have constructed a program building random sequences of the allowed chords using the additional harmonic rule that two subsequent chords contain at least one common note and this music sounds rather harmonic (albeit boring in absence of any other elements!)

4. Could one distinguish between different states/phases of DNAs, mRNAs, tRNAs, and amino acids in terms of harmony? Could their functioning depend on the harmony? With the inspiration coming from the connection of emotions and musical harmonies I have proposed that the harmony associated with a gene or organ could correlate with something analogous to an emotional state or mood - maybe micro-mood or microemotion could be the proper notion. Could amino-acids be happy, hilarious, melancholic, sad, depressed? Could one distinguish between different phases of DNA, RNA, tRNA, aminoacid collections characterized by the harmony in turn characterizing the of a cell, organelle, organ, or even organism? tRNA defines the map of the harmony associated with DNA codons to amino-acid harmony. Is the information about DNA codon and about corresponding 3-chord represented at the level of magnetic body of amino-acid- that is as the 3-chord, which it represents, and realized as the rules telling with which tRNAs amino-acid can reconnect?

   In contrast to DNA codons, which represent local information, harmony could represent holistic information and characterize entire genes or their intronic portions.

1.2 Problem

There is however a problem. DNA codons coding for the same amino-acid correspond to different 3-chords of harmony. One of these chords corresponds to amino-acid itself and the codons coding for amino-acid correspond to the orbit of this chord under subgroup of isometries of icosahedron moving the triangles of icosahedron along the orbit. This would apply also to mRNA and maybe also to tRNA. The chords at the orbit of amino-acid are isomorphic (intervals are same) and obtained as transposes of each other.

The chords are isomorphic but not identical and this leads to the problem with resonance paradigm unless one gives up the idea that amino-acid corresponds to a unique DNA codon and assumes that there is analog of gauge invariance allowing to choose the preferred codon freely.

1. The assumption about preferred DNA codon could be given up if one can choose the preferred DNA codon freely so that also the magnetic bodies of amino-acids are characterized by 3-chords and thus carry information about what DNA codon coded them. This is possible if one has the analog of fiber space structure with DNA codons coding for amino-acid defining the fiber and amino-acids defining the base. This fiber structure with discrete gauge invariance is strongly suggestive and I have proposed it for two decades ago but it seems that it poses strong conditions on the orbits of the subgroups of isometries of icosahedron.

   This condition is very restrictive. Simplifying somewhat: one considers 60 codons decomposing into 20+20+20 codings and each group of 20 codons codes for amino-acids belonging to different groups. There are twenty of them. The 20 triangles of icosahedron correspond to 3 DNA codons each and each of them corresponds to one and only one amino-acid. One has 3 subgroups of isometries corresponding to 20+20+20 decomposition.

   Can one perform a global gauge transformations realized as isometries and moving triangles along the orbits of one of the 3 subgroups involved - say isometry g_1 of G_1? These transformations would move the entire orbits of 2 subgroups involved - call them G_2 and G_3. What happens to the chords of G_2 and G_3: is their character changed completely so that these harmonies would be destroyed? It seems that this cannot work. Should one replace G_2 and G_3 with their automorphs $g_1 G_2 g_1^{-1}$ and $g_1 G_3 g_1^{-1}$. Does this make sense? 3-chords defining give orbit should be invariant under automorphisms of G_i? This does not seem to be a realistic condition.

2. Could different automorphs correspond to different collections of chords physically just as global gauge transformations generate different physical situations? Isometries of groups G_i would therefore define physically different realizations of bio-harmonies such that for each of them only one of the DNA codons coding for given amino-acid could actually perform the coding. Ordinary genetic code with many-to-one correspondence would make sense in statistical sense only. If this is true, the cyclotron frequency 3-chord assignable to amino-acid depends on the DNA coding it and implies physical distinctions.

