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# Science Beyond Enchantment

## Revisiting the Paradigm of Re-enchantment as an Explanatory Framework for New Age Science

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## Abstract

A common understanding of scientists within the New Age movement is that they are manifesting a form of re-enchantment and that their ideas should be addressed as natural theologies. This understanding often takes as its reference point, the re-entanglement of science and religion whose original separation, in this case, is often the working definition of disenchantment. This essay argues that many contemporary scientists who are both popular references and active participants on New Age conferences cannot fully be accounted for by this paradigm. Among these scientists and more particularly those interested in quantum physics, there are many who wish to extend the quantum phenomena not only to support questions of religious character, but to develop theories on physical reality and human nature. Their ambitions are not solely about merging science and religion but also about suggesting new scientific solutions and discussing scientific dilemmas. The purpose of this essay has therefore been to find a viable alternative to the re-enchantment paradigm that offers a more detailed description of their ideas. By opting instead for a radically revised re-enchantment paradigm and an anthropological suggestion for studying minor sciences, this essay has found that a more precise definition of popular New Age scientists could be as (1) “problematic” to the epistemological and ontological underpinnings of the disenchantment of the world, where the problem is not necessarily restricted to the separation of religion and science, and (2) as being a minor science, which entails a critique and challenge to state science, albeit not necessarily in terms of imposing religion on the grounds of science.

**Key words:** New Age science, minor science, re-enchantment, disenchantment, natural theology, content analysis.

# Table of Contents

1. Introduction .....	1
1.1 Purpose and Research Questions .....	1
2. Delimitations and Selected Material .....	2
3. From Natural Theology to New Age Science .....	5
3.1 The Emergence of Natural Theologies .....	5
3.2 The Emergence of New Age Science .....	10
4. Science and Religion as an Academic Field .....	12
4.1 The Discursive Approach .....	13
4.2 The Cultural Contingency Approach.....	14
4.3 The Re-enchantment and Natural Theology Approach .....	15
4.4 Problems and Contributions .....	16
5. Theoretical preliminaries.....	17
5.1 Disenchantment and Science as a Vocation .....	17
5.2 Re-enchantment .....	19
5.3 Problems .....	20
6. Theory .....	20
6.1 The Problem with Disenchantment .....	20
6.2 Minor science .....	23
7. Method .....	25
7.1 Categories and Application .....	27
7.1.1 The Problem of Disenchantment .....	27
7.1.2 Minor Science.....	29
8. Results .....	30
8.1 Lothar Schäfer: A Science for Human Potential .....	30
8.2 Menas Kafatos: An Improved Metaphysics of Reality .....	36
8.3 Henry P. Stapp: A Psycho-Physical Dualism of Mind and Matter .....	43
8.4 Roger Penrose: The Orch OR Theory and Its Platonic Predisposition.....	53
9. Conclusions .....	59
References .....	65
Material:.....	67

# 1. Introduction

Annual New Age conferences such as *Science and Non-duality* and *Sages & Scientists* witness a variety of renowned intellectuals and scientists not yet explored by scholarly research. These conferences were initiated in an American context during the early twenty-first century as an attempt to forge pioneering scientific research with spiritualism, and has since then provided spiritualists and scientists with a platform to discuss the depths of human and spiritual issues.<sup>1</sup> For scholars in religious studies this phenomenon falls under the category of New Age science, a subject which lately has received a lot of scholarly attention. Mostly, this area of interest is focused on New Agers application and interpretation of science to further their personal beliefs,<sup>2</sup> and less about how the New Age environment furthers the viewpoints of scientists themselves. While one might feel persuaded to include these scientists among the previous group of believers, a closer examination of their ideas reveals that there is more to them than just an enchanted science. Previous attempts to understand scientists within religious environments, especially during the historical era of the late nineteenth and beginning of the twentieth century, have often been submitted under a re-enchantment paradigm. As opposed to Max Weber's thesis on the disenchantment of the world, where the separation of science and religion is central, re-enchantment is often referred to as a flight from reason and as a romantic tendency where both the categories of nature and divine, as well as the differentiated realms of science and religion, become re-entangled. While this might be characteristic to New Ager's interpretation of science, it is not automatically representative for scientists on New Age conferences. It is the argument of this essay therefore, that to establish a more informed image of scientists within the New Age movement, we must revise our understanding of them.

## 1.1 Purpose and Research Questions

Since little has been written on New Age science with focus on scientists themselves, the aims of this essay are quite elementary. To pave the way for a new approach to these scientists, we must first learn to recognize them differently. The purpose of this essay is therefore to *explore* the ideas and theories of popular New Age scientists and to create a more detailed understanding of (1) *what their ideas are* or more specifically what their views of physical

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<sup>1</sup> Science and Nonduality, 2017; Chopra Foundation 2017.

<sup>2</sup> See Olav Hammer, *På spaning efter helheten. New Age, en ny folketro?* (Stockholm: Dejavu, 2004); Jennifer Burwell "Figuring Matter: Quantum Physics as a New Age Rhetoric" *Science as Culture*, 22, 3 (2013), pp. 344-366.

reality and human nature are, and (2) *what positions they hold in relationship to science and religion*, and furthermore to (3) *re-evaluate the paradigm of re-enchantment* that currently dominates our understanding of them.

## 2. Delimitations and Selected Material

This essay is concerned primarily with scientists using the New Age movement as a platform for mediating ideas and theories. More specifically, these ideas are held and presented in an American context and on conferences interested in uniting religion with science. The *Science and Nonduality* and the *Sages & Scientists* conferences are describing themselves as founded on the wish to create a synthesis between spiritualism/mysticism or imagined ancient traditions and cutting edge science, and include annual gatherings where a mix of scientists, philosophers, mystics and spiritualists meet and discuss metaphysical, ethical and religious questions. What is intriguing about these scientists is that they are often professional and sometimes highly reputed individuals within the scientific community. At first appearance, this suggests that even some of the most eminent intellectuals are prone to spiritual beliefs, but at closer scrutiny it becomes evident that their participation is a much more complex matter than the result of mere spiritual proneness. The most interesting thing about them thus, is not that they are reputed scientists wishing to unite science and religion, but on the contrary that they are participating without such ambitions. They are not primarily, as one might assume, there to support the union between their field and the field of religion, but to discuss their thoughts and speculations on how to scientifically understand physical reality.

I chose therefore to study more closely, the ideas and theories of a few selected scientists whom are recognized for popularising science within these conferences. Since quantum physics is undoubtedly the most common science featured in the New Age movement, I decided furthermore to select and scrutinize the most popular physicists. This amounted to four individuals; Lothar Schäfer, Menas Kafatos, Henry P. Stapp, and Roger Penrose. After getting more acquainted with them, I selected material that concerned subjects that were held at the new age conferences. This included their popular writings or more specifically the writings presented for a broader audience as well as a few texts written for an academic audience. Besides their oral presentations thus, I also selected the popular books and articles presenting them, which time-wise was published between 1975 and 2016. Although this makes a time-span of 40 years, I am not interested in it from a historical point of view, but as representative of the ideas found *presently* among these physicists. In terms of delimitation my study thus concerns the ideas and theories held contemporarily.

As can be imagined, popularisations of science are rarely the same as the science occurring within the walls of academic research, but a broader and sometimes metaphysical description of reality. As such it often attends larger questions about physical reality or the universe, and our place within it. While their scientific research is accessible and of interest primarily to other scientists, these books and articles speak to a broader public and is accessible to laypeople as well. In that sense, when I speak of their “ideas” or “theories” I am referring primarily to their thoughts on physical reality and human nature in the more popular sense, and not their scientific research, even though they at times are difficult to separate. Sometimes these more broadly available ideas are simultaneously published in scientific journals, which of course forces us to consider that the line between accessible and non-accessible is very difficult to draw. While it is relevant to explain that their books are written for a broader audience, to signify that it is something *more* than their academic work, it is therefore not entirely adequate to describe them as something *else* than their professional opinions. Also, even when a text is explicitly written for an audience beyond physics, it is not a guarantee that it is accessible for the untrained eye. Most of their writings are highly technical and demands some previous knowledge on the subject. While the genres of these texts are thus mostly popular science, it is helpful to remember that they sometimes cross over to scientific writing.

A good example of the technical nature of these texts is the work of Roger Penrose and his partner Stuart Hameroff. Together they are founders of the so called Orch OR theory which is a non-computational theory of consciousness that initially began when Penrose wrote his book *The Emperors New Mind* (1989) but which was developed after a meeting with Hameroff and then presented in Penrose’s *Shadows of the Mind. A Search for The Missing Science of Consciousness* (1994). The final product was then presented in their famous article called *Orchestrated Reduction of Quantum Coherence in Brain Microtubules: A Model for Consciousness* (1996) which was published in Elsevier’s journal on Mathematics and Computers in Simulation. This theory, which mixes quantum mechanics, theories on gravity, and microbiology, may be accessible in principle, but is very difficult to comprehend for a layperson. Although this was during the late nineties, the theory is still very much alive and was revised in 2011, through an article called *Consciousness in the Universe: Neuroscience, Quantum Space-Time Geometry and Orch OR Theory*. This time however, it was published for the Journal of Cosmology, which far from the prestige of Elsevier, also publishes more theological and philosophical work. When it comes to this theory, which seems to be one of the more reputable theories on consciousness present at these New Age conferences, it is

created by both Penrose and Hameroff but presented singularly by the latter. While the three other physicists included here all engage independently on New Age conferences, Roger Penrose is more indirectly participating since it is his partner who seems to do most of the talking. Since I am interested in physics and think that the association of Penrose with the New Age conferences is particularly fascinating because of his high reputation, I have chosen to prioritise Penrose texts and to select only the material where Penrose is directly participating. I have therefore excluded the videos from the conferences since only Hameroff is present.

When it comes to Henry P. Stapp's books *Mind, Matter and Quantum Mechanics* (2009) and its sequel called *Mindful Universe. Quantum Mechanics and the Participating Observer* (2011) the language is slightly less technical. Both books were published by Springer, which in similarity to Elsevier publishes scientific literature. The first book is a collection of several texts, and is constituted by articles, lectures and interviews dating back to 1975. His ideas are in similarity to Penrose and Hameroff also about the relationship between brain and consciousness, and not rarely do they comment on each other's theory.

Sometimes Menas Kafatos takes part in this discussion on consciousness, and both Penrose and Stapp are referred to in his texts. His books *The Conscious Universe. Parts and Wholes in Physical Reality* (1990) and its update *The Non-Local Universe. The New Physics and Matters of the Mind* (1999) written together with Robert Nadeau, as well as more recent articles such as *The Fundamental Mathematics of Consciousness* (2015) and *Fundamental Awareness: A Framework for Integrating Science, Philosophy and Metaphysics* (2016) co-authored by Neil D. Theise, are much more about understanding physical reality as conscious than about consciousness itself as a human faculty. The books are both published by Springer and the articles are published by *Cosmos and History: The Journal of Natural and Social Philosophy*, and Taylor & Francis: *Communicative and Integrative Biology*.

While these books and articles sometimes touches upon metaphysical and spiritual things they are in their entirety written as scientific literature or popular science. When it comes to Lothar Schäfer however, the style is much more accessible and not to mention, more poetical. It is also clear that his books are informed more directly by a New Age discourse, something which is seen in the title of his books. The first one is called *In Search of Divine Reality: Science as a Source of Inspiration* and was published by the University of Arkansas Press in 1997 and the second one called *Infinite Potential. What Quantum Physics Reveals About How We Should Live* (2013) was written in collaboration with Deepak Chopra, who is a

well-known New Age and spiritual guru, and published by his foundation and more specifically by Deepak Chopra Books.

These books and articles, together with the lectures, panel talks and interviews held at the conferences of Science and Nonduality and Sages & Scientists makes out the foundation of my material. Since the entire material is a bit more extensive than what I have presented here, you can see the additional sources in the end of this essay.

### 3. From Natural Theology to New Age Science

The phenomenon of scientists within the New Age movement is sometimes described as a form of *natural theology*,<sup>3</sup> which roughly can be defined as a “desire to pursue religion on the grounds of science, or to create a worldview in which there is a harmonious and overlapping relationship between the two”,<sup>4</sup> or alternatively as a *philosophy of nature* which in comparison to natural science can be described as an “intuitive approach” to nature that rests upon a “religious or mystical mode of thinking”.<sup>5</sup> Although natural theology or philosophy of nature, which is closely related to western esotericism,<sup>6</sup> can be traced all the way back to ancient Greece and while it has existed and continues to exist in various forms, the natural theologies emerging among scientists during the end of the nineteenth and beginning of the twentieth century carry special weight for the natural theologies within the New Age movement today.<sup>7</sup> Besides being an historical foundation for the ideas and concepts present in contemporary New Age science, this period also demonstrates a history of scientists using spiritual platforms to develop and demonstrate scientific ideas that resemble the use of New Age constellations today.

#### 3.1 The Emergence of Natural Theologies

The natural sciences we know today are perceived as almost uncontestedly separated from values and beliefs. For scientists during the sixteenth and seventeenth century this was not at all obvious, and a separation between science and religion had to be urged and defended. While medieval philosophers of nature never made any separations between facts and values, thinkers such as Galileo, Newton and Descartes insisted that it was essential for the

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<sup>3</sup> Egil Asprem, *The Problem of Disenchantment: Scientific Naturalism and Esoteric Discourse 1900-1939* (Boston: Brill, 2014), p.10, 260.

<sup>4</sup> Asprem 2014, p. 207–208.

<sup>5</sup> Wouter J. Hanegraaff. *New Age Religion and Western Culture. Esotericism in The Mirror of Secular Thought* (New York: Brill, 1996), p. 65.

<sup>6</sup> Hanegraaff 1996, p. 65, 395, 387-388.

<sup>7</sup> Asprem 2014, p. 10.



investigation of nature to adopt a value-free approach. Although they agreed with protestant thinkers that God had created the world, they concluded that God was not concerned with the further process of nature, something which left the machinery of physical reality to be calculated by natural scientists, and questions of meaning and faith to be handled by the church.<sup>8</sup> Since then, the natural sciences and particularly the scientific revolution during the sixteenth and seventeenth century has been recognized as the catalyst for breaking the enchanted nature of the past and forcing any sober knowledge to be based on empirical evidence alone. As the authority of natural sciences increased the nineteenth century would witness the emergence of *scientific naturalism*, where science became the defender of both political and philosophical values. Scientific naturalism is often identified as an intellectual and philosophical movement where nature is viewed as self-sufficient and where everything that happens are due to naturalistic causes.<sup>9</sup>

Eventually, these values paved the way for modernity, a historical period which among other things was featured by a process of differentiation, which can be defined as a process “through which societal institutions such as religion, education and politics grow increasingly independent from each other”.<sup>10</sup> Because the general pathos of such processes de-mystified or disenchanting the world, as Max Weber described it, many began to realise that they were not content with the limits it imposed. Although it had become a common rule to measure any truth or knowledge against it, many thus found scientific naturalism too restrictive. The growing sensation that the values of materialism and mechanism, that science allegedly promoted, were depriving life of meaning, caused an intellectual and emotional crisis that is often recognized as the peak of the romantic period, a historical era where the rational and mechanical rules of the industrial and scientific revolutions were opposed in favour of the inner, subjective life and feelings of the individual.<sup>11</sup>

This ambition to break the curse of disenchantment resulted in a reconciliation of science and religion most explicitly seen in modern esoteric and occult movements but also in the spiritual revival of the twentieth century.<sup>12</sup> Esotericism which roughly can be defined as a complex of imagined traditions emerging during antiquity, is sometimes described as the

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<sup>8</sup> Wouter J. Hanegraaff, *Esotericism and the Academy: Rejected Knowledge in Western Culture* (London: Cambridge University Press, 2012).

<sup>9</sup> Asprem 2014.

<sup>10</sup> Kennet Granholm, “Locating The West. Problematizing the Western in Western Esotericism and Occultism” in *Occultism In a Global Perspective*, eds. Henrik Bogdan & Gordan Djurdjevic (London: Routledge, 2013), p.25.

<sup>11</sup> Asprem 2014; Hanegraaff 2012; Kocku von Stuckrad, *The Scientification of Religion: A Historical Study of Discursive Change, 1800-2000* (Boston: De Gruyter, 2014).

<sup>12</sup> Asprem 2014; Hanegraaff 2012; Stuckrad 2014.

middle path between Judeo-Christian religion and enlightenment thought. As such it tends to produce knowledge that blurs the distinction between nature and divine, causing it to be rejected by both doctrinal faith and enlightenment rationality.<sup>13</sup> Occultism which is sometimes described alternatively as a form of modern esotericism,<sup>14</sup> often rests on rational inquiries into the hidden truths of physical reality and human nature.<sup>15</sup> Spirituality in turn, which is not traditionally associated with the practice of entangling faith and reason, experienced a revival during the nineteenth century where it appeared in an “occult flavour” and was driven toward more complex metaphysical teachings.<sup>16</sup>

The crisis of modernity not only rekindled the interest in spiritualism and occultism among laypeople however, but also brought about the emergence of an anti-materialist and anti-mechanist group of intellectuals that often found themselves engaging with metaphysical or spiritual societies.<sup>17</sup> While established science was too narrow for their ideas, the spiritual, esoteric and occult movements offered foundations where they could flourish, thus quickly becoming a popular foundation for those scientists investigating the “something more” of reality and for those wishing to challenge the dominating values within their own community.<sup>18</sup>

Two vehicles more specifically focused at promoting such ambitions were the Society for Psychic Research founded in 1882 to investigate the spiritual and psychic phenomena by scientific means, and the Gifford Lectures, which was established in 1885 by Lord Adam Gifford to promote the study of natural theology.<sup>19</sup> As different as they were in their intellectual feats and personal agendas, their proneness to anti-materialism and mechanism often made them inclined to make meaningful and sometimes religious inferences about reality. This tendency can be divided in three categories.

One popular notion was *vitalism* which is the belief that the universe is permeated by a nonmaterial force. This could especially be seen among physicists who promoted the theory of ether, an idea that for a short while was used to explain “how light waves could travel

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<sup>13</sup> See Henrik Bogdan, *Western Esotericism and Rituals of Initiation*. (New York: SUNY, 2007), p. 7; Wouter J. Hanegraaff, *Western Esotericism: A Guide for The Perplexed* (London: Bloomsbury, 2013), p. 5.

<sup>14</sup> Bogdan & Djurdjevic 2013, p. 1.

<sup>15</sup> Alex Owen, *The Place of Enchantment. British Occultism and the Culture of the Modern* (Chicago: University of Chicago Press, 2004), p. 20.

<sup>16</sup> Owen 2004, p. 21.

<sup>17</sup> Asprem, 2014; Janet Oppenheim, *The Other World. Spiritualism and psychical research in England, 1850-1914* (New York: Cambridge University Press, 1985).

<sup>18</sup> Janet Oppenheim, *The Other World. Spiritualism and Psychical Research in England, 1850-1914* (New York: Cambridge University Press, 1985); Asprem 2014.

<sup>19</sup> Asprem 2014, p. 201–206.

through seemingly empty space”.<sup>20</sup> As the space-filling substance or transferring medium it was thought to be, the ether was made capable to encompass the vastness of non-empirical and invisible realms which in turn were often connected to paranormal or spiritual phenomena.<sup>21</sup>

When quantum mechanics arrived, however, it quickly replaced the ether as a source for spiritual and metaphysical claims. As physicists probed deeper into the subatomic levels of reality it was found to behave in ways that was previously thought to be mutually exclusive. As demonstrated explicitly in the so called double-slit experiment, light-waves appeared simultaneously as both wave and particle – something which unavoidably meant that physical reality could be spread out over a large area while at the same time confined to one point. The consequence of this reality when trying to measure a physical system or an entity, was expressed in the Copenhagen interpretation, developed by physicists Niels Bohr and Werner Heisenberg in 1927.<sup>22</sup> Due to the wave-particle duality, the Copenhagen interpretation argued that physical reality was composed of complementary aspects – wave and particle – which despite seeming mutually exclusive was both needed for a full description of reality. It also argued that because of this complementarity a particles’ momentum and position could not be known simultaneously and when measuring the position the momentum or the wave-function would be affected. The act of measurement therefore caused a quantum “jump” where all the alternative positions were reduced into one state.

The scientists who appeared on SPR and Gifford Lectures often shared a radical appreciation of this problem, where the measurement was taken primarily as a *conscious* observation. The act of reducing several possibilities into one state was therefore extended into an argument where the mind of the observer caused or created physical reality to jump into being. The enhanced role of our mental faculties brought about many theories that pictured the essence of reality as conscious. Physicist and cosmologist Arthur Eddington famously described that “the stuff of the world is mind-stuff” and that “the substratum of everything” is of “mental character”.<sup>23</sup> In another famous quote James Jeans stated that the universe “appears to have been designed by a pure mathematician” and thus looked “more like a great thought than like a great machine”.<sup>24</sup> This new vision of reality, as something else

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<sup>20</sup> Asprem 2014, p. 209.

<sup>21</sup> Asprem 2014, p. 210, 213.

<sup>22</sup> Asprem 2014, p. 115.

<sup>23</sup> Peter Bowler, *Reconciling Science and Religion. The Debate in Early-Twentieth-Century Britain* (Chicago: University of Chicago Press, 2001), p. 106.

<sup>24</sup> Asprem 2014, p. 275.

than randomness and matter, Eddington argued, made the development of the Copenhagen interpretation especially significant for scientists who wished to combine their science with faith. He said therefore that the year 1927 was the year when “religion first became possible for a reasonable scientific man”.<sup>25</sup> A similar opinion could be found in Wolfgang Pauli who believed in a unified foundation for natural sciences and psychology, and envisioned a return to “alchemy’s old dream of a psycho-physical unity”.<sup>26</sup> An important conclusion is therefore that the arrival of quantum physics and its replacement of the older classical or Newtonian physics, seems to have spurred a metaphysical and religious tendency among its early practitioners.

Another trend among scientist on SPR and the Gifford Lectures that was often coupled with a vitalist perspective, was the *organicist and emergentist* thought. Much like the concept of holism,<sup>27</sup> Organicism states that biological life is more than the sum of their chemical and physical processes, and was an argument that often included a view of nature as imbued with a purpose or with a teleological force. An example of this could be seen in the work of Hans Driesch and his opposition to the mechanical view on inheritance.<sup>28</sup> While the dominating view on inheritance suggested that the whole of an organism was dependent upon the sum of its cells, Driesch found that blastomeres of eggs would develop into complete organisms even if they were destroyed and parts of the cell information was lost. To explain this anomaly he developed the concept of *entelechy*, where biological life was driven by an organising and teleological principle.<sup>29</sup>

Emergentism, which developed as an extension and furthering of the organicist viewpoint, held that novel properties of the whole sometimes emerges due to new and unexpected relations between already existing parts.<sup>30</sup> This can be seen in Samuel Alexander, who viewed the emergence of matter, life and mind as ascensions of physical reality toward novel qualities and as niches that pushed the universe towards higher grounds. The highest form of this ascension and hence the goal of emergence was what he called “the quality of the deity”,<sup>31</sup> something which wedded his description with an attempt to understand God, and thus gave life the direction of a teleological character.

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<sup>25</sup> Bowler 2001, p. 108.

<sup>26</sup> Stuckrad 2014, p. 71.

<sup>27</sup> The philosophical idea that the whole is greater than the sum of its parts.

<sup>28</sup> Asprem 2014; Bowler 2001.

<sup>29</sup> Asprem 2014, p. 158, 162.

<sup>30</sup> Asprem 2014, p. 160, 234-235.

<sup>31</sup> Asprem 2014, p. 239

### 3.2 The Emergence of New Age Science

The New Age is often considered a continuation of the esoteric movement,<sup>32</sup> but is more generally defined as a non-organised movement emerging around the 1970's.<sup>33</sup> Although it ranges from various beliefs, practices and rituals, such as astrology, channelling, healing and meditation, to more secular interpretations found in practices such as coaching and therapy,<sup>34</sup> a few tendencies are recurring. As Wouter Hanegraaff argues, New Age beliefs are sometimes better described, not by what positive content they share but what negative concepts they oppose.<sup>35</sup> In that sense, one characteristic of the New Age is that it is critical to the dominating values of modern western society. Much like its esoteric predecessor it is highly suspicious of the dual worldview of both mainstream science and religion, and can in that sense also be viewed as a continuation of its middle path.

The alternatives created by the New Age movement is often pervaded by an appreciation for *holism*,<sup>36</sup> something which is frequently expressed through variations of monism, the metaphysical assumption that everything is one, and pantheism, that everything is God or divine.<sup>37</sup> It can also be seen in practices such as alternative medicine, where the whole of the person is treated, as opposed to body and mind separately. A second tendency is the belief that *we create our own reality*. Because of the holistic universe and the fact that we are integrative parts of everything else, we are also parts of the divine creator. Sometimes this amounts to beliefs where humans are perceived as “co-creating with God”,<sup>38</sup> or even as being Gods themselves. Other times, however, a potential divine status is placed somewhere in the future. As Jeffrey J. Kripal eloquently describes it in his comparison between the New Age movement and superhero comics,<sup>39</sup> a common idea is that humans will experience a future metamorphosis. While previously restrained by the shackles put on us by society, we are slowly realising that we ourselves own the potential to create our own reality. This notion can especially be seen in holistic health and personal development, two concepts which are central to the human potential movement.<sup>40</sup>

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<sup>32</sup> Hanegraaff 1996.

<sup>33</sup> Hanegraaff 1996, p. 97

<sup>34</sup> Anne-Christine Hornborg, *Coaching och lekmanaterapi: en modern väckelse?* (Stockholm: Dialogos, 2012).

<sup>35</sup> Hanegraaff 1996, p. 515.

<sup>36</sup> Hanegraaff 1996, p. 119

<sup>37</sup> Hanegraaff 1996, p. 128, 121

<sup>38</sup> Hanegraaff 1996, p. 205

<sup>39</sup> Jeffrey J. Kripal, *Mutants & Mystics. Science Fiction, Superhero Comics, and The Paranormal* (London: University of Chicago Press, 2014).

<sup>40</sup> Jeffrey J. Kripal, *Esalen. America and the Religion of No Religion* (London: University of Chicago Press, 2011).

Another tendency that is reoccurring in the New Age movement, which sustains the above beliefs is its *use of science*. Whereas the dualism and reductionism of mainstream science is opposed, the New Age movement still wield selected parts of science – often described by themselves as leading edge or pioneering science.<sup>41</sup> Just like the natural theologies during the early twentieth century however, New Age science is not a one-way street. Some of the more popular New Age science trends are informed and supported by scientists themselves. One example is *the holographic paradigm* developed from the physicist David Bohm’s theory of implicate and explicate orders. As Bohm describes it, reality is composed of two orders, the explicate order which is the reality we perceive daily, and the implicate order which lies behind this visible reality and is comparable to the frequency domain behind holographic images. The implicate order which Bohm also calls the *holomovement* is the very essence or ultimate form of reality, in which everything exists entangled and where every part contains the whole. In a similar manner as the frequency blur comes out as a stable image, the implicate order unfolds into the explicate order and thus the permanent and stable reality we know as our own.<sup>42</sup> As the unfoldment of this relative stability does not seem to be random, Bohm argues that some sort of necessity is causing its continuation. Within the principle of necessity therefore lies a temptation to imagine an order behind the implicate one, a super-implicate order, which in turn is organized by yet another deeper order, the “super super-implicate” order, and so on.<sup>43</sup>

Another popular new age science is the so-called *paradigm of self-organization* where the universe is believed to be self-organizing. It was initially based on Ilya Prigogine and his work on the thermodynamics of nonequilibrium systems, and further developed through the New Age writer Erich Jantsch. Prigogine’s vision contrasts both Newtonian dynamics where the direction of time is insignificant, as well as the classical form of thermodynamics which suggests that the arrow of time points towards increasing dissipation of usable energy, something which would mean that the world eventually dies in chaos. Contrary to both of these concepts Prigogine declares that time is irreversible and that life remains an open system where sudden and spontaneous changes are possible. This open system has the ability to develop more complex orders out of the otherwise pessimistic destiny of chaos, orders from

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<sup>41</sup> Hanegraaff 1996, p. 62

<sup>42</sup> Hanegraaff 1996, p. 142-148.

<sup>43</sup> Hanegraaff 1996, p. 147.

which an energy exchange with the environment is possible, thereby hindering it to be ultimately lost.<sup>44</sup>

The perhaps most popular trend however is *parallelism* which is the argument that there are parallels between modern physics and eastern religion. This trend is best recognized in Fritjof Capra and his bestseller *The Tao of Physics: An Exploration of the Parallels between Modern Physics and Eastern Mysticism* (1975).<sup>45</sup> The holism of Capra's vision is featured by the so called Bootstrap theory, a philosophy developed by the physicist Geoffrey Chew to account for the reality implicated by quantum mechanics. The Bootstrap philosophy roughly says that nature consists of a dynamic web of interrelated events and processes, where everything is participating in everything else, something which Capra believes is compatible with several eastern philosophies. Another new feature to this holism, which is also a popular form of New Age science, is what Capra calls the *systems theory*. The systems view he declares, is based on the interrelatedness of all phenomena, and transcends the boundaries between disciplines, concepts and models. As such, it is a form of holism that accounts for, not only natural, but also social and environmental systems.<sup>46</sup>

#### 4. Science and Religion as an Academic Field

The subject of this essay relates to the field within religious studies that concerns the exchanges between science and religion. The term "science and religion" is a bit misleading however, since the contributions to this field have long been dominated by Christian perspectives and, at best, the Abrahamic monotheistic traditions.<sup>47</sup> Within this perspective we find for instance the subject of creationism and how believers within the Abrahamic religions have come to terms with scientific understandings of evolution, or the matter of Abrahamic religions and bioethics.<sup>48</sup> However, this essay relates to the exchange between science and religion occurring more specifically within the esoteric and new age movement, where "religion" often denotes eastern religion and philosophy. As we have seen, such movements have often been described as a middle path between reason and faith that often share the tendency of uniting science and religion, so, naturally, the academic fields interested in such movements have in some sense always been dealing with the entanglement of "science and

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<sup>44</sup> Hanegraaff 1996, p. 72, 163-167.

<sup>45</sup> Hanegraaff 1996, p. 128-131.

<sup>46</sup> Hanegraaff 1996, p. 132-137.

<sup>47</sup> Thomas Dixon, "Religion and Science" in *The Routledge Companion to the Study of Religion*, ed. John Hinnells (London:Routledge, 2010) p.509-525.

<sup>48</sup> Dixon 2010.

religion”. Within this area in turn, there are several predominant perspectives which I will try to distinguish and evaluate in this section.

#### 4.1 The Discursive Approach

A recently made popular tendency within esoteric and New Age studies is the discursive approach.<sup>49</sup> One of its main proponents is Kocku von Stuckrad who suggests that the exchange between science and religion within esoteric and New Age movement should be understood as entanglements between discourse strands. Discourse which in broad terms refers to a way of speaking and communicating, is often viewed in social sciences as a constructive force that affects or produces our social reality.<sup>50</sup> Rather than an ontologically independent entity, every pagan and esoteric idea or belief should therefore be understood as socially and culturally constructed. Viewing them from this direction, binary constructions such as science and religion, or science and pseudoscience must be problematized. Rather than simple dichotomies, discourse strands never form themselves around fixed centres, but are dynamical and fluid and may thus become separated and re-entangled through various constellations. Stuckrad borrows from Michel Foucault the word “dispositives” to account for such constellations, which can be anything from individuals, groups, societies, laws, systems and institutions.<sup>51</sup> Roughly described, dispositives are foundations or devices where discourses are distributed or developed, and within these dispositives, borders between different discourses can be altered. As Stuckrad demonstrates, the critical responses to materialism and mechanism during the end of the nineteenth and beginning of the twentieth century seem to have made both believers and scientists especially prone to re-entangling the discourse strands of science and spirituality.

Olav Hammer’s approach is similar to Stuckrad’s, but whereas the latter problematizes the simple distinction between them, Hammer emphasises the more one-directed use and interpretation of science among esoteric spokespersons. Among other discursive strategies, such as appeal to tradition or experience, the most characteristic strategy among modern esoteric spokespersons, Hammer argues, is the appeal to science. To explain the use of science to legitimise one’s claims, he borrows the term *scientism* which he defines as an “active positioning of one’s own claims in relation to the manifestations of any academic

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<sup>49</sup> Egil Asprem & Kenneth Granholm, *Contemporary Esotericism* (London:Routledge 2012); Wouter J. Hanegraaff, “Esotericism Theorized: Major trends and Approaches to the Study of Esotericism” in *Religion: Secret Religion*, ed. April D. DeConick (London:Macmillan, 2016), p. 155-170.

<sup>50</sup> Titus Hjelm, “Discourse Analysis” in *The Routledge Handbook of Research Methods in the Study of Religion*, ed. Michael Stausberg & Steven Engler (London: Routledge 2011), p.134-150; Stuckrad 2014.

<sup>51</sup> Stuckrad 2014, p. 11.



scientific discipline” which includes a selective assortment of scientific theories and discoveries, of mathematical calculations and scientific terminology.<sup>52</sup> A necessary part of scientism as a discursive strategy for legitimacy is the construction of a so called *significant other*.<sup>53</sup> While this term is often recognised in psychology of religion as a formulation of a negative counterpart, in relation to which one’s own goodness or soundness is compared, Hammer declares that the significant other of any position can be both positive, in terms of someone or something that is looked up to, and negative, that is, as someone or something posing a bad example. Science often experiences a dual role as the significant other of esoteric spokespersons, and as demonstrated previously, while orthodox science is often refuted, scientism tends to embrace certain fringe-sciences.