3. One can consider also a third alternative. DNA codon with same 3-chord as coding for amino-acid is in special role in that only it can resonate with the amino-acid! Could DNA codons codons correspond to same cyclotron frequency triplet (magnetic fields) but different value of h_{eff} so that one would have chord with respect to energy rather than frequency. Different values of h_{eff} for DNA codons coding for the same amino-acid would scale their cyclotron frequencies to the same amino-acid frequency while keeping cyclotron energies invariant? Cyclotron energy ratios for codons correspond to rational valued ratios $E_i/E_j = h_{eff}(i)/h_{eff}(j) = n(i)/n(j)$. Amino-acid would correspond to fixed h_{eff} and this creates a problem: can DNA codon code for amino-acid with different value of h_{eff}. This option does not look attractive.

Second option looks the most plausible one. Of course, it is early to talk about a prediction: it might well be that I have mis-understood something.

2 How the notions of magnetic body and bio-harmony could help to understand inheritance

Next more concrete ideas about magnetic body and bio-harmony in relation to epigenetics and inheritance will be developed.

2.1 Questions about bio-harmony

One can pose a lot of questions about bio-harmony.

1. It is not necessary to assign any interpretation on the harmony. Just the harmony could be enough if it is forced to be same for DNA, corresponding mRNA, tRNA, and aminoacids. One can however make questions. Is the harmony inherited invariant and could it distinguish between different personality types about which we learned in old books of psychology? Or could the harmonies correlate with our own moods?

2. Could differentiation selecting particular genes as expressed genes apply also to harmonies so that given gene would correspond only to a particular harmony and different copies of gene could correspond to different harmonies. Could this selection rely on the same mechanisms as ordinary differentiation realized in terms of epigenetic mechanisms and DNA editing? From the magnetic bodies of genes the harmony would be automatically transferred to the magnetic bodies of mRNA, tRNA and aminoacids since otherwise the transcription and translation do not work since magnetic bodies do not have common resonance frequencies and reconnection and resonant interaction is not possible.

3. Does given harmony characterize given gene or the entire cell? All basic biomolecules associated with a gene would naturally correspond to the same harmony. If the rRNAs associated with ribosomes are in harmony mutually cellular harmony seems to be the only option. If ribosomes have their own harmonies, only certain ribosomes can translate given gene. This would bring in additional control tool. The most plausible picture is that the situation depends on what happens in the self-organization process. Some organs/organisms are more harmonious, others not so harmonious. Harmony need not be given fixed to remain the same: magnetic body can have motor actions changing the cyclotron frequencies. Moods could reflect the character of harmony at gene level.

4. Does magnetic body control the differentiation by posing restrictions on gene expression or vice versa? The idea about magnetic body as intentional agent suggests that the first option is correct. There would be hierarchy of magnetic bodies with magnetic bodies at the higher level controlling bodies at the lower level. The value of Planck constant would label the hierarchy levels and also DNA codons would be characterized by "intelligence quotient" defined by h_{eff}/h. This would be nothing but the analog for the hierarchy of program modules and I have earlier considered the realization of this hierarchy (see `http://tgdtheory.fi/public_html/articles/braidparse.pdf`).

5. The selection of harmony could take place and be analogous to cell differentiation. This would be a self-organization process in which magnetic bodies of genes, cells, etc.. tune themselves to resonance with each other by modifying their magnetic fields by controlling their thickness (for monopoles flux the flux is invariant). Something analogous to the development of social skills. This could pose resonance as a constraint on processes like replication, transcription, reverse transcription, silencing, enhancing, editing, etc.... It might induce the differentiation at gene level.

   Editing processes for genome could be seen as being induced by the motor actions of the magnetic body involving reconnection and change of the value of h_{eff} changing the length of the flux tube and bringing biomolecules near to each other or separating them. This selection would also apply to the intronic part of DNA proposed to be responsible for topological quantum computation like

processes. The copies of same fragment appearing in intronic portion and copies of genes could correspond to different harmonies.

2.2 Can the notions of magnetic body and bio-harmony explain something that ordinary genetic cannot?

It would be nice to identify some biological phenomenon difficult to understand in standard framework but having an elegant explanation in terms of magnetic body.

1. The notion of harmony could manifest itself at the level of genes as different expressions for the copies of same gene if they correspond to different notions of harmony. The copies of gene are known as alleles (see `https://en.wikipedia.org/wiki/Allele`). The alleles can indeed give rise to different phenotypic traits such as different pigmentation.