#### 4.2 The Cultural Contingency Approach

A similar idea can be seen in Sal Restivo who identifies New Age science, and more specifically parallelism as an *epistemic strategy* which he defines as a socially and culturally conditioned classifications or systems of filtering that decide how we perceive the world and which furthermore can function as a cultural resource.<sup>54</sup> Certain epistemic strategies can thus be used to gain power and privilege, something which Restivo argues is a wish among post-war physicists whose goal is to counter corrosive values and regain the trust of the public opinion. Restivo suggests that the new physics of later generations can be understood as framing a solution for contemporary societal and human problems, and thereby conveying a positive image of science which will promote the interests of one’s own scientific community. Restivo stresses that contemporary parallellists have faced a loss of adaptability that their predecessors did not suffer, in which modern science and rationality seem to have reached their limits. This loss forces scientists into a “vulgar” reaction, which causes them to radically adopt from distinct cultural traditions such as mysticism to improve their mode of thinking. While I would argue that this lacks a historical sensitivity, since scientists obviously have used religious thought to inform their thinking for quite some time, it is noteworthy for the present purpose that Restivo views the exchange between science and religion the other way around, that is, how scientists make use of religion to promote themselves.

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<sup>52</sup> Olav Hammer, *Claiming Knowledge: Strategies of Epistemology from Theosophy to the New Age* (Boston:Brill, 2001) p. 206.

<sup>53</sup> Hammer 2001, p. 203-204.

<sup>54</sup> Sal Restivo, *The Social Relations of Physics, Mysticism and Mathematics* (New York: Springer, 1983).

### 4.3 The Re-enchantment and Natural Theology Approach

Another perspective concerns the historical exchange between science and religion occurring during the nineteenth and early twentieth century. Since I have already described this in the historical background I will formulate myself more briefly here. Two terms often used to refer to these oppositions is as we have seen, *re-enchantment* and *natural theology*. One explicit study that recognizes the sciences above as re-enchanting is Anne Harrington who focuses more specifically on the German context.<sup>55</sup> Although this context articulates very well the commonality among scientists during this historical period, to scapegoat materialist and mechanist notions, it was, as Harrington argues, not unique to German scientists but was frequently occurring during this historical period among a range of political affiliations. One very famous example that is also focused on the German context, which should be mentioned despite lying beyond our present scope of previous research, is the thesis presented by Paul Forman where it is argued that the scientific achievements among physicists in the Weimar republic was part of an attempt to dispense with the crisis of their nation.<sup>56</sup> As both Harrington and Forman describes it, these tendencies more specifically expressed themselves in interpretations of nature and physical reality, through a-causal and non-deterministic terms.

Two other important scholars are Peter J. Bowler and Janet Oppenheim whose interests both concern England during the fin de siècle and beginning of the twentieth century.<sup>57</sup> Oppenheim's classical book called *The Other World* studies the broad variety of social backgrounds of those interested in psychic phenomena, among which many scientists were included. As Oppenheim describes it, these scientists were experiencing a loss of faith where they suffered from the inabilities of their dogmatic belief to incorporate the new scientific demands of the century. Foundations such as SPR where the psychic phenomena were put under scientific scrutiny became their salvation. Bowler in turn, describes these forms of "reconciliations" between science and religion as forms of *new natural theologies*.

The historical continuity of such natural theologies within contemporary New Age science can be seen on several occasions. For instance, in Wouter Hanegraaff's alternative recognition of such streams of thought as *Naturphilosophie*. Contrary to Bowler's perspective Hanegraaff does not view New Age science as belonging to the domain of natural science, but

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<sup>55</sup> Anne Harrington, *Reenchanted Science. Holism in German Culture from Wilhelm II to Hitler* (Princeton: Princeton University Press, 1996).

<sup>56</sup> Paul Forman, "Weimar Culture, Causality, and Quantum Theory, 1918-1927: Adaption by German Physicists and Mathematicians to a Hostile Intellectual Environment", *Historical Studies in the Physical Sciences*, 3, (1971), pp. 1-115.

<sup>57</sup> Bowler 2001; Oppenheim 1985.

to philosophy of nature. Hanegraaff refers to Antoine Faivre's distinction between philosophy of nature which is intuitive in character, versus natural philosophy that springs from Galileo, Comte and Darwin and which entails the pursuit of objective knowledge. The philosophy of nature or *Naturphilosophie* Hanegraaff argues "has always been closely associated with a religious or mystical mode of thinking" and should be understood against the history of western esotericism.<sup>58</sup> This continuity is also recognized in Egil Asprem's study of naturalism and esotericism during the period of 1900-1939,<sup>59</sup> but we will return to his ideas in the theoretical section.

#### 4.4 Problems and Contributions

There are many differences between previous research and the contribution I am trying to make here. An obvious reason for this difference is my choice of material. While earlier research has focused on the abstract exchange between both sides, I am interested exclusively on the singular texts and speeches by the scientists involved. Also, the scientists selected here, has not, at least to my knowledge, been scrutinized before.

The consequence of this focus as well as the nature of the ideas themselves, is that many of the assumptions on science and religion expressed above becomes less useful. The problem with general descriptions can be described through something Weber called *methodological individualism*. It can be defined as "the doctrine that all social phenomena (their structure and their change) are in principle explicable only in terms of individuals – their properties, goals and beliefs".<sup>60</sup> To work by the imperative of methodological individualism Egil Asprem explains, means that any "higher-order processes" must be related to "lower-order concerns",<sup>61</sup> which as he argues, also is the reason why macro-trends, such as the disenchantment of the world, is rarely "irreversible or total".<sup>62</sup> It is an undeniable fact therefore that lower-level concerns such as the one expressed in this essay, is more complicated than the abstract frameworks used to understand the context they are depicted in.

This context, which is couched in a re-enchantment paradigm, assumes an oppositional position toward mainstream science, that is often wedded with religious ambitions. I do not suggest that this is a misrepresentative description of the spiritual and popular culture, neither historically nor contemporarily, but it proves problematic when dealing with the singular

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<sup>58</sup> Hanegraaff 1996, p. 65.

<sup>59</sup> Asprem 2014.

<sup>60</sup> Jon Elster, "The Case for Methodological Individualism" *Theory and Society*, 11,4 (1982), pp. 453.

<sup>61</sup> Asprem 2014, p. 49.

<sup>62</sup> Asprem 2014, p. 49.

ideas and theories of the selected physicists. The baseline of my thesis is therefore that there are scientists appearing within the New Age movement, who cannot merely be viewed as mouthpieces for New Age belief and should thus not be reduced to or uncritically lumped together into one group who wishes to harmonise science and religion.

In addition to this, I have neither approached their ideas as being driven by a hidden agenda or strategy for greater status and public appeal. While it is important to recognize that scientists are not isolated from the surrounding culture nor the basic needs for appreciation, it seems a bit arrogant to display their ideas as part of a political and social scheme. It is my opinion that being critical toward the production of knowledge does not have to amount to a total deconstruction of scientific knowledge. I also believe that it is possible to say that scientists popular within the New Age movement represent something else than mainstream science, without assuming that their ideas are merely mirrors of cultural discontent.

## 5. Theoretical preliminaries

To account for the ideas and theories of the selected physicists we must therefore find a theoretical alternative to the re-enchantment paradigm. Before we do so however, we must take some time to consider the definitions of both the re-enchantment paradigm itself, but also the disenchantment thesis preceding it.

### 5.1 Disenchantment and Science as a Vocation

The sociology of Max Weber is a complex network that stretches over a vast territory of themes and subjects. The most important work of Weber cover both the history of economy, philosophy of science, methodology and sociology of comparative religion. Although they are difficult to summarise in one piece, one theme that seems to underlie much of his work is the process of rationalisation. What distinguished Western societies from others, he believed, was a tendency to view everything from the natural world, to human action and experience, to our ways of organising and governing our societies and institutions as increasingly knowable. It was a process occurring on several levels, in which all our various endeavours could be calculated and predicted to develop the most profitable outcome. To investigate this process and arguably to distinguish rationalisation from other tendencies and characteristics, Weber developed ideal types, which roughly can be defined as typologies or hypothetical constructs of a certain phenomenon. Although Weber's typologies differed depending on what they were used, the variations within the phenomena studied often followed a certain pattern. This is most visible in his ideal-type for human action, which is described in four variations. Besides

the increasing form of *instrumental-rationality* that was characteristic to the process of rationalisation, human actions could also be *traditional-rational* and led by traditions and customs, *affective-rational* where decisions were made as a part of an emotional reaction, or *value-rational* in which choices were based on conscious beliefs or principles.<sup>63</sup> While these typologies were just meant to aid the process of thinking, they clearly demonstrate what Weber believed was the direction of history. Whereas the world was previously ruled through tradition and emotion, the historical development was moving more and more toward instrumental-rationality.

To Weber, this was not “a triumph of reason”,<sup>64</sup> but a pessimistic outlook of a future run by profit interest and heartless bureaucracy. Although the characteristic of this grim future were already beginning to manifest, Weber believed that his contemporaries were still awaiting the real “iron cage of rationality”.<sup>65</sup> As a child of his time Weber very much reflected the angst and fears of his century, where modernity was perceived as a force of fragmentation and cultural decadence. It is often emphasised that Weber grew depressed by his own predictions and he seems to have been experiencing personally the very loss of meaning that he thought was pending due to the process of rationalisation. During his last years, Weber also began emphasising that the result of this process would be the *disenchantment of the world*. Although this was never a part of his previous writings, he adjusted his earlier work so to more strongly articulate that disenchantment, above all, was the fate of our time.<sup>66</sup> Among various other embodiments of rationalisation, the natural sciences played a special role in enhancing the world’s disenchantment. In 1917 Weber also held a special lecture on the subject of science as a vocation. The diminishing of mysterious and incalculable forces in nature, which in theory meant separating nature from the mysterious or divine, in practice meant for scientists to keep their hands off anything of incalculable and mysterious character. Weber thus declared that the disenchantment of the world would demand a separation of the value spheres of science and religion and refuse any transfers between them. To be religious Weber declared, one would have to exclude any rational inquiries and restrain oneself to faith alone. As he called it, religion required an “intellectual sacrifice”.<sup>67</sup> Naturally, any attempts to do science on the other hand, would therefore neglect

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<sup>63</sup> Boglind Anders, Eliaeson Sven, Månson Per, *Kapital, rationalitet och social sammanhållning* (Stockholm: Norstedts, 2005), p. 154-155.

<sup>64</sup> Alan Aldridge, *Religion in the Contemporary World. A Sociological Introduction* (Cambridge: Polity Press, 2013), p. 41.

<sup>65</sup> Boglind et al. 2005, p.183.

<sup>66</sup> Aspren 2014.

<sup>67</sup> Aspren 2014, p. 37.

divine inquiries and faith. Consequently, to be a scientist meant an inability to satisfy existential or religious needs, or to extrapolate meaning or morality from nature.

## 5.2 Re-enchantment

Contrary to what Weber believed however, several scientists actively endorsed a combination of religion and science, while simultaneously refusing to commit an “intellectual sacrifice”.<sup>68</sup> The fact that the process of disenchantment seems occasionally at least, to have been disturbed by what may be called, romantic tendencies, has thus led many historians to speak of a *re-enchantment*. This phenomenon is defined by Richard Jenkins as consisting of two tendencies “one which insists that there are more things in the universe than are dreamed of by the rationalist epistemologies and ontologies of science, the other which rejects the notion that calculative, procedural, formal rationality is always the ‘best way’”.<sup>69</sup> Another description of re-enchantment presented by Kennet Granholm is “as an active effort to acknowledge embrace and seek affective and analogical thinking and action, while at the same time underscoring the insufficiency of rationality”.<sup>70</sup> Jenkins therefore argues that “disenchantment has, at best, proceeded unevenly, and, at worst, not at all”.<sup>71</sup> The reason behind this failure, Jenkins argues, is that modern society is wrongly assumed to be a hegemonic force of formal-rational logics in which organisations or institutions are assumed to be immune to irrational tendencies. Weber, he says, underestimated both the capacity of humans to resist formal bureaucratic rationalities and the enduring force of irrational dimensions of social life. While it might have seemed plausible when Weber suggested it, modernity is not composed of a singular force but – as history often reveals – of both rational and irrational segments. Even the most efficient bureaucracy is not immune to the influence of tradition and, as Jenkins stresses, formal rational organisations themselves are often inherently irrationalised. Thus in times when rationality and formal bureaucracy seems to dominate, our inclinations towards irrational tendencies will not just cease to exist.

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<sup>68</sup> Asprem 2014, p. 37.

<sup>69</sup> Richard Jenkins, “Disenchantment, Enchantment and Re-enchantment: Max Weber at the Millenium” *Max Weber Studies*, 1,1 (2000), pp.11-32, p. 12.

<sup>70</sup> Kennet Granholm, “Locating The West. Problematizing the Western in Western Esotericism and Occultism” in *Occultism In a Global Perspective*, eds. Henrik Bogdan & Gordan Djurdjevic (London: Routledge, 2013), p. 30.

<sup>71</sup> Jenkins 2000, p. 12.

### 5.3 Problems

There are two problems with the re-enchantment paradigm which reveals themselves when trying to understand the ideas of scientists on new age conferences. Firstly, the re-enchantment paradigm is couched in oppositional terms which means that it has traditionally been linked to a form of reaction against dominating science.<sup>72</sup> In the above definitions, re-enchantment is suggested to be an alternative to, if not even a refutation of, rational epistemologies and ontologies. If we apply this on scientists within the New Age movement, it automatically suggests that they are reactionary and share a connection with earlier oppositional and strange ideas. It also suggests that they seek answers beyond the means of rational science. Secondly, the common feature of re-enchanting science as uniting both science and religion as two previously differentiated realms, as well as faith and reason as two categories, is also difficult to apply practically when approaching these ideas.

Whereas the re-enchantment paradigm might have an explanatory power when it comes to general descriptions of our popular culture, it will prove problematic when studying scientists within the contemporary New Age movement more closely.<sup>73</sup> It is, in other words, not the primary purpose to question re-enchantment as a historical and contemporary tendency, but to question its usefulness as an explanatory tool for the ideas of such scientists.

## 6. Theory

As an alternative I have chosen to combine two theories. The first one is Egil Asprem's thesis on the *problem of disenchantment* which is an alternative to the re-enchantment paradigm, that addresses the problems with disenchantment perceived among scientists and occultists during the beginning of the twentieth century, and the second one, written from an anthropological point of view, by Matthew Wolf-Meyer and Chris Cochran,<sup>74</sup> proposes that quantum consciousness should be understood as a *minor science* and thus be treated as a science in a marginal position.

### 6.1 The Problem with Disenchantment

At the heart of Asprem's theory lies the historical period between 1900-1939 and the attempts among both intellectuals and esoteric spokespersons to counter the disenchantment of the

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<sup>72</sup> Asprem 2014, p. 26.

<sup>73</sup> See Christopher Partridge, *The Re-enchantment of the West: Alternative Spiritualities, Sacralization, Popular Culture, and Occulture* (New York: T & T Clark International, 2004).

<sup>74</sup> Matthew Wolf Meyer & Chris Cochran, "Unifying Minor Sciences and Minor Literatures: Reproduction and Revolution in Quantum Consciousness as a Model for the Anthropology of Science" *Anthropological Theory*, 15, 4 (2015), pp.407-433.

world. Similar to the argument I am trying to make, Asprem finds that these ideas should not be viewed as merely reactionary. The anti-materialists and anti-mechanists of these intellectuals, he says, may seem heterodox when viewed against the disenchantment thesis, but are nonetheless protagonists in the scientific successes of the century. While they might have been less successful then, they were not automatically unconventional. In fact, many of them were amongst the pioneers of scientific theories which are orthodox today. The reason why they have traditionally been viewed as counter-voices, Asprem argues, is that the plurality of positions available among post-enlightenment intellectuals have been neglected. The naturalism during the early twentieth century was not especially well-defined and while intellectually normative it was thus also flexible enough for individuals such as Hans Driesch and Samuel Alexander to engage with its inherent challenges and problems. While this flexibility also allowed them to converge with occultists and esoteric spokespersons, it did not necessarily mean that they stood in opposition to the dominating values of science. They were not re-enchantments or oppositional forces Asprem stresses, but merely expressing intellectual problems for which they sought the “outer limits of reason” to solve.<sup>75</sup> To account for such seemingly heterodox sciences he suggests that the common assumption of disenchantment as an anachronistic process is reconceptualised as “a cluster of related intellectual problems, faced by historical actors”.<sup>76</sup> Instead of using disenchantment as a developing process towards the declining mysteries within nature, he employs the concept as a synchronic event expressing itself in the parallel expressions of intellectuals from various fields of research. The general argument made by Asprem is that the various ways of doing natural theologies during the beginning of the twentieth century suggests that naturalism is not a closed subject but a paradigm open for alterations. The argument concludes that this openness poses a problem for the disenchantment of the world in which a central requirement is the separation of religion and science. To understand the negotiation of naturalism that took place during this period Asprem therefore develops the term *open-ended naturalism*. Instead of retaining the simple distinctions between naturalism and supernatural, he argues that we must learn to see the continuum between them. This he says, allows one for instance to distinguish between epistemological naturalism and ontological naturalism. Whereas the latter only includes beliefs or worldviews in which reality per se is understood through naturalism, the former can get away with various panentheistic and animistic views by only adopting the naturalistic methods. I will add to this claim, however, that ontological naturalism in a similar

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<sup>75</sup> Asprem 2014, p. 1.

<sup>76</sup> Asprem 2014, p. 5.



manner can display a methodology common to or inspired by spiritualism or psychic research which refutes the epistemology of established science and instead opts for other alternatives. Such alternatives might include non-material, non-mechanical methods or a more general refutation of positivism. Consequently, naturalists can indeed pay attention to things of supernatural character so long as it has a “this-worldly component” or they can gain from supernatural claims due to its epistemological propositions.

To make the problem of disenchantment – and the open-ended naturalism displayed therein – methodologically applicable, Asprem reconstructs the three main features of Weber’s lecture on “Science as a Vocation” as *epistemic optimism*, *metaphysical scepticism* and *axiological scepticism*.<sup>77</sup> The Epistemic Optimism of disenchantment entails “a belief in the explicability and calculability of the world”,<sup>78</sup> or in other words an optimistic attitude towards acquiring knowledge of the world. Because everything can be measured through rational means, no mysterious or unexplainable forces are left to be expected in the world. There are however, limits to the *type* of knowledge we can obtain, which is the question the other two features are concerned with. The Metaphysical Scepticism entails a restriction to the kind of knowledge Immanuel Kant called “phenomena” which refers to things that are observable by the senses, and is opposed to what Kant in turn calls “noumena”,<sup>79</sup> which refers to the thing-in-itself or the essence behind it. Science should according to a metaphysical scepticism thus only be concerned with acquiring knowledge about the empirical world and is therefore restricted against questions about the deeper forms of reality. Another limitation, seen in the feature Asprem calls Axiological Scepticism, is the distinction between facts and values. Science do not provide any variables or means for expressing subjective things, since it is merely focused upon empirical facts. Together, these three facets allow Asprem to point out where exactly disenchantment becomes a problem. The question of whether scientists’ ideas are problematic to the disenchantment can in other words be specified by asking questions about these three demands. For example, “Are there incalculable powers in nature, or are there not? How far do our capabilities for acquiring knowledge extend?” and “Can there be any basis for morality, value, and meaning in nature?”.<sup>80</sup>

There are several differences, I believe, between Asprems approach and the traditional re-enchantment paradigm. Besides his own wish to contribute with an alternative to

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<sup>77</sup> Asprem 2014, p. 32.

<sup>78</sup> Asprem 2014, p. 34.

<sup>79</sup> Asprem 2014, p. 34.

<sup>80</sup> Asprem 2014, p. 47.

disenchantment that does not view the expressions of early twentieth century scientists and esoteric spokespersons as *tendencies* or as *oppositions*, he also introduces the potential of an intellectual idea to carry strains of thought that does not work well together with Weber's predictions of what science should entail, something which gives room for variation, for ideas that are not only problematic to disenchantment because of, for instance, re-entanglements between science and religion or nature and divine, but which allows a broader range of problems to be included. In other words, it makes it possible to be problematic to disenchantment for a broader range of reasons, something which on a more fundamental level forces us to consider what exactly disenchantment or at least its epistemological and ontological underpinnings means to the individual scientist.

## 6.2 Minor science

Another possibility is to regard these physicists as a minority in relation to the scientific community. Matthew Wolf-Meyer and Chris Cochran suggest that the common New Age science called quantum consciousness should be understood against Gilles Deleuze and Felix Guattari's theories of minority.<sup>81</sup> In the example of the authorship of German speaking Prague Jew Franz Kafka, Deleuze and Guattari define *Minor literatures* as composed of three characteristics. Firstly, minor literature is *deterritorializing*, which signifies the use of a language that is not one's own and the shattering and reshaping of it in an incorrect or a non-conventional way. The second characteristic for minor literatures is *politicisation* which means that it is inherently *political*. In contrast to "great" literature where the individual question is not necessarily connected to the social and cultural context, in minor literature where one suffers from a narrow and limiting space, the individual case is always a political one. Lastly, minor literatures often attribute *collective* value to its interests. Things that are uttered are not of subjective character or merely significant for the individual author but takes on a positive function for the collective.<sup>82</sup> *Minor science* in turn – also called nomadic science – is identified as a marginalized, fluid and critical counterpart to what Deleuze and Guattari calls *State science* and which I have previously referred to as mainstream science. The latter which is a science whose knowledge production is "predicated upon the capitalist arrangements of labour" is "concerned with classification, hierarchy, and order; theories of solids and being".<sup>83</sup> It is a form of knowledge production which is ruled by objectivity, and

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<sup>81</sup> Wolf Meyer & Cochran, 2015.

<sup>82</sup> Gilles Deleuze, Felix Guattari, *Kafka. För en mindre litteratur* [Kafka: Pour une littérature mineure, 1975] translated by Vladimir Cipciansky & Daniel Pedersen (Göteborg: Daidalos, 2012).

<sup>83</sup> Wolf Meyer & Cochran 2015, p. 413.

reproduction, and which is initiated by the ambition to discover. Minor sciences on the other hand are marginalised sciences ruled by contingency and subjectivity. Its pursuit of knowledge is not focused upon finding solutions nor replicating earlier experiments to slowly increase its wisdom, but on singularities and specific problems which are either pre-existing or invented during the process. Following this latter characteristic, minor sciences often demonstrate how the objects of science are “invented through complex social investments”,<sup>84</sup> contrary to the positivistic understanding of reality as objects existing autonomously. Moreover, since they are involved in questions that neither contribute to dominant science and its wealth nor can be submitted to its rules of conduct, minor sciences are both marginalized and in opposition to the state. Ever since sciences moved into the hallways of universities and corporations Wolf-Meyer and Cochran explains, it also grew closer to the state, and from there on the state and its capitalist system have ruled the orderings of its conduct. In conclusion thus, any science who choose to work by different methods, becomes a minor or a nomad and must survive by other means. In their case study of such nomad sciences, Wolf-Meyer and Cochran argues that Quantum consciousness manages to avoid the state science division of labour, due to the aid of wealthy donors who are interested in its cause, or through popular writings which creates “external pressure in society to force scientific consideration” of its ideas.<sup>85</sup>

To study quantum consciousness as a minor science, Wolf-Meyer and Cochran suggest that it should be complemented by minor literatures, and therefore builds a model combining the two. This combination consists of three features which are partly taken from the three-folded characteristics of minor literature. Firstly, *minor sciences are deterritorialized* which means that they utilize the same discourse as state science, while simultaneously framing questions with it that demands a slight stretch of the language or the discourse’s original purpose. Minor sciences therefore “unsettle”, or re-contextualize the scientific language and make it into something that it was not meant to be from the point of view of state science. While these scientists employ the language of state science they simultaneously suggest an emergence of a new mode of thinking which plays right into the hands of the New Age and spiritual culture. In other words, they allow themselves to be the proof used to promote a global transformation – and by their pioneering of new-thinking rationale, deterritorialize the scientific language. Secondly, *minor sciences are political* in that their ideas and practices are challenging to state science. Since its language is used for the purpose of entertaining singular

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<sup>84</sup> Wolf Meyer & Cochran 2015, p. 413.

<sup>85</sup> Wolf-Meyer & Cochran 2015, p. 427.

subjects of no relevance to state science it produces a cramped and political space which further its existence. This irrelevance can be exemplified by the links drawn by some scientists between science and existential or ethical issues, something which makes it inherently political; it becomes a science for people and human issues. Following this second feature is the fact that *minor sciences are bachelor* which refers to the self-marginalisation and furthering of one's external and critical position in relation to state science. Deleuze and Guattari used the concept of the bachelor to describe a middle between state and nomad, where one is positioned to inherit the power of the other, and Wolf-Meyer and Cochran adopt it to describe the self-described status as a minority awaiting its future replacement of state science.

Viewing scientists within the New Age movement as being minor instead of oppositional might seem like a minimal change, but in comparison with the latter, being minor re-appraises one's status as a science. If we approach their ideas and positions as being minor, they are, in comparison, taken more seriously as attempts to scientific development, instead of being merely mouthpieces to New Age beliefs or false attempts to win approval and higher public status. Their writing becomes an expression of being a science in a "cramped and political space" rather than an irrational and reactionary pseudoscience. Ultimately this allows us to appreciate the ideas of scientists within the New Age movement, as occupying this particular space for reasons concerning their scientific ambitions as opposed to reasons concerning religious motivations. In similarity to the problems-approach then, the minor science theory recognizes that being fluid or critical as a scientist does not have to manifest itself as a position of heresy where it becomes wedded with religion.

## 7. Method

To analyse the selected material, I have used a qualitative content-analysis. Like other forms of textual analysis, the content analysis examines "the messages imbedded in texts" where texts can be identified as "any object, artefact or behaviour that involves symbol use".<sup>86</sup> More specifically, content analysis can be defined as "a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use",<sup>87</sup> and it ranges from more quantitative to qualitative or interpretative form. A qualitative content analysis is very similar, if not the same, as the coding of material used in qualitative

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<sup>86</sup> Chad Nelson & Robert Junior H. Woods, "Content Analysis" in *The Routledge Handbook of Research Methods in the Study of Religion*, eds. Michael Stausberg & Steven Engler (London: Routledge, 2011), p.109-120, p. 109.

<sup>87</sup> Klaus Krippendorff, *Content Analysis. An Introduction to its Methodology* (London: Sage, 2013), p. 39

research in general, and is often composed of different levels of reading. Although it varies depending on what approach we have, William Neumann suggests that the initial step is often an open coding, where the material is read for the first time and sometimes accompanied by side notes. The open coding does not relate to any pre-existing concepts or theories but rests on an open mind, and will result at most in a few broader labels. In the second stage of coding which Neumann calls axial coding, the researcher approaches the material with a somewhat more organised set of concepts – developed from the initial coding – and tries to find relations or patterns between them. Lastly, in what Neumann calls selective coding, the researcher has settled for a set of concepts which he or she uses to selectively look for to support a certain case or theme.<sup>88</sup> This levelled reading looks a lot like the one I have employed here but whereas the previous is more of a straight line, mine has been characterised by a back-and-forth process. This can be described as an alternation between an inductive and empirical-laden approach where one allows the material to speak for itself, and a deductive approach navigated by preconstructed theories. This type of combination is sometimes called an abductive approach.<sup>89</sup> To describe this more closely, the choice to finally use the combination of the above theories as a benchmark for the entire material was a decision taken after already reading the material, first against an open mind and then more causally against several theories. As I struggled to understand these ideas, I realised that my initial theoretical framework, was misleading. I was convinced that a more informed understanding of them had to be established, and with a humble attempt to do so, I started looking for alternatives. While I did not know it at this point, this dilemma would eventually become articulated as a problem with the re-enchantment paradigm. The theoretical perspectives by which I arrived at this epiphany was then subdivided into the final categories that guided my reading.

As opposed to quantitative research, where facts are sampled and collected more objectively, qualitative research thus rely on an interpretative framework. A common assumption is therefore that the truth is not merely out there but that it must be interpreted and in some sense constructed.<sup>90</sup> While this means that the rules for achieving a reliable research are expressed a bit differently, they are not less extensive. Two important criterions in both quantitative and qualitative research are reliability and validity. The latter, which signifies whether a research is possible to repeat for similar results in a similar time or context, means

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<sup>88</sup> William Neumann, *Social Research Methods: Qualitative and Quantitative Approaches* (Harlow: Pearson, 2014), p. 482.

<sup>89</sup> Mats Alvesson & Kaj Sköldböck, *Reflexive Methodology: New Vistas for Qualitative Research* (London: SAGE, 2009), p. 5.

<sup>90</sup> Alan Bryman, *Samhällsvetenskapliga metoder* (Malmö: Liber, 2002).

that a detailed enough description must be made so that another researcher may compare and judge for himself whether one's study is relatable or doable on another occasion. Validity, which concerns whether the ideas or theoretical understandings matches what is being studied, or more quantitatively put, whether one's operationalisations measure what is implied to be measured, is customarily described in qualitative research as the need to create a "tight fit" between our statements and the social reality we are studying.<sup>91</sup> Both criteria suggest that we carefully account for the concepts and ideas we have used. One intrinsic part of this is therefore the construction and presentation of the categories I have used to read my material. In the following I will therefore describe how I have utilized the theoretical framework above, what categories I have employed to signify them, and on what principles these choices rest.

## 7.1 Categories and Application

Since I have chosen to use two theories which sometimes tend to express the same problem, I have adjusted my categories to signify different things,<sup>92</sup> or at least different aspects, so that they do not overlap each other. Due to such reasons the following categories – which are borrowed directly from Asprem and Wolf Meyer & Cochran – have been slightly revised to better suit my material.

### 7.1.1 The Problem of Disenchantment

The first categories will denote what Asprem calls the problem of disenchantment, which is a reconceptualization of disenchantment as a set of interrelated problems. These problems are embedded in three domains, the *epistemological*, the *metaphysical* and the *axiological* and depending on how they are treated they will either consolidate or challenge the disenchantment of the world. In terms of the research question of what these ideas are and what position they hold in relation to science and religion, these categories will tell how the borders between science and metaphysics/religion are being set. The re-evaluation of the re-enchantment paradigm emerges through the focus on how the ideas relate to the epistemological and ontological underpinnings of disenchantment rather than as a direct opposition to its separation of science and religion.

*Epistemological domain:* If scientists believe, as according to Weber, that everything in the world is calculable, then they share what Asprem calls an *epistemic optimism*. As we have seen among the scientists during the late nineteenth and early twentieth century however,

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<sup>91</sup> Neumann 2014, p. 218.

<sup>92</sup> Krippendorff 2013, p. 147–148.

nature is often considered to be ruled by “something else” and the calculability of physical reality is therefore doubted. To denote such tendencies I will use the concept of *epistemic pessimism*. The strength of this code is that it has the capacity to detect when certain mysterious forces are attributed to the laws of physics, and when references are made to the unexplainable and non-reducible aspects of life. In this domain, the problem of mechanism vs. teleology can be found, where intellectual actors argue on the question of whether the universe and its parts are driven by purely mechanical means or if they are imbued with a purpose (*telos*). It contains questions of free will vs. determinism and the problem of spontaneity and order. We have seen this been exemplified both among emergentists, where new qualities emerge from the interaction of the systems parts and thereby creating a whole that is non-deducible, as well as in New Age sciences such as Bohm’s notion of the super implicate order which implies that physical reality is driven by purpose.

*Metaphysical domain:* The second domain refers to what type of knowledge science should obtain. To obey disenchantment means to possess what Aspren describes as a *metaphysical scepticism* where science is defended against descriptions concerning the essence of reality, that is, what Kant called “noumena”. Thus, in this domain, we are concerned with the relationship between science and metaphysics, or in a broader sense, with what science can or cannot say about what reality *is* on a deeper level. When and if physicists on New Age conferences are speaking about the latter I will refer to them as *metaphysically optimist*. If we think about the early twentieth century physicists described in the historical section above, being metaphysically optimist would include those physicists who believed that one could extrapolate from the Copenhagen interpretation that the underlying essence of reality was conscious or that the substratum of everything was similar to the structures of the mind. Another later example among New Age scientists is Bohm’s holomovement. It is therefore the description of the very form – to speak in terms of Plato – behind, or at the foundation of reality that is referred to in this case.

*Axiological domain:* Weber believed that the disenchantment of the world imposed a separation between science and religion that required an “intellectual sacrifice” when concerned with faith.<sup>93</sup> Hence to be a proper scientist one had to apply the notion of *axiological scepticism*, which means to not extrapolate values, worldviews, meanings or faith from the scientific knowledge of physical reality. If this restriction is broken I will refer to it

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<sup>93</sup> Aspren, Egil. 2014, p. 37.

as an *axiological openness*. There can be different expressions of this openness, one being that the categories of nature and divine are united, such as in the emergentist understanding of life where God becomes the directing nissus of evolution, and another being more direct statements about how science and religion as two realms may be brought closer to each other, which for instance could be seen in both Pauli and Eddington's visions of quantum physics, or perhaps more explicitly in the later parallelism of Capra. Since this openness reaches far beyond just nature-divine and science-religion distinctions, this category will also denote anything that can be put under the entanglement of fact and value, such as the combination of science and political or moral concerns.

### 7.1.2 Minor Science

The second set of categories will be used to denote what Wolf-Meyer and Cochran call *minor sciences*, which refer to sciences that are in a marginal position in relation to state science, which in this case is the discipline of physics. To measure this position, they suggest three categories, *Deterritorialization*, *Politicisation* and *Bachelorhood*. Since the previous set of categories are much more valuable in our analysis of the ideas' relationship to religion and metaphysics, I have tried to emphasize the following categories in a way that denotes the ideas' relationship with dominant or mainstream science. In terms of the question of what these ideas are and how they relate to science and religion, these will therefore relate more one-sidedly to how science becomes negotiated. The latter is significant for the question of re-evaluating the re-enchantment paradigm since it signifies that the ideas are speculations or negotiations of science rather than entanglements with religion.