2. Morphogenesis provides examples of this kind of phenomena [2, 3, 4]. The first key idea is that DNA and cell replication is induced by the replication of magnetic bodies serving as information carriers (see `http://tgdtheory.fi/public_html/tgdlian/tgdlian.html#lianPB`) [8]. The second key idea is that in zero energy ontology (ZEO) magnetic body is 4-dimensional and represents behavioral patterns rather than only 3-dimensional patterns. For instance, memory as behavioral patterns can be inherited by the piece of planaria worm not containing the brain. The explanation could be that the magnetic body carries behavioral patterns replicated in the splitting of the worm.

3. Epigenetics studies changes of gene expression not caused by the change of DNA itself. Epigenome (see `https://en.wikipedia.org/wiki/Epigenome`) is the highly dynamic part of DNA controlling expression of the rather stable part of genome. One might regard stable part of genome as hardware and epigenome as topological quantum computer programs assignable to magnetic body and modifying gene expression epigenetically. Comment sign in computer code serves as a computer scientific metaphor for epigenetic control by repression.

The modelling of epigenesis in terms of magnetic body and bio-harmonies deserves a separate discussion.

1. The modification of transcription rate is the basic tool of epigenetic regulation. There are two basic mechanisms involved. Histone modification (see `https://en.wikipedia.org/wiki/Histone` affects the histones of chromatin so that the transcription is repressed or activated. Histone modification takes place by several mechanisms. DNA methylation occurs for CpG pair and if it occurs for a promoter region it represses the transcription and serves as a kind of gene lock. The degree of methylation serves as a measure for the effectiveness of repression. I do not know whether the locking is absolute at the level of single gene or whether only the transcription rate is reduced. Two mechanisms are mentioned in the Wikipedia article (see `https://en.wikipedia.org/wiki/DNA_methylation`). Methylation can impede geometrically some step in the transcription. Methylated site can be also accompanied by proteins affecting histones in chromatin and in this manner impede transcription.

2. The notions of magnetic body and bio-harmony suggest an alternative - one might even hope fundamental - mechanism of repression. Methylation (histone modification) could affect some cyclotron frequency associated with DNA codon (histone). In the optimal situation for transcription the DNA and protein catalyzing the transcription or mRNA are in resonance. When cyclotron resonance condition is not exactly satisfied, the reconnection rate for the U-shaped flux tubes associated with the molecules involved in the process is reduced and also transcription is repressed.

   I have considered also the radical possibility that the dynamics at the level of magnetic body is fundamental for biology and that magnetic body defines templates for the bio-molecular self-organization making dark matter dynamics visible. This is probably too extremist view and it

would seem that biochemistry affects the cyclotron frequencies assignable to the magnetic body by affecting the strengths of magnetic fields also at dark magnetic flux tubes.

3. The notions of epigenetic code (see `https://en.wikipedia.org/wiki/Epigenetic_code`) and histone code (see `https://en.wikipedia.org/wiki/Histone_code`) have been proposed. Epigenetic code would consist of histone modifications and additional modifications such as DNA methylation. The codeword of the epigenetic code could code for some larger unit than protein: say gene or entire cell. The hypothesis is that the chromatin-DNA interactions are induced by histone tail modifications (such as methylation, acetylation, ADP-ribosylation, ubiquitination, citrullination, and phosphorylation). There are 4 histones and the position of modification varies as well as the modifier (the above modifications are not the only ones) so so that the number of modifications is very large.

   The addition of bioharmonies to the genetic information could simplify the situation dramatically since the modifications could be seen as defining of of the 256 bio-harmonies with 64 chords each (this for fixed scale which varies if the value of magnetic field strength is varied: biophoton spectrum in visible is proposed to represent the range of values of magnetic field). The most plausible starting hypothesis is that given harmony characterizes the gene. Much simpler option would be that the harmony characterizes entire cell or even group of cells.

   If the modification by kicking cyclotron frequency out of harmony is enough to repress transcription, almost endless number of bio-chemical manners to achieve would exist but the epigenetic code could be very simple at the basic level as TGD would predict. Each bio-harmony [**?**]harmonytheory [7] would provide a representation of genetic code in terms of 3-chords predicting correctly the DNA-amino-acid correspondence (there are actually two slightly differing codes explaining the presence of 21st and 22nd amino-acid and deviations from the standard code). The states of dark protons (or neutrons) are also proposed to realize genetic code [6, 5]: it is an open question whether these codes imply each other as they should.

4. The understanding of transgenerational epigenetic inheritance (see `https://en.wikipedia.org/wiki/Transgenerational_epigenetic_inheritance`) raises difficult challenges. One should understand how histone modification and DNA methylation are transferred to daughter cells in cellular division or inherited by the offspring. Transgenerational interaction of the genomes seems necessary. In TGD framework the interaction of magnetic bodies of via resonance mechanism could transfer the epigenetic programs to the offspring. Offspring could "learn" the epigenetic programs of the mother by tuning.

5. Gregory Carey (see `http://www.colorado.edu/ibg/people/61`) gives nice real life examples about the complexities of epigenesis identified quite generally as gene regulation (see `http://tinyurl.com/zb97cgs`). He compares the gene regulation involved with the handling of a stressful situation to "nightmarish Rube Goldberg mousetrap" and sees the process as extremely ineffective from engineering point of view. For instance, the hormones secreted to blood circulation are distributed to the entire body. The whole thing could be carried out in brain! He also wonders why evolution is so inefficient. All cells have same genome although most of the genes are silenced. Second strand of DNA is totally un-used and most of DNA consists of introns. His explanation is that evolution does not make long term plans but finds just a solution to a particular without thinking it from a wider perspective: "If it ain't broke, don't fix it".

   I tend to see this differently. If entire body is coherent quantum entity, engineering based thinking does not make sense. Entire body and also magnetic body must be informed from the stress situation since the reaction is holistic. The genes which are not used for gene expression might be used for other purposes. Topological quantum computation could be this purpose in TGD framework and repressed genes could be thus used for quantum information processing. Information processing could be actually the dominating function of the DNA of higher vertebrates.

To sum up, magnetic body could be seen as the "boss" controlling the gene expression and also the evolution of genome in longer scales. Magnetic body would use bio-molecular mechanisms for its purposes. This would bring in a new kind of inheritance: bio-harmony would be inherited. The most spectacular almost-prediction would be that genetic code is many-to-one only in statistical sense.

2.3 RNA is transferred between soma cells and germ cells

The basic question of epigenesis is how the information between soma cells and germ cells is transferred. In standard genetic the transfoer RNA or DNA molecules is necessary to achieve this. In TGD dark DNA, RNA, tRNA, and aminocids consisting of dark nucleons realized as nuclear strings and accompanied by the corresponding biomolecules is one possibility. The extremist view would be that the dynamics of the dark variants of basic bio-molecules induces the dynamics of their molecular shadows making them only visible. Also the transfer of information as cyclotron radiation can be considered in TGD framework and cyclotron resonance could serve as a fundamental mechanism of epigenetic control. The above model suggest that epigenetic control mechanisms rely on resonance mechanism for 3-chords associated with DNA codons and other biomolecules giving them names is also at work besides purely geometrical silencing.

The popular article No Sex Required: Body Cells Transfer Genetic Info Directly Into Sperm Cells, Amazing Study Finds (see `http://tinyurl.com/hhdth5j`) summarizing the findings discussed in the article [1] (see Soma-to-Germline Transmission of RNA in Mice Xenografted with Human Tumour Cells: Possible Transport by Exosomes (see `http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4081593/`) as very interesting concerning this basic question.

The abstract of the article gives for a professional a readable summary.