*Territorialization*: The word deterritorialization, which in its original form is meant to identify a form of language that is used outside its original territory, is suggested by Wolf-Meyer and Cochran to denote the tendency among minor sciences to utilize the discourse of state science while simultaneously framing it beyond its original purpose. While they exemplify Deterritorialization through scientists who are entangled with the New Age movement and who thereby present state science in the light of New Age beliefs, I will employ the term a bit differently. Since the axiological domain will account for such entanglements, this concept will be borrowed to *describe the negotiation of physical theories and the territory of physics*. Instead of deterritorialisation which signifies a misuse or misplacement of something, I will refer to it as territorialisation, focusing instead on how a territory is negotiated. The same example mentioned above where the measurement problem is used to say something about the essence of reality, can according certain interpretations of that problem, be described as an



unsettlement of its original purpose. What we are concerned with when it comes to territorialization is therefore the discussion of what should be regarded as the right interpretation and thus the territory of physics.

*Politicisation*: A common feature of minor sciences is that they entertain singular or specific interests which due to its irrelevance to state science make them suffer from a limited and narrow space. Gilles and Deleuze believe that this has a tendency of making one's ideas inherently political, something which they refer to as a form of politicisation. While Wolf-Meyer and Cochran exemplifies this with scientists who connect with existential or ethical issues, politicisation will be used in this essay *to denote criticism toward the doings of science* which more explicitly intends a critical attitude toward how things are organised or how specific notions are praised or upheld despite their inadequacy, *which in turn might be the result of entertaining less relevant or conventional subjects*. A second feature of this concept is therefore that the critique or *politicisation* is often bound to singular or specific interests, which as a result, dominant concepts within science do not comprehend.

*Bachelorhood*: Directly related to politicisation is the concept of bachelorhood which *I will use to denote the belief that one's less conventional ideas will one day bring success to science*. As Wolf-Meyer and Cochran define it, minor sciences are self-marginalising and furthering of its own critical position in relation to state science. In my use of this category I will not emphasise this critical position as external to state science, but as a wish to replace certain trends *within* science. Their allegiance is still toward the scientific community but they are simultaneously critical to parts of it, and believes that their own contributions will develop it into a better version. As such, they are revolutionising science rather than reproducing it.

## 8. Results

In the following chapter I will provide an individual analysis and interpretation of each scientist before sketching any general inferences. The layout of this section, I believe, demonstrates how the re-enchantment paradigm decreases in analytical value, and more specifically ranges from Lothar Schäfer who is noticeably more informed by the New Age discourse, to Roger Penrose who is foremost informed by and related to a scientific discourse.

### 8.1 Lothar Schäfer: A Science for Human Potential

Among the scientists in the following Lothar Schäfer's explicit belief in the significance of quantum physics for human potential and spiritual growth, makes him a good example of a scientist that can be understood through a more traditional re-enchantment paradigm. The

focus of his idea is mainly to speak about human potential, and he does this based on an ontology developed on quantum physics and more particularly the measurement problem. The measurement problem which as we have seen concerns the measurement of physical systems, can be interpreted in several ways. The Copenhagen interpretation mentioned above, for instance, says that the collapse of the wave-function into one position is merely a heuristic and does not say anything about reality per se. The discontent toward this type of formalism has driven physicists as famous as Albert Einstein to argue that quantum mechanics is fundamentally incomplete. Schäfer believes however that this incompleteness is not inherent to the theory but to the very physical reality it attempts to understand:

As it turns out, something is, indeed, missing in the world of atoms and molecules. However, whatever it is that is missing isn't missing in the theory; it is missing in the visible reality. The problem isn't that the theory is incomplete. The problem is that the visible surface of things is incomplete because it has little to say about the nonempirical realm of reality, where the cosmic potentiality has its home.<sup>94</sup>

Contrary to the heuristic interpretation, Schäfer thus uses the measurement problem to build an ontology of two orders; the visible surface of things and the non-empirical realm of potentiality. On a more fundamental level however, the non-empirical realm, which he also calls the cosmic realm, is a holistic background to everything that exists in the universe, making his ontology essentially monistic:

The specific forms that quantum physics had to adopt to describe the states of potentiality are *waveforms*... This formalism implies that the things we see in the world aren't made up of material particles, but of waves: and that the universe is an ocean of waves – not waves of matter or energy, but nonmaterial, invisible waves in the realm of potentiality. There are indications that these waves are hanging together like the water waves in an ocean, so that the nature of cosmic potentiality is that of an indivisible wholeness – some call it *the One* – in which all things and people are interconnected. The things you see in the world are somehow actualizations of waves; they are emanations out of the One.<sup>95</sup>

The actualization of things out of the cosmic potentiality can be described as an emanation out of a holistic background of the world; out of an indivisible wholeness that is One.<sup>96</sup>

These waves, he explains, are numerical patterns which emanates or actualises themselves into the visible world as a result of interaction with other entities or particles. This relation looks a lot like the platonic notion of forms which is believed to precondition the visible reality. The Pythagoreans before Plato also believed that the primary of all things were numbers, and in similarity to such ideas, Schäfer describes that the basis of the visible world

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<sup>94</sup> Lothar Schäfer, *Infinite Potential. What Quantum Physics reveals About How We Should Live* (New York: Deepak Chopra Books, 2013a), p.9.

<sup>95</sup> Schäfer 2013a, p. 9.

<sup>96</sup> Schäfer 2013a, p. 22.

is “a realm of hidden images”.<sup>97</sup> To put it even more philosophically Schäfer likens it with both Carl Gustav Jung’s concepts of archetypes and the Biblical notion of logos:

What the unconscious is to the mind, the nonempirical realm of reality is to the empirical world. As elements of our mind, the archetypes are nonempirical. Since they have the potential to appear in our consciousness, they form a realm of potentiality. I think that we should have the courage to integrate the two and think of them together: Jung’s realm of forms and the realm of forms that quantum physics discovered.<sup>98</sup>

“In the beginning was the Word, and the Word was with God, and the Word was God”. This is how the Bible begins its account of creation of the world. In the original Greek text of the bible, the term *logos* is used as the principle of creation, which is translated as “Word” in the English version. This is precisely the ontology of quantum theory. In the beginning – that is, before it is a visible thing – everything is a logical state in the realm of potentiality: *logos*.<sup>99</sup>

The initial interpretation of Schäfer’s scheme is therefore related to the concept of *metaphysical optimism* where the essence of the world is viewed as a nonmaterial and invisible background to empirical reality.

Related to this is also an *epistemic pessimism and politicisation* where he is sceptical to scientists for not accepting the non-empirical as real. In fact, he says, the waves of the non-empirical realm are not just real but *elementary*. Reality is not created *after* the process of actualisation he says; reality includes the non-empirical realm as well:

A second misunderstanding is that, in the process of actualizing an ET [entity] into a particle state, *reality is created*. This is completely wrong. It is the mistake of equating “being real” with “being visible” or “being real” with “being material”. ETs are always real. The invisible, nonempirical, and nonmaterial forms in the realm of potentiality are a part of reality.<sup>100</sup>

The notion that observation creates reality is a striking example of how deeply rooted convictions, such as classical empiricism, can brainwash even the most brilliant scholars.<sup>101</sup>

The fact that the non-empirical is *real* seems to make scientists uncomfortable Schäfer argues, and instead of recognizing its realness, they come up with other solutions:

Now you see, when you start talking about non-empirical entities in an empirical science, that’s embarrassing you know. So, the pioneers, they tried to explain these things away. Like Niels Bohr, he said, ‘look we have no experience of things, we only have an experience of our experiences, it tells us nothing, just forget about it’.<sup>102</sup>

In an empirical science the discovery of a nonempirical reality is an embarrassment, like the illegitimate child of a fallen daughter in a pious family. A young science walking a nonempirical path way soon find herself fired, where the verdict “You are fired” is often pronounced with a certain feeling of nostalgia and regret that heretics can’t be set on fire anymore. Many pioneers, among them such giants as Niels Bohr and Albert Einstein, constantly reassured their clients that, because they are invisible, wave functions, and particularly, virtual states are epistemological, not

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<sup>97</sup> Schäfer 2013a, p. 49.

<sup>98</sup> Schäfer 2013a, p. 198.

<sup>99</sup> Schäfer 2013a, p. 12.

<sup>100</sup> Schäfer 2013a, p. 52.

<sup>101</sup> Schäfer 2013a, p. 52.

<sup>102</sup> Lothar Schäfer, *Quantum Reality and the Metamorphosis of Human Consciousness* (Sages & Scientists, 2012).

ontological entities. That is, they have nothing to do with the nature of reality, but only with our knowledge of reality.<sup>103</sup>

As one can interpret by this statement, scientists thus avoid more essential understandings of reality – even if it is the more correct one – because it is problematic to ideals of science as dealing with solid and material objects.

A more central concern to Schäfer however, which I have interpreted as an *axiological openness*, seems to be the possible metamorphosis of man that the non-empirical realm implies. Though Schäfer does not believe that consciousness creates reality he still believes that reality itself is thought-like. Quantum theory, he says, is “without any doubt... a form of idealism”.<sup>104</sup> The difference between his idealism and the other, where consciousness creates reality, is that we are not the idea-like reality’s creator or source, as much as we are an expression of it. Schäfer is convinced that since physical reality in general has a nonempirical realm that precedes it, humans as well are actualizations of its potentials. The same way potentials must actualise into the visible world, we must also actualise ourselves:

The suggestion that I would like to make is this: We have an inner potential because the universe has an inner realm of potentiality. The inner need in you is a cosmic need, and this is where the wholeness of it all is so important: The inner urge can be in you because the nature of reality is that of a wholeness; that is, it can be in touch with you. Because the universe is an indivisible wholeness, the potential in you is cosmic.<sup>105</sup>

In that regard, the cosmic or non-empirical realm has two ways in which it appears in our world, “as images in our mind or as structures in the material world”,<sup>106</sup> something which if occurring at the same time, gives rise to a synchronic event. Synchronicity is as Schäfer defines it “a concept introduced by Carl Jung to describe the simultaneous appearance of two or more events that are connected in meaning but not in their visible causes”.<sup>107</sup> This might seem like it does not give much room for freedom, but Schäfer believes that the cosmic realm “feels out” the visible realm before it jumps into it, something which makes it possible for us to affect what result will be actualised.<sup>108</sup> In addition, Schäfer claims that state transitions like these are comparable with what goes on in our minds; we reach into our unconscious realm “of inner images and then decide which one will be the best to actualize”.<sup>109</sup> But this also works the other way around; things do not only emanate *from* the cosmic field into our consciousness but also from our consciousness into the cosmic field:

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<sup>103</sup> Schäfer 2013a, p. 72-73.

<sup>104</sup> Schäfer 2013a, p. 23.

<sup>105</sup> Schäfer 2013a, p. 93.

<sup>106</sup> Schäfer 2013a p. 113.

<sup>107</sup> Schäfer 2013a p. 111.

<sup>108</sup> Schäfer 2013a, p. 70.

<sup>109</sup> Schäfer 2013a, p. 70.

With the experiences that it makes through us, the cosmic potentiality is learning. It constantly manifests and reabsorbs. There is a continuous flux from the evolution of tendencies to their actualizations – empirical events – and from empirical events to new tendencies. Each new state of potentiality carries in it, like a stigma, the memory of the last state. You are a white crest on the surface of this ocean.<sup>110</sup>

The consequence of this is that our way of thinking and acting is essential for our self-actualization. The “potential in you” as Schäfer expresses it “allows you to choose what kind of world you will create and live in”.<sup>111</sup>

You contain infinite potential and boundless capacity for happiness and fulfilment. How do I know? Quantum physics has revealed this to be the nature of reality, and in this book, I hope to explain these discoveries and their profound implications to you. These principles can guide you to a better life and all of us to a better world.<sup>112</sup>

While the realm of potentialities may be indifferent to values, there are better and worse ways of actualizing it:

The quantum world has, indeed, some advice for how to live together on this planet. In a short formula: In a holistic world in which all things and living beings are connected, we should do nothing to impair the other. In a wholeness it isn't smart to harm, hurt, or cheat, because if you cheat others, you ultimately cheat yourself.<sup>113</sup>

In line with this argument, Schäfer even suggest that morality has its base in the nonempirical realm:

Morality is the manifestation of a transempirical, tacit moral form that exists in the realm of potentiality and appears spontaneously in our consciousness when it is needed, offering its advice to our judgement and free will.<sup>114</sup>

It is possible to think that Jung's collective conscious is a cosmic memory field that stores all the memories of humanity, good and bad. Diego Valadas Ponte, Sisir Roy, and I have presented arguments for the thesis that the human brain can transfer forms from the cosmic field into our consciousness and from our consciousness into the cosmic field. In this way the cosmic field stores the crimes of humanity as well as the achievements.<sup>115</sup>

Thus, quantum physics should be allowed to guide our world ethos and as Schäfer argues “Moral laws can and should be derived from cosmic order”.<sup>116</sup> Because we still live according to the mechanistic and deterministic notions of the classical epistemology, however, our bodies and minds are constricted. Since Darwin, Schäfer argues, we have been slaves to the laws of conflict and survival of the fittest – he “took away our right to choose”, and made us into machines where hopes and dreams “are important only insofar as they serve the manipulations of our genes”.<sup>117</sup> To break free from these shackles we should adopt the

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<sup>110</sup> Schäfer 2013a, p. 11.

<sup>111</sup> Schäfer 2013a, p. 160.

<sup>112</sup> Schäfer 2013a, p. x.

<sup>113</sup> Schäfer 2013a, p. 165.

<sup>114</sup> Schäfer 2013a, p. 188.

<sup>115</sup> Schäfer 2013a, p. 192.

<sup>116</sup> Schäfer 2013a, p. 165.

<sup>117</sup> Schäfer 2013a, p. 145, 153.

quantum worldview. Because whereas the worldview of Darwinism tells us that we are meaningless and accidental, quantum physics re-integrates us into the creative process of reality. If we manage to do this, Schäfer believes that our consciousness, and human nature in general, will be fundamentally changed. When human consciousness “undergoes a mutation” he says, the “effects are comparable to the appearance of a new species” and therefore, our new knowledge of the realm of potentiality will result in a human metamorphosis:

My suggestion is this: The discovery of the quantum phenomena signifies an evolutionary metamorphosis of the human consciousness, a leap of the evolution of life into a new human species. It shows that the structure of your mind is evolving if you allow it to evolve.<sup>118</sup>

These examples of *axiological openness* can also be witnessed in a more explicit suggestion that science and religion share common grounds:

In reality, practically all of the unexpected concepts that quantum physicists are using to describe the world were invented by spiritual teachers thousands of years ago. The quantum numbers, the concept of potentiality, the principle of wholeness, the importance of waves as the source of the manifest world – all of these ideas have historically spiritual roots...I don't think that the quantum physicists have anything spiritual in mind when they consider that elementary particles are numbers, but it doesn't matter what they have in mind. The fact is that, by the way in which it describes the world, quantum physics has taken science right into the middle of historic traditions of spirituality.<sup>119</sup>

Quantum physics he says, express the same universe that has been imagined by ancient spiritual principles for ages. The wave-mechanics he believes, revives principles of cosmic creativity and looks similar to Kashmir Shaivism and its belief in *spanda*:

In Kashmir Shaivism, *spanda* denotes subtle vibrations, waves, or throbs of the universe. These waves aren't visible in a physical medium, like water waves or airwaves, but are “vibrations in the divine”. In this spiritual tradition, origin and basis of the manifested world were seen in a divine consciousness that has the nature of vibrations. The empirical world is an emanation out of a realm of waves, or an ocean of potentiality...Quantum physics doesn't understand the realm of potentiality as an “ocean of consciousness”, and every reference to the numinous is alien to it. Nevertheless, the forms in the realm of potentiality have mindlike properties, like *spanda*. These similarities weren't intended by the physicists, but they show, nevertheless, to what extent physics has moved science into the context of spirituality.<sup>120</sup>

It can be interpreted by this, that quantum physics has no intention of understanding the depths of the universe or the numinous as he expresses it, but has because of its similarities to ancient spirituality, still moved into that context.

In conclusion Schäfer's ideas are in their entirety characterised by an axiological openness where physics and the physical reality it describes is made to function both as a directive for our consciousness to reach higher levels, as well as a moral compass for the greater good of all. The fundament of this openness is in turn a metaphysical openness and a

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<sup>118</sup> Schäfer 2013a, p. 197.

<sup>119</sup> Schäfer 2013a, p. 20-21.

<sup>120</sup> Schäfer 2013a, p. 119.

critique against the dominance of materialist among physicists which can be summarised as both an epistemic pessimism and a politicisation.

## 8.2 Menas Kafatos: An Improved Metaphysics of Reality

The next scientist who occasionally also expresses some form of spiritual worldview is much more complicated. Menas Kafatos who is a popular visitor on New Age conferences, tends to adopt somewhat paradoxical or at least complicated combination of viewpoints. While he refutes metaphysics, and wishes to banish it from science, he simultaneously argues for an improved metaphysics which he believes holds significant value for various human and environmental issues. Although he says that personal convictions and science should be held apart he also argues for a renewed dialogue between natural sciences and humanist and social sciences, but also between science and religion. To complicate things further he also seems to adopt different roles depending on the situation. Sometimes he is present in the role of a knowledgeable scientist who informs his audience on scientific concepts and theories – including both written and spoken performances – and other times he takes on the role of a meditational guru where scientific concepts are transformed into models for contemplation.<sup>121</sup>

At the bottom of these complex viewpoints lies a critique against the scientific community and especially the positivist paradigm which he believes is metaphysical:

During the eighteenth and nineteenth centuries, attempts to purge physics of all metaphysical and nonmathematical constructs resulted...in the doctrine of positivism. As it turned out, however, the epistemology that this doctrine was designed to protect was premised on an unexamined article of faith – that physical theory is a logically consistent and self-referential system that could disclose with complete certainty the essence of physical reality.<sup>122</sup>

One irony is that the physics that had allegedly purged itself of all metaphysical constructs was premised on what we have termed here the “hidden ontology of classical epistemology” hence the progress of this physics was deeply wedded to a metaphysical quest.<sup>123</sup>

...attempts to preserve this view not only require metaphysical leaps that result in unacceptable levels of ambiguity. They also fail to meet the requirement that testability is required to confirm the validity of any physical theory.<sup>124</sup>

The ontology of classical physics is therefore defined as a form of metaphysics and a leap of faith that manifests itself through the belief in one-to-one correspondence between theory and reality. When quantum physics arrived, this positivism was refuted and external reality was no longer just “out there”. While some call this change a turn toward more idealistic science, Kafatos argues that it is on the contrary more realist, since it is more careful at making

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<sup>121</sup> Menas Kafatos, *Living the Living Presence in the Quantum Universe* (Science and Nonduality, 2016).

<sup>122</sup> Menas Kafatos & Robert Nadeau, *The Conscious Universe. Parts and Wholes in Physical Reality* (New York: Springer, 1990) p. 143

<sup>123</sup> Kafatos & Nadeau 1990, p. 144.

<sup>124</sup> Kafatos & Nadeau 1990, p. 135.

assumption about things we cannot know. It is his belief that the Copenhagen interpretation suggested by Bohr and Heisenberg, and the inherent principles of complementarity and uncertainty, undermines such leaps of faith:

Rather, complementarity is a “logical framework” for the acquisition and comprehension of scientific knowledge that discloses a new relationship between physical theory and physical reality that undermines all appeals to metaphysics.<sup>125</sup>

The power of Bohr’s arguments derives largely from his determination to remain an uncompromising realist by insisting that all conclusions be consistent with experimental conditions and results and refusing to make metaphysical leaps.<sup>126</sup>

To Kafatos discontent however, even this logical framework is used by contemporary physicists in a way that makes extra-scientific assumptions. He regrets to say that instead of taking the restrictions of the Copenhagen interpretation seriously, many physicists “ontologizes” the measurement problem into two worlds – a classical world and a quantum world. What this means is essentially that the wave-aspect of the measurement problem is assumed to exist independent from measurement:

In all of these examples, the decision to ontologize, or to confer an independent and unverifiable existence on, the wave function or some aspect of the function disallows the prospect of presenting any new physical content that can be verified under experimental conditions. It seems clear that the impulse here is not to extend the mathematical description of increasingly greater verifiable limits. It is to sustain the classical view of one-to-one correspondence between every element of the physical theory and physical reality. If, however, we practice epistemological realism and refuse to make metaphysical leaps, wave and particle aspects of quantum reality must be viewed as complementary...both are required for a complete understanding of the situation, and observer and observed system are inextricably interconnected in the act of measurement and in the analysis of results.<sup>127</sup>

Although many physicists refute metaphysics they are unaware that this type of ontologization is in fact metaphysical, something which Kafatos believes should have nothing to do with the actual practice of physics. Physicists are thus disobeying the “epistemological realism” of the Copenhagen interpretation, he says, which “requires strict adherence to and regard for the rules and procedures for doing science as a precondition for drawing any conclusions worthy of the name scientific”,<sup>128</sup> and are opting instead for a dual view where reality is assumed to exist outside human observation:

In an attempt to preserve the classical view of one-to-one correspondence between every element of the physical theory and physical reality, some physicists have assumed that the wave aspect of a quantum system is real in the absence of observation or measurement...As we hope to demonstrate however, Bell’s theorem and the experiments testing that theorem have revealed that these attempts to preserve the classical view of correspondence are not in principle subject to experimental proof, and must, therefore, be viewed as little more than philosophical speculation.<sup>129</sup>

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<sup>125</sup> Kafatos & Nadeau 1990, p. 78.

<sup>126</sup> Kafatos & Nadeau 1990, p. 76.

<sup>127</sup> Kafatos & Nadeau 1990, p. 139.

<sup>128</sup> Kafatos & Nadeau 1990, p. 7.

<sup>129</sup> Kafatos & Nadeau 1990, p. 7.



The reason why the classical epistemology keeps dominating is not based on intellectual motives he believes, but depends on a “metaphysical angst”:

How does one account for this metaphysical angst? One possible explanation is that challenges to the belief in a one-to-one correspondence between every element of the physical theory and the physical reality...make cosmos, in the mind of many physicists, less comprehensible and alien. The perception of the cosmos by many physicists as purposeless and meaningless is perhaps occasioned more by this loss, or the threat of this loss, than by any other implication of modern physical theories.<sup>130</sup>

The ontologization described above might therefore be a form of supplement for the feelings of loss among these scientists.

The above examples, I believe, are possible to interpret as a *metaphysical scepticism* where it is argued that reality per se cannot be reached in physics any more, as well as a *territorialization* in which the discipline of physics and more specifically the Copenhagen interpretation of the measurement problem is defended against metaphysical leaps and ontologization.

While Kafatos goes to great lengths defending the epistemological restrictions of the Copenhagen interpretation and thus consolidating the metaphysical scepticism, he simultaneously argues for its significance in our understanding of reality. A bit ironically perhaps, this understanding looks a lot like what he refers to as an ontologization of the measurement problem. Although the consequence of the interpretation being, that we cannot scientifically prove the essence of reality, there is nothing preventing us from *philosophically* inferring it. In the following examples where he speaks about the Copenhagen interpretation and related experiments showing nonlocality, this irony becomes apparent.

Although metaphysical assumptions have played a role in the history of science and continue to play this role in what we will term the “hidden ontology of classical epistemology”, metaphysics in our view should have, ideally at least, nothing to do with the actual practice of physics. Yet we will also make the case that the discovery that nonlocality is a new fact of nature *allows us to infer in philosophical terms, although certainly not to prove in scientific terms* [emphasis added], that the universe can be viewed as a conscious system.<sup>131</sup>

Although the formalism of quantum physics predicts that correlations between particles over space-like separated regions is possible, it can say nothing about what this strange new relationship between parts (quanta) and whole (cosmos) means outside this formalism. *This does not, however, prevent us from considering the implications in philosophical terms* [emphasis added] ...<sup>132</sup>

we will make the case that complementarity is an emergent property or dynamic in the life of the evolving universe at increasingly larger scales and times and that new part-whole complementarities emerged at greater levels of complexity in biological life... We will also make a philosophical argument that carries large implications in human terms that may initially seem very

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<sup>130</sup> Menas Kafatos & Robert Nadeau, *The Non-Local Universe. The New Physics and Matters of the Mind* (New York: Oxford University Press, 1999), p. 177-178.

<sup>131</sup> Kafatos & Nadeau 1990, p. 6.

<sup>132</sup> Kafatos & Nadeau 1990, p. 153.

radical. Based on our new understanding of the relationship between parts and wholes in physics and biology, we will argue that human consciousness can be viewed as an emergent phenomenon in a seamlessly interconnected quantum universe. And we will make the case that nonlocality allows us to reasonably infer, without being able to prove, that the universe is a conscious system that evinces self-organizing and self-regulating properties that result in emergent order. *We will, however, take care in this discussion to distinguish between what can be proven in scientific terms and what can be reasonably inferred in philosophical terms* [emphasis added].<sup>133</sup>

The entire case of keeping science pure from metaphysics and philosophical speculations obviously does not prevent him from entangling the two from the opposite direction, i.e. by taking from science and imprinting it on philosophy and metaphysics. One thing that becomes evident is therefore that the metaphysical skepticism is both challenged and consolidated, making him simultaneously skeptical and *metaphysically optimist*, and that, while he argues against it, he seems to be unsettling the very *territory* he previously defended.

In terms of what we can imagine philosophically about reality, Kafatos argues, the hidden ontology of classical epistemology is also a misguided understanding. As seen in the above quote, reality should on the contrary be imagined as composed of complementary aspects, and nonlocality. What Kafatos does, is therefore to ontologize the heuristic of the Copenhagen interpretation; the impossibility to know position and momentum simultaneously, due to the complementary aspects of particle-wave duality, is taken to represent inherent qualities in reality itself. In more abstract terms, reality is composed of part- (particle) and whole (wave) complementarity, which leads Kafatos to suggest that reality is indivisible and whole, and that we cannot deduce it from its parts. The interconnectedness of this holistic universe, is supported by experiments demonstrating non-locality, and more particularly experiments testing what is known as the Bells theorem. The Bells theorem was invented by John Bell with the purpose to disprove non-locality – or as Einstein used to call it, “spooky actions at a distance”.<sup>134</sup> Contrary to Bell’s expectations however, the experiment showed correlations between measurements occurring in space-like separated regions, which implied that this spookiness was indeed a part of physical reality. In this ontology “there is no ‘outside’ perspective”,<sup>135</sup> which means that everything is intertwined and that even the human consciousness is a part of everything else.

If the universe is a quantum system, it is obvious, first of all, that we can no longer treat it as a closed system separate and discrete from the observer.<sup>136</sup>

wave-particle dualism and quantum indeterminacy are facts of nature that must be factored into our understanding of the nature of scientific epistemology. In doing so, we are obliged to

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<sup>133</sup> Kafatos & Nadeau 1990, p. 5–6.

<sup>134</sup> Kafatos & Nadeau 1990, p. 2; Menas Kafatos, *The Nonlocal, Entangled, Conscious Universe* (Science and Nonduality, 2014).

<sup>135</sup> Kafatos & Nadeau 1990, p. 76.

<sup>136</sup> Kafatos & Nadeau 1990, p. 121.

recognize that any phenomena alleged to exist in the absence of observation or measurement in quantum physics cannot be viewed as real. As physicist John Archibald Wheeler puts it “no phenomenon can be presumed to be a real phenomenon until it is an observed phenomenon”.<sup>137</sup>

Quantum entanglement in the experiments testing Bell’s theorem reveals an underlying wholeness that remains a property of the entire system even at macroscopic distances. This forces us to conclude that the underlying wholeness associated with quantum entanglement in the early universe remained a property of the universe at all times and all scales.<sup>138</sup>

In fact, Kafatos even goes so far as to suggest that this holistic universe is conscious. The road to this assumption is taken via the comparison of complementarity and non-locality with the concept of emergence. As you might remember, emergentism implies that interactions between parts can enable wholes that display new characteristics which cannot be seen in the mere sum of the parts:

In these terms, consciousness, or mind, can be properly defined as a phase in the process of the evolution of the cosmos implied in presupposing all other stages. If consciousness manifests or emerges in the later stages and has been progressively unfolding from the beginning stages, we can logically conclude, as opposed to scientifically prove, that the universe is conscious. In the grand interplay of quanta and field in whatever stage of complexity, including the very activities of our brain, there is literally “no thing” that can be presumed isolated or discrete. From this perspective, consciousness could be an emergent phenomenon that folds within itself progressive stages of order embedded in part-whole complementarities throughout the history of the universe.<sup>139</sup>

The universe is participatory as Consciousness, which otherwise would be unmanifest and unknowable, to operate and give rise to all subjective experiences. The Universe is participatory as Consciousness is in partnership, or participation, with everything in it. This participation manifest as sentience *at all levels, in all objects*. The participatory Universe implies that conscious experience is fundamental. It is the experience of universal Consciousness that manifests in countless beings.<sup>140</sup>

The consequence, of the holistic and complementary nature of the universe is that we cannot deduce the character of it:

With the discovery of nonlocality, it seems clear that the whole is not identical to the sum of parts and that no collection of parts, no matter how arbitrarily large, can fully disclose or define the whole...Although this discovery may imply that the universe is holistic, physics can say nothing about the actual character of this whole.<sup>141</sup>

In terms of his recognition that this wholeness is non-deducible, his ideas can also be interpreted as *epistemically pessimist*. Reality is something else, and it is non-reducible both in principle and in practice. Not only is the essence of reality non-dual, but our knowledge about it is necessarily limited because of it. In a speech held at the Science and Nonduality conference he seems to be suggesting furthermore that the belief in oneness – in comparison to the two-world approach of the classical epistemology – can be noticed in the writings of

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<sup>137</sup> Kafatos & Nadeau 1990, p. 7.

<sup>138</sup> Kafatos & Nadeau 1990, p. 125.

<sup>139</sup> Kafatos & Nadeau 1990, p. 157.

<sup>140</sup> Menas Kafatos, “Fundamental Mathematics of Consciousness” *Cosmos and History: The Journal of Natural and Social Philosophy*, 11, 2 (2015), pp 175-188, p. 182.

<sup>141</sup> Kafatos & Nadeau 1990, p. 141.

many famous physicists, but whose commitment as a physicist prevents them from speaking out:

you could sort of see in the writings of Heisenberg and Schrödinger and of course Bohr, Pauli, Dirac, von Neumann, that somehow they knew that was the case, but they were also good physicists, and if you're a good physicist, you belong to the party of the physicists, then you believe in an external reality.<sup>142</sup>

It can be interpreted from this that although physicists feel that another interpretation is more correct, their responsibility to the scientific community stifles them, and forces them instead to reproduce the ideal description. Besides a metaphysical optimism, this could thus also be viewed as another example of politicisation.

If the above examples demonstrate the possibility of extrapolating philosophical viewpoints from physics, then the following argument will demonstrate an equal possibility to be inspired by these ideas to inform one's religiosity. However, in similarity to the above argument, Kafatos rejects any intrusions of this entanglement on the ground of science. The argument against ontological dualism in favour of an indivisible universe can according to Kafatos entice one to adopt eastern philosophies but only on the level of personal conviction:

From this perspective, the results of the Aspect and Gisin experiments [Bell's theorem/non-locality] could be providing a kind of scientific proof for ontological monism.<sup>143</sup>

The extent to which the study of modern physical theories entice one to embrace the eastern metaphysical tradition is nicely illustrated in an interview with David Bohm. In this interview, Bohm commented that, "Consciousness is unfolded in each individual", and meaning "is the bridge between consciousness and matter".

Eastern philosophies can be viewed on the level of personal belief or conviction as more parallel with the holistic vision of nature featured in modern physical theory. It is, however, impossible to conclude that eastern metaphysics legitimates modern physics or that modern physics legitimates eastern metaphysics. The obvious reason for this is that orthodox quantum theory, which remains unchallenged in its epistemological statements, disallows any ontology.<sup>144</sup>

It is possible to interpret therefore that while this reflects an *axiological openness* it is not directed toward the more institutional entanglement of science and religion, but as he emphasises, toward personal belief. However, as with his inconsistency in general, his more recent suggestions seem to overrule this restriction. In an attempt to present a framework for understanding consciousness he expresses the wish for an interdisciplinary approach between science and metaphysics. A notable fact is that "metaphysics" in this example denotes several spiritual and esoteric traditions such as Vedic traditions, Kabbalah, and Buddhism:

We feel that a generalized framework for considering the nature of consciousness can solve the hard problem if it considers inputs from all three investigational domains: scientific, philosophical, and metaphysical.<sup>145</sup>

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<sup>142</sup> Kafatos 2014.

<sup>143</sup> Kafatos & Nadeau 1990, p.142.

<sup>144</sup> Kafatos & Nadeau 1990, p.141.

<sup>145</sup> Kafatos 2016, p. 1.