Mendelian laws provide the universal founding paradigm for the mechanism of genetic inheritance through which characters are segregated and assorted. In recent years, however, parallel with the rapid growth of epigenetic studies, cases of inheritance deviating from Mendelian patterns have emerged. Growing studies underscore phenotypic variations and increased risk of pathologies that are transgenerationally inherited in a non-Mendelian fashion in the absence of any classically identifiable mutation or predisposing genetic lesion in the genome of individuals who develop the disease. Non-Mendelian inheritance is most often transmitted through the germline in consequence of primary events occurring in somatic cells, implying soma-to-germline transmission of information. While studies of sperm cells suggest that epigenetic variations can potentially underlie phenotypic alterations across generations, no instance of transmission of DNA- or RNA-mediated information from somatic to germ cells has been reported as yet.

To address these issues, we have now generated a mouse model xenografted with human melanoma cells stably expressing EGFP-encoding plasmid. We find that EGFP RNA is released from the xenografted human cells into the bloodstream and eventually in spermatozoa of the mice. Tumor-released EGFP RNA is associated with an extracellular fraction processed for exosome purification and expressing exosomal markers, in all steps of the process, from the xenografted cancer cells to the spermatozoa of the recipient animals, strongly suggesting that exosomes are the carriers of a flow of information from somatic cells to gametes. Together, these results indicate that somatic RNA is transferred to sperm cells, which can therefore act as the final recipients of somatic cell-derived information.

Some background is needed to understand this rather technical summary.

1. Darwinism has dominated biology since Darwin. The rules of classical Mendelian inheritance conform with the Darwinian view and can be reduced to genetic level. Various traits are inherited genetically by sexual reproduction and genome would change during lifetime only through mutations. Genome changes exremely slowly by random changes for offspring from which selection pressures choose the survivors.

   Lamarckian view in turn assumed that the external circumstances experienced by organism leave a trace, which can be inherited but it could not be formulated in terms of modern molecular biology whereas the Darwinian dogma could be formulated in terms of Weissman's genetic barrier. Information flows from germ cells to soma but never in opposite direction. If it would do so, the

soma interacting with environment could transfer information to germ cells and the experiences during lifetime could leave inheritable trace to germ cells.

An analogous dogma is that information is always transcribed from DNA to RNA to proteins but never in opposite direction. It is now known that this takes place in case of viruses and retroviruses: there are so called jumping genes which can also make copies of themselves. 5 per cent of human genome conists of endogenous retroviruses capable of doing the same. The huge genome of maize is due to this kind of proces.

2. The development epigenetics has started to shatter the belief on Wessimann's genetic barrier. Gene expression is not fixed by genome alone and can be change even when genes are unaffected. Silencing of genes by DNA methylation and histone modification allow to modify gene expression. Silencing is essentially a locking of gene preventing its expression by transcription followed by translation.

   It is now known that epigenetic changes in the gene expression can be inherited. The mechanisms are still poorly understood. What seems however clear the genome is more like a slowly changing hardware and gene expression or whatever is behind it is the software and programs can change very rapidly by just adding or deleting comment signs in the code. A deeper understanding of this software is needed.

3. Epigenetic inheritance requires that genetic information is transferred from soma cells to germ cells. If only DNA or RNA are capable of representing genetic information, then DNA or RNA must be transferred from soma cells to germ cells. No instance of direct DNA or RNA mediated information from soma to germ cells had been observed before the above mentioned experiments. One can of course challenge the assumption about DNA and RNA as the only representations of genetic information.

The basic idea of the experiment was simple. Use a marker for RNA by using plasmids (DNA strands not belonging to chromosomes) genetically engineered to code for a marker protein making itself visible by fluoresence. Then one just follows the fate of these proteins generated in soma cells and looks whether they end up inside germ cells and how this happens.

More technically: mouse model was xenografted with human melanoma cells stably expessing EGFP-coding plasmid (expressed in a manner possibly evoking emotions: human melanoma cancer tissue was implanted in mouse). EGFP-RNA is released from xenografted human cells to blood. One just looks whether it eventually ends up to the sperm cells of mice and tries to identify the transfer mechanism. Only transfer to sperm cells was studied. One might expect that the transfer of RNA can happen also to ovum. I guess that the sperm cells are easier to study.

What was observed?

1. The transfer of RNA from soma cells to sperm cells was indeed found to occur. The transferred RNA can in turn induce epigenetic effects in germ cells known to be inherited by a mechanisms, which however remain poorly understood. Epigenetic mechanisms seem to be involved in the cases considered so that DNA is not changed, only its expression.

2. The transfer mechanism was identified. The transferred RNA is contained by exosomes analogous to synaptic vesicles transferring neurotransmitters from presynaptic to postsynaptic cell. Transfer of RNA takes place via fusion of the membranes just like transfer of neurotransmitters. Maybe genetic engineering using exosomes or analogous structures to transfer the needed material to cells has been tried.

The implications of the findings are dramatic but already implied by the earlier work in epigenetics. What is important that Lamarckian view can be now defended by a concrete genetic mechanism. Lamarckism implies that the time scale of inheritance becomes the time scale for the appearence of a new generation. Nutrition, environment, lifestyle and even meditation and similar practices, are already

now known to affect gene expression on daily basis: we are not victims of genetic determinism and are epigenetically responsible for our own well-being. Epigenetic information can be transferred also to germ cells so that we responsible also for the well-being of our children. Our children suffer our sins and share our sufferings.

The precise mechanism of inheritance of epigenetic modifications remains still poorly understood although it seems that the transfer or RNA to germ cells occurs. There are also other hints: it is known that alleles (variants of game gene) can express themselves differently. One allele can also induce other allele to express in the same manner. Somekind of "social pressure" like interaction seems to be involved.

As explained, TGD suggests the notion of magnetic body and cyclotron resonance as this interaction. The DNA of offspring get tuned to the DNA of mother during pregnancy and this gives to epigenetic inheritance. Various epigenetic mechanisms such as methylation and histone modification could affect cyclotron frequencies besides purely geometric modifications of DNA and locking at the level of gene could be accompanied kicking out of tune at the level of magnetic body. In this framework the transfer of RNA to germ cells would be necessary to affect the cyclotron frequencies.

References

[1] Cossetti C et al. Soma-to-Germline Transmission of RNA in Mice Xenografted with Human Tumour Cells: Possible Transport by Exosomes. *Plos One.*Available at: `http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4081593/` , 9, 2014.

[2] Levin M. The wisdom of the body: future techniques and approaches to morphogenetic fields in regenerative medicine, developmental biology and cancer. *Regen Med .* Available at: `http://www.futuremedicine.com/doi/pdf/10.2217/rme.11.69`, 6(6):667–673, 2011.

[3] Levin M. Morphogenetic fields in embryogenesis, regeneration, and cancer: Non-local control of complex patterning. *Biosystems.* Available at: `http://www.ncbi.nlm.nih.gov/pubmed/22542702`, 109(3):243–261, 2012.

[4] Levin M Somrat T. An automated training paradigm reveals long-term memory in planarians and its persistence through head regeneration. *The J Experimental Biology.* Available at: `http://tinyurl.com/ntlxpep`, 216:3799–3810, 2013.

[5] Pitkänen M. Homeopathy in Many-Sheeted Space-Time. In *Bio-Systems as Conscious Holograms*. Onlinebook. Available at: `http://tgdtheory.fi/public_html/hologram/hologram.html#homeoc`, 2006.

[6] Pitkänen M. Nuclear String Hypothesis. In *Hyper-finite Factors and Dark Matter Hierarchy*. Onlinebook. Available at: `http://tgdtheory.fi/public_html/neuplanck/neuplanck.html#nuclstring`, 2006.

[7] Pitkänen M. Quantum Model for Hearing. In *TGD and EEG*. Onlinebook. Available at: `http://tgdtheory.fi/public_html/tgdeeg/tgdeeg/tgdeeg.html#hearing`, 2006.

[8] Pitkänen M. Quantum Mind, Magnetic Body, and Biological Body. In *TGD based view about living matter and remote mental interactions*. Onlinebook. Available at: `http://tgdtheory.fi/public_html/tgdlian/tgdlian.html#lianPB`, 2012.

[9] Pitkänen M. Geometric theory of harmony. Available at: `http://tgdtheory.fi/public_html/articles/harmonytheory.pdf`, 2014.