For such a synthesis we here specify a monistic form of idealism, that we call Fundamental Awareness. Monistic views posit that everything in existence, all “reality,” is comprised of a single substance: material (the reigning paradigm in contemporary science, other than perhaps quantum physics), ideal (comprising of non-material “mind” or “spirit”), or neutral (neither material nor nonmaterial).<sup>146</sup>

Kafatos also believes that these types of personal beliefs may be significant for a great deal of human and environmental issues. If it was not for the dominance and reproduction of the classical epistemology or positivist science, the new part-whole complementarity would have a large impact on “some major real world problems” Kafatos says.<sup>147</sup> The flaw of the previous model is that it “treat human systems as if they consist of atomized units or parts that interact with one another in terms of laws or forces external to or between the parts”. The classical paradigm in physics he says “has greatly influenced and conditioned our understanding and management of human systems in economic and political realities” and the current human and ecological crisis is proof of its failure. The precondition for solving the situation is to realize that everything is part of the whole and that “the actions of all parts are inextricably related to the welfare of the whole”. As Kafatos emphasizes however, one cannot “merely reason oneself into acceptance of this view. One must also have the capacity of what Einstein termed ‘cosmic religious feeling’”.<sup>148</sup> The success of this new awareness is therefore dependent not only on science, but on changes within our ethical thought:

While the task of properly understanding, much less effectively dealing with, problems that now threaten human survival is daunting, there is no reason to conclude that we cannot or will not do so...The sources of the problems are generally well understood in scientific terms, many of the technologies that could serve to alleviate them already exist, and we are rapidly moving toward the point where their resolution is a top priority in the international community. In our view, however, there is probably little hope that scientific knowledge per se will occasion the massive cooperative efforts between people and governments needed to effectively deal with these problems in the time allowed. Cooperation in this scale could be dependent on the rapid emergence of something like a global ethos, termed here a new ecology of mind – that would serve as the basis for more universally accepted guidelines in ethical thought and behavior. This new ecology of mind, which is consistent with, although not legitimated by, our current scientific worldview – could evolve without any appeal to metaphysics or in the absence of any dialogue between science and religion. However, we believe this will not occur for the following reasons: The foundations of ethical thought and behavior have rarely (if ever) followed the dictates of pure reason, and virtually all such changes have historically resulted from the influence of people with the capacity for profound religious awareness.<sup>149</sup>

We are, however, personally in agreement with Capra, who has consistently argued that the global revolution in ethical thought and behavior that is prerequisite to human survival may not occur unless intellectual understanding of the character of physical reality is wedded to profound religious or spiritual awareness.<sup>150</sup>

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<sup>146</sup> Kafatos 2015, p. 2.

<sup>147</sup> Menas Kafatos & Nadeau 1999, p. 198.

<sup>148</sup> Kafatos & Nadeau 1999, p. 211.

<sup>149</sup> Kafatos & Nadeau 1999, p. 207–208.

<sup>150</sup> Kafatos & Nadeau 1999, p. 214.

To form a new ethical awareness toward the environment and to other major world problems, the new science must thus be felt on a deeper level. In conclusion then, these thoughts takes us far from his initial concerns about the critique against the “hidden ontology of classical epistemology”.<sup>151</sup>

### 8.3 Henry P. Stapp: A Psycho-Physical Dualism of Mind and Matter

If Schäfer is almost entirely couched in a New Age discourse while Kafatos is painstaking when it comes to separating his metaphysical/spiritual scheme from his scientific profession, the next scientist remains almost entirely silent on spiritual matters. Henry P. Stapp’s ideas can be described as rigorous metaphysics that draws directly from theories in quantum physics. The outlook of his metaphysics is similar to Schäfer’s dual distinction between potential and empirical events but whereas Schäfer ontologizes the measurement problem into two separate realms, Stapp develops a less abstract ontology based on the ideas of John von Neumann and Werner Heisenberg, two of the most central figures in the history of physics. Instead of two realms Stapp believes in a psycho-physical dualism which is constituted by two processes. This dualism is mainly used to comprehend the phenomenon of consciousness:

My proposal regarding consciousness is based on Heisenberg’s picture of the world, or, more accurately, upon my elaboration upon his picture which he did not describe in great detail. The central idea in Heisenberg’s picture of nature is that atoms are not “actual” things. The physical state of an atom, or of an assembly of atoms, represents only a set of “objective tendencies” for certain peculiar kinds of “actual events” to occur. These events are things of a new and entirely different kind. Moreover, the fundamental dynamical process of nature is no longer one single uniform process, as it is in classical physics. It consists rather of two different processes. One of these processes is a continuous, orderly, deterministic evolution. This process is controlled by fixed mathematical laws that are direct generalizations of the laws of classical physics. However, this process does not control the actual things themselves. It controls only the propensities, or objective tendencies, for the occurrence of the actual things. The other dynamical process consists of a sequence of unruly “quantum jumps”. These jumps are not individually controlled by any known law of physics. Yet collectively they conform to strict statistical rules. These quantum jumps are considered to be the “actual” things in nature. They are Heisenberg’s actual events.<sup>152</sup>

What Stapp refers to here is the reduction of the wave function but posed through the more ontological description suggested by Heisenberg. The separation of these two processes, and the place where the reduction, or the quantum jump, appears, is often referred to as the Heisenberg cut.<sup>153</sup> As Stapp argues, the placement of this cut is somewhat imprecise and ambiguous and dependent upon the specific theoretical expectation of each situation. Bohr he says, used to exemplify this in the metaphor of the blind man with a cane:

The founders had often emphasized that the cut could be shifted, within limits, without changing the predictions of the theory. Bohr gave the example of a blind man with a cane: when the cane is

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<sup>151</sup> Kafatos & Nadeau 1990, p. 6.

<sup>152</sup> Henry P. Stapp, *Mind, Matter and Quantum Mechanics* (Heidelberg: Springer, 2009a), p. 41.

<sup>153</sup> Henry P. Stapp, “Mind, Brain, and Neuroscience” *Cosmos and History: The Journal of Natural and Social Philosophy*, 10,1 (2014a), pp. 227-231, p. 228.

held loosely, the boundary between the person and the external world is the divide between hand and cane; but when held tightly the cane becomes part of the probing self: the person feels that he himself extends to the tip of the cane.<sup>154</sup>

What von Neumann does and what Stapp employs in order develop his own ontology suitable for a theory of consciousness, is a modification of the Heisenberg cut where it is moved upward, all the way into the mind of the observer and thus placing everything in the material world, including the body of the observer, below the cut. This is explained differently in these two examples:

John von Neumann, and the basis of a detailed mathematical examination, resolved this problem by moving the Heisenberg cut all the way up, until everything normally considered to be part of the material world built of atoms and molecules, and the electromagnetic and gravitational fields that they generate, were placed below the cut and were described in quantum mechanical terms, whereas our conscious experiences, including our perceptions, were described generally in psychological terms, *but with our perceptions expressed in the usual way associated with the concepts of classical physics.*<sup>155</sup>

Von Neumann rigorized these ideas, and moved the cut, step by step, up to, and then into, the body of the observer, without altering the predictions – which continue to reside in the mind of the experimenter/observer – until at last the entire physical body of the observer; and of all observers; and of all else that is regarded as 'physical', are shifted to below the cut, and described in terms of the quantum mathematics. The probing and observing *psyche* of the experimenter/observer is thereby shifted completely outside the physically described world. Yet von Neumann's laws of *interaction* between the two realms remained intact. Hence the residents of these disparate domains become dynamically linked, producing an ontology akin to Descartes' psycho-physical dualism.<sup>156</sup>

Everything below the cut represents what von Neumann calls process II, which is the physical evolution governed by the Schrödinger wave equation. The only thing left above the cut, and which constitutes the reducing entity that von Neumann calls process I, is therefore, the psyche and the conscious experience of the observer:

Von Neumann identified two very different processes that enter into the quantum theoretical description of the evolution of a physical system. He called them Process I and Process II. Process II is the analog in quantum theory of the process in classical physics that takes the state of a system at one time to its state at a later time... However, Process II by itself is not the whole story: it generates physical worlds that do not agree with human experiences. For example, if Process II were the *only* process in nature, then the quantum state of the moon would represent a structure smeared out over a large part of the sky... To tie the quantum mathematics to human experience in a rationally coherent and mathematically specified way quantum theory introduces *another process*, which von Neumann calls Process I. It is a *selection* process that is tied to conscious experience...It is a selection made by an agent about how he or she will act or attend.<sup>157</sup>

Thus, together the objective tendencies or process II and the selecting or observing process I interacts to create the actual events of the world. To begin with, Stapps ideas are hence *metaphysically optimist*, and infers the fundamental cores of reality from the basis of the

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<sup>154</sup> Henry P. Stapp n.d. "Compatibility of Contemporary Physical Theory with Personal Survival" p. 7.

<sup>155</sup> Stapp 2014a, p. 228.

<sup>156</sup> Stapp n.d. p. 7.

<sup>157</sup> Stapp 2009a, p. 212–213.

measurement problem and more particularly the ontological versions of this problem presented by Heisenberg and von Neumann.

Because of this, another central category to interpret Stapp's ideas through is *territorialization*. While the measurement problem lies at the core of Stapp's metaphysical ideas, he recognizes that it is not originally *meant* to be stretched beyond the experimental and practical aspects of physics. Bohr he stresses, was very firm in his view that quantum mechanics only described an isolated experiment, acting under certain circumstances and rules, and did not, as many had begun to imply, say anything about the nature in itself:

the Copenhagen strategy was to refrain from making ordinary ontological claims, but to take, instead, a fundamentally pragmatic stance. Thus the theory was formulated *basically* as a set of practical rules for how scientists should go about their tasks of acquiring knowledge, and then using this knowledge in practical ways. Speculations about "what the world out there – apart from our knowledge of it – is really like" were regarded as "metaphysics", and hence outside real science.<sup>158</sup>

Stapp quotes Bohr who said that:

In our description of nature the purpose is not to disclose the real essence of phenomena but only to track down as far as possible relations between the multifold aspects of our experience.<sup>159</sup>

Stapp believes however, and so did von Neumann before him, that quantum mechanics *should* be viewed as relevant beyond the demarcated system that is being measured in the experimental context, and that quantum theory should therefore, not only concern the explicit experimental situation, but all physical systems, and all of the physical universe.<sup>160</sup> This understanding which was held by von Neumann together with physicist Paul Dirac is sometimes recognized as the "standard" or "orthodox" interpretation,<sup>161</sup> and as described, it states that what happens in the measurement is representative of reality per se. What Stapp does therefore, is to negotiate the measurement interpretation in favour of a version which is applicable to reality per se:

The introduction of these actual events carries quantum theory far beyond the ontologically neutral stance of the strictly orthodox interpretation... Heisenberg's picture allows quantum theory to be viewed as a coherent description of the evolution of physical reality itself, rather than merely as a set of stark statistical rules about connections between human observations.<sup>162</sup>

Since the measurement problem is important to understand reality, Stapp is confident that it should also be used to understand the brain. The following description of Stapp's interest in

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<sup>158</sup> Stapp 2009a, p. 212.

<sup>159</sup> Stapp 2009a, p. 64.

<sup>160</sup> Stapp 2009a; Henry P. Stapp, *Mindful Universe. Quantum Mechanics and the Participating Observer* (Heidelberg, 2011); Henry P. Stapp, *How Free Will Effects the Universe* (Sages & Scientists, 2012b).

<sup>161</sup> Guido Bacciagaluppi, "Measurement and Classical Regime in Quantum Mechanics" in *The Oxford Handbook of Philosophy of Physics* ed. Robert Batterman (New York: Oxford University Press, 2013), p. 305.

<sup>162</sup> Stapp 2009a, p. 42



developing a quantum physics specifically for the brain, coupled with a critical approach to current science arguably places Stapp in relation to the concept of *politicisation*. To Stapp's great disappointment, brain science is not particularly updated on the changes in physics and their failure of understanding how the mind and the brain works together is a result of neurobiologists' employment of classical physics. Classical physics, as René Descartes demonstrates, excludes consciousness from the realm of matter, and should naturally not be assumed to be of any help if we wish to understand consciousness:

The problem is, rather a conceptual one: the concept of classical physics that many neurobiologists are committed to using are logically inadequate because, unlike the concepts of quantum physics, they effectively exclude our conscious thoughts.<sup>163</sup>

According to the precepts of classical physics, the subject's behaviour is controlled by physically described variables alone, and his feeling that his 'conscious effort' is effecting his thinking is an illusion: the causal chain of physical events originating in the instructions being fed to the trained subject is controlling the brain response, and his feeling of 'conscious effort' is an epiphenomenal side-effect that has no effect whatever on his brain... According to quantum mechanics, the microscopic uncertainties must rationally be expected to produce, via the Schrodinger equation (of brain plus environment), macroscopic variations that, to match observation, need to be cut back by quantum reductions. This means process 1 interventions. This leads, consistently and reasonably, to the entry of mental causation as described above, where the subject's conscious effort is *actually* causing what his conscious understanding *believes*, on the basis of life-long experience, that effort to be causing.<sup>164</sup>

Moreover, the processes occurring when signals are transferred in the brain, reaches such an extreme smallness that it is nearly unavoidable to employ quantum physics, Stapp argues. These events occur at the synaptic junctions between two neurons. When signals reach the nerve terminal between these neurons, ion channels are opened so that calcium ions can travel towards sites where they release the chemical contents that will affect the neighbouring neuron. Since these ion channels are extremely small the consequence according to Stapp is the same as when one squeezes a state of lowest energy into a narrow space – it will start to move faster, and when it is finally released, it will explode outward. The pattern created when these calcium ions fans out over the release site is similar to the interference pattern in the double slit experiment, which means that the calcium ions may or may not be absorbed in the slit that is the release site:

The channels through which the calcium ions enter the nerve terminal are called "ion channels". At their narrowest points they are less than a nanometer in diameter. This extreme smallness of the opening in the ion channels has profound quantum mechanical importance. The consequence is essentially the same as the consequence of squeezing of the state of the simple harmonic operator, or the narrowness of the slits in the double-slit experiments. The narrowness of the channel restricts the lateral spatial dimension. Consequently, the lateral velocity is forced by the *quantum uncertainty principle* to become large. This causes the cloud associated with the calcium ion to *fan*

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<sup>163</sup> Stapp 2011, p. 3.

<sup>164</sup> Stapp 2011, p. 48.

out over an increasing area as it moves away from the tiny channel to the target region where the ion will be absorbed as a whole, or not absorbed, on some small triggering site.<sup>165</sup>

This uncertainty Stapp argues, means that “the state of the nerve terminal will become a *quantum mixture* of states”,<sup>166</sup> or more simply put, a superposition of alternative plans of action. It seems therefore that another process must occur for one course of action to actually happen, and this is where von Neumann’s process I steps in:

The effect of the independent superpositions of the “release” or “don’t release” options, coupled with the uncertainty in the timing of the vesicle release at each of the trillions of nerve terminals will be to cause the quantum mechanical state of the brain to become speared out superposition of different macro-states representing different alternative possible plans of action. As long as the brain dynamics is controlled wholly by Process II... all of the various alternative possible plans of action will exist parallel, with no one plan of action singled out as the one that will actually occur. Some other process, beyond the local deterministic Process II, is required to pick one particular real course of physical events from the smeared out mass of possibilities generated by all of the alternative possible combinations of vesicle releases at all of the trillions of nerve terminals. That other process is Process I, which brings the action of the mind of the agent upon his brain.<sup>167</sup>

The act of reducing these states or alternatives for plans of action, into one course of action, is therefore made through the mind of the observer which enables one course of action to take place. This view of evolutionary development of the brain, in two steps, goes in line with psychological theories on attention. Stapp refers to Harold Pashler who speaks of two levels of mental processing, the perceptual which is the unconscious, and the post-perceptual which represent the active consciousness.<sup>168</sup> The von Neumann process II supports the perceptual levels where simultaneous alternatives lie waiting for the process I, which in turn is the very effort of attention that makes the course of action “jump” into being. The placement of the process I therefore depend on the free choice of the agent, and the intensity of the following experience is controlled by the mental effort applied to that choice:

The *timings* of the process I actions are, within the orthodox formulations, controlled by the ‘free choices’ on the part of the agent. Mental effort applied to a conscious intent increases the intensity of the experience. Thus it is consistent and reasonable to suppose that the rapidity of a succession of essentially identical process I actions can be increased by mental effort... Applying mental effort increases the rapidity of the sequence of essentially identical intentional acts, which then causes the template for action to be held in place, which then produces the brain activity that tends to produce the intended feedback.<sup>169</sup>

In physics this can be explained through the quantum Zeno effect he says, which entails that an unstable particle can be prevented from decay, if observed continuously:

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<sup>165</sup> Stapp 2009a, p. 222.

<sup>166</sup> Stapp 2011, p. 31.

<sup>167</sup> Stapp 2009a, p. 223.

<sup>168</sup> Stapp 2011.

<sup>169</sup> Stapp 2009a, p. 36.

This 'holding-in-place' effect is called the quantum Zeno effect...The quantum Zeno effect can, in principle, hold an intention and its template in place in the face of strong mechanical forces that would tend to disturb it.<sup>170</sup>

In similarity Stapp argues, William James once said that the “essential achievement of the will, in short, when it is most ‘voluntary’, is to attend to a difficult object and hold it fast before the mind”.<sup>171</sup> Accordingly, Stapp proclaims, it takes a thought’s prolonged stay in our consciousness to develop enough force for one system to be enabled instead of another.

As can be assumed from the description above, Stapp believes that the happening of actual events must be caused by some sense of meaning, which can be seen for instance in his argument about free will or mental efforts. His belief in purposefulness does not only concern the mind-brain relationship however but extends onto his view of physical reality in a way that could be perceived as an *epistemic pessimism*, where the mechanist and randomness of quantum physics is rejected. The original Copenhagen interpretation and quantum mechanics in general assume however that the position the system is reduced to, is based purely on chance. To solve this problem, he turns to Alfred North Whitehead who views the actual events of reality as purposefully caused. While Stapp does not accept the panpsychism or panexperientialism attributed to Whiteheads philosophy, he at least finds his thoughts compelling enough to incorporate them in his own ideas. According to Whitehead, psyche or experience exist on all levels of reality and should be viewed as its smallest building block. In a different but analogous way to our own experience - nature feels and experiences an attraction or repulsion under certain conditions. What happens during the moment of experience is what Whitehead calls a “prehension” of past events and a selection of the event that is becoming.<sup>172</sup> During this moment, the many alternatives from the past is sorted out into what will become a novel event or an “actual entity”. In other words, the world is a process of events, and it weaves together past and present into each actual occasion. Whiteheads philosophy therefore functions as a solution to the void left in Heisenberg’s ontology and Stapp suggests that the actual events that Heisenberg talks about happen through the intervention of a selective agency that take in consideration previous events. In that sense, a system evolves, not based on chance, but on meaning or intention:

Each event has an intentionality that does not just take randomly from the past, but rather takes selectively from the past particular potentialities whose actualizations create potentialities for future events that serve some purpose. Quantum theory seems to allow mind/brain events of this kind, and Whiteheadian thought can be viewed as an effort to provide the beginning of an understanding of the structure of such events. Whiteheadian thought also provides an approach to

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<sup>170</sup> Stapp 2009a, p. 36.

<sup>171</sup> Stapp 2011, p. 37–38.

<sup>172</sup> Stapp 2009, p. 93.

the question of how one extends quantum dynamics to times and regions where consciousness as we know it is absent. All of nature is composed of actual occasions of the same genus, and thus even primordial events must have aspects that have some kinship to our conscious thoughts.<sup>173</sup>

Stapp says therefore that he finds it “unthinkable” that the choice between possibilities has “no basis whatsoever” and thus that chance “has no rational place among the ultimate constituents of nature”.<sup>174</sup> If nature was founded upon pure randomness, then events would only dissolve into further tendencies and no identifiable reality would exist which these tendencies could act upon. Under such circumstances, human beings would not have a free will Stapp argues, and since we do, nature must rest “upon the law of necessity” which entails as Leucippus claimed that “naught happens for nothing, but everything from a ground and of necessity”.<sup>175</sup> Through this law of necessity every creative act has an “emergent” quality where novel events are in a continuous state of becoming through meaningful selection by prehension of the past.<sup>176</sup>

Another example of Stapp's epistemic pessimism is his reflections upon the experiments of Daryl J. Bem, which measures the psi-phenomena precognition and premonition. The structure of the experiment is, in short, as follows: The participants are shown two similar screens, and behind one of them lies a picture that the participant is supposed to find, on the basis of his or her feelings. After the participant has chosen the preferred screen, a random number generator chooses one of the screens, and assigns it with a picture. Yet another random number generator also chooses, with equal probability, whether this picture will be (1) Erotic or (2) Neutral. The result is that the participants choose more often the screen which there lies an erotic picture behind, and the conclusion is that nature seems to favour positive and pleasing experiences. According to quantum mechanics this should not be possible since the choices on the part of nature is supposed to be completely random. However, Stapp agrees with what Albert Einstein who said that “God does not play dice with the universe” and in similarity to the above argument, makes the statement that everything happens for a reason.<sup>177</sup> While Stapp says that he will leave it to the scientific community to decide whether the purported evidence of the psi-phenomena is correct or not, he argues against those who reject

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<sup>173</sup> Henry P. Stapp, “Whiteheadian Process and Quantum Theory” in *Physics and Whitehead: Quantum, Process, and Experience*, eds. Timothy Eastman & Hank Keeton (New York: State University of New York Press, 2003), p. 102.

<sup>174</sup> Stapp 2009a, p.93.

<sup>175</sup> Stapp 2009a, p. 93.

<sup>176</sup> Stapp 2009a, p.94.

<sup>177</sup> Henry P. Stapp, “Quasi-Orthodox Quantum Mechanics and The Principle of Sufficient Reason” (2012), p. 3.

the evidence because it would mean an “wholesale abandonment of basic ideas of contemporary physics”.<sup>178</sup> Besides the technical details, he explains it as follows:

The idea that choices made now can influence what has already happened needs to be clarified, for this idea is, in some basic sense, incompatible with our idea of the meaning of time. Yet the empirical results of Wheeler’s delayed-choice experiments, and the more elaborate delayed-choice experiments of Scully and colleagues are saying that, *in some sense*, what we choose to investigate now can influence what happened in the past.

How can one make rationally coherent sense out of this strange feature of QM?

This new “effective past” is the past that smoothly evolves *into the future the quantum state (of the universe) that incorporates the effects of the psycho-physical event that just occurred*. As far as current predictions about the future are concerned it is *as if* the past were the “effective past”: the former *actual* past is no longer pertinent because it fails to incorporate the effects of the psycho-physical event that just occurred.

In orthodox QM each instant of process time corresponds to an “observation”: the collapse at process time *n* reduces the former quantum state to the part of itself that is compatible with the increased knowledge generated by the new observation. This sequential creation of a sequence of new “effective pasts” is perhaps the strangest feature of orthodox quantum mechanics, and the origin of its other strange features.

The *actual* evolving physical universe is generated by the always-forward-moving creative process. It is forward-moving in the sense that the sequence of surfaces *Sigma(n)* advances into the future, and at each instant *n* of process time some definite, never-to-be-changed, psycho-physical events happens. But this forward-moving creative process generates in its wake an associated sequence of effective pasts, one for each process time *n*. *The conditions that define the effective past associated with process time n change the preceding effective past imposing a “final” condition that represents what happened at process time n*. It is this “effective past” that evolves directly into the future, and is the past that, from a future perspective, has smoothly evolved into what exists “now”. The actual past is not relevant to a history of the universe that starts from now and looks back, and projects smoothly into the immediate future.<sup>179</sup>

Thus, the past changes according to what is being presently collapsed into being, which might explain how the participant’s choices at an earlier time depends on the later choices made by the random number generator. When the choice on the part of nature is biased to the benefit of positive feelings and against negative feelings, this choice sets the stage for a new final past – that fits in, and evolves into present time.

One might think that the above description are just like a bundle of mere technicalities but Stapp assures us that they are significant for questions regarding life, morality, and politics. The following examples I believe are therefore possible to interpret as an *axiological openness*. It is important, Stapp emphasizes, to recognize that science is not only about technological advancement, but about man and his place in the universe. Stapp therefore dismisses the common assumption that science is irrelevant to values:

It is often maintained that science stands mute on the question of values: that science can help us achieve what we value once those values are fixed, but can play no role in determining values. That claim is certainly incorrect: what we value depends upon what we believe, and what we believe is increasingly determined by science.<sup>180</sup>

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<sup>178</sup> Stapp 2012, p.4

<sup>179</sup> Stapp 2012, p. 6–7.

<sup>180</sup> Stapp 2009a, p. 176.

Stapp stresses the importance of grasping the deeper questions posed by quantum physics, something which he believes Pauli recognized before him, but which physicists have been encouraged to ignore by fore figures like Bohr. Stapp refuses to settle for this and argues that a worldview which “is compatible with the available scientific evidence, and which counters the corrosive mechanical world view that arose from the basically incorrect concepts of classical physics” is “desperately needed today”.<sup>181</sup> The worldview that has been dominating since Newton is severely destructive, for moral, social and ecological reasons:

Science has enlarged tremendously the potential of human life. By augmenting our powers it has lightened the weight of tedious burdens, and opened the way to a full flowering of man’s creative capacities. Yet, ironically, it is the shallowness of a conception of man put forth in the name of science that is the cause today of the growing economic, ecological, and moral problems that block that full flowering.<sup>182</sup>

The nineteenth century science turned nature into a machine and “reduces human beings to mechanical automata”. The principles of experience and feeling are neither necessary nor possible in the world of classical physics, and our thoughts are at best “passive bystanders” to the whole spectacle.<sup>183</sup> The separation of mind and matter that rules this description, fails, not only in terms of how to explain the fact that we can cause ourselves to move by intentional effort, but also has profound significance for how societies are built and what moral values are upheld in it. The view of consciousness as isolated from nature creates an attitude, according to Stapp, that tells us that it is useless to try and make a change since nature follows its own laws. Since we believe our conscious lives to be separate from nature, we act upon nature without restriction, pushing it to its limits. Because this nature equally includes our bodies we also lose care for our fellow man. Stapp says that the classical conception of nature therefore “preaches material self-aggrandizement” and thus causes ecological crisis as well as economical and moral problems for mankind.<sup>184</sup> Stapp believes however that because of the new physics, we can conceive of ourselves in a different way. There are several example of this:

The behaviour consistent with an isolated cog in a mindless machine would be to act in accordance with the belief that everything is fated, anyway, and that neither “I”, nor anyone else, can either do anything about, or be responsible for, anything that happens in the world, even personal voluntary acts. This sort of “rational” view is not uncommon today. On the other hand, the person who recognizes himself to be an integral component of a universal process that selectively weaves waiting potentialities into dynamic new forms that create potentialities for still newer potentialities into dynamic new forms that create potentialities for still newer integrations should be inspired to

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<sup>181</sup> Stapp 2009a, p. 167.

<sup>182</sup> Stapp 2009a, p. 181.

<sup>183</sup> Stapp 2009a, p. 238.

<sup>184</sup> Stapp 2009a, p. 184.

engage actively and energetically in the common endeavour to enhance the creative potentialities of all of us.<sup>185</sup>

The sense of *separateness, isolation, and powerlessness* that issues from the nineteenth century image of man as automaton is replaced by a conception of efficacious creative human selves imbedded in an encompassing community endeavour and adventure. This conception of nature, and of ourselves, provides a rational foundation for exercising our mind-based freedom of action in accord with values that give weight to the good of the whole.<sup>186</sup>

My suggestion is that replacing the classical physics conception of oneself (as a being that is causally equivalent to a mindless mechanical automaton stalking through a mindless clockwork universe) by the quantum conception of oneself (namely as an integral aspect of nature's non-local process of creation that allows components of one's stream of consciousness, such as reasons and values, to influence the activities of one's brain and body) provides a rational foundation for the notion of *responsibility and belonging to a community* based on trans-cultural contemporary science rather than culture-dependent and often antagonistic religious faiths. Causally efficacious mind is a prerequisite of ethical theory, and quantum theory allows it to be supplied by science, rather than by a religious faith or doctrine that contradicts science, *insofar as science is identified with classical physics*.<sup>187</sup>

Whereas classical physics renders life meaningless, by asserting that we are, effectively, mindless mechanical puppets, acting out a pre-choreographed script, quantum mechanics restores meaning by allowing, and indeed causing, one's own experienced future to be directly influenced by one's own value-based consciously felt efforts!<sup>188</sup>

A second example of this *axiological openness* where it also becomes relevant to speak of a *metaphysical optimism* is when Stapp lends his ideas to the concept of nonduality at the Science and Nonduality conference. In an interview, he says that he was not acquainted with this concept before he participated, but that he learnt from other participants that duality was something negative. Although his ontology is undeniably dualistic, and although he believes that quantum physics is a form of dualism, he says that since the underlying character of both parts are more mind-like it is possible to imagine a form of monism at a deeper level:

But, if you look a little more carefully at the two parts of this duality, there is the mental part – which is mindlike to begin with – but if you look at the physical part, and go beyond the fact that it is described in terms of a space-time locations, and ask what is its ontological nature, what is its basic quality? ... So, the structure of quantum theory is that you have these potentials, which represents space-time descriptions. They are physical in that sense and yet their ontological character is not matter-like. Matter-like things evolve continuously, and these things have some quantum jumps, so they are not behaving the way matter behaves at all. And their meaning and their significance in the theory is to give probabilities and tendencies for an event to happen. So, they're not like matter, they are more like mind... Philosophers of physics and mathematics discuss probabilities a lot, and there's a lot of discussion of exactly what is the character of probability, and many of these people say that there is a mental aspect to probability... So if you look at the ontological character of this potential part, its more mindlike than matterlike. So, in this way you say, well even though, at a pragmatic, practical, operational level, quantum physics is dual/dualistic – mind matter are different things and they interact in the brain – if you look at the underlying nature of both parts, the two parts will seem to be more mindlike. So, you have a kind of oneness now, you don't have two different things that you don't understand how they connect together... A key and a lock have to have a some similar form or structure in order that the one can

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<sup>185</sup> Stapp 2009a, p. 179.

<sup>186</sup> Henry P. Stapp, "Science's Conception of Human Beings As a basis For Moral Theory" *Zygon*, 41,3 (2006), pp.617-622, p. 621.

<sup>187</sup> Stapp 2011, p. 125.

<sup>188</sup> Henry P. Stapp, "Quantum Physics Meets Philosophy of Mind" (2013), p. 6.

relate to the other. In regards to promises like this, it certainly makes more sense to think that the underlying nature is essentially more monistic.<sup>189</sup>

Contrary to the Cartesian split, the mental and the physical realm are in other words interconnected the same way a key and a lock are; while different, they share components that allows them to connect. This shared component is the physical realms “potentia” as Heisenberg calls it, that is, it’s potential to change when new knowledge is received. Because of this character the essence of reality is therefore also described as “idealike” and similar to the mental realm. This idea can be strengthened by the previously mentioned Bells theorem or the experiments testing it. Because these experiments prove that reality is also non-local it can be used by those who believe in a form of pantheism:

Of course for those who want to believe that there is somehow a cosmic mind working, this is something that they can point to and say well it looks like it is moving in that direction.<sup>190</sup>

While his thoughts about the essence of reality and their function to monistic and/or pantheistic beliefs may not be central to his ideas, the above examples do seem to indicate that he occasionally lends his words to support such notions.

#### 8.4 Roger Penrose: The Orch OR Theory and Its Platonic Predisposition

Before continuing our analysis of yet another physicist it is important to emphasise how significant he has been to science. Roger Penrose is distinguishable from the others by his massive contributions to science and more specifically to general relativity and cosmology, for which he has received many notable prizes and awards.

The central thesis presented by Penrose and his partner Hameroff, called the Orch OR theory, is a quantum physical and neurobiological suggestion for a model of consciousness. This suggestion takes as its basis the idea that consciousness is a noncomputational phenomenon.

The conclusions are that conscious thinking must indeed involve ingredients that cannot be even *simulated* adequately by mere computation; still less could computation, of itself alone, evoke any conscious feelings or intentions. Accordingly, the mind must indeed be something that cannot be described in any kind of computational terms.<sup>191</sup>

That consciousness is more than an epiphenomenon of complex computation does not mean that we should abandon science as a method however, but that the science as we know it today, must be extended:

The problem of consciousness is indeed a scientific one, even if the appropriate science may not yet be at hand. I strongly support this viewpoint; I believe that it must indeed be by the methods of

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<sup>189</sup> Stapp 2009b.

<sup>190</sup> Stapp 2009b.

<sup>191</sup> Roger Penrose, *Shadows of the Mind. A Search for the Missing Science of Consciousness* (London: Vintage Books, 1994), p. vi.



science – albeit appropriately extended in ways that we can perhaps only glimpse at present – that we must seek our answers.<sup>192</sup>

As simple as this argument may seem, it describes what Penrose and Hameroffs' theory is meant to be, namely an extension of contemporary science. As such, their theory is, in its entirety, compatible with the minor science approach. To begin with, the theory is a form of *territorialization* and more specifically a negotiation of several territories in physics of which we will see many examples below. Secondly it is a *politicization* and thus a critique of the currently available scientific theories, related to the specific subject of consciousness and their suggestion of how to understand it. Thirdly, while realizing that it is still in its infancy, they believe it will be of significance to the future development of science, which makes it possible to interpret it as a form of *bachelorhood*.

The Orch OR theory has many components, but essentially begins with the collapse of the wave-function or reduction of the quantum system. To appear as a viable theory of the brain, the collapse must first be appreciated as an actual physical phenomenon, which can be interpreted as the primary territorialization or negotiation necessary for their theory:

Von Neumann, Schrödinger and others in the 1930's supposed that quantum collapse, or R effectively occurred when a quantum system interacted with its environment, was otherwise "measured" or consciously observed. Exactly why and how collapse occurs, and how eigenstates are determined, are unknown and indicate a gap in physics knowledge: R is not taken to be an objectively real, independent phenomenon in the standard Copenhagen interpretation.

A number of physicists have argued in support of specific models (or of general schemes) in which the rules of standard U -quantum mechanics are modified by the inclusion of some additional procedure according to which R does become an objectively real process. The relevant procedure of any such specific scheme is here denoted by OR (objective reduction).<sup>193</sup>

Since Penrose believes that consciousness is non-computational the collapse must be viewed as something else than random, which leads them to introduce the concept of self-collapse:

Precisely where a quantum particle is and how it is moving when observed is "indeterminate" and, according to the Copenhagen interpretation, results in random measured values. We take the view (Penrose, 1994) that, to address this issue, a new physical ingredient (objective reduction: OR) is needed in which coherent quantum systems can "self-collapse" by growing and persisting to reach a critical mass/time/energy threshold related to quantum gravity.<sup>194</sup>

A state which "self-collapses" (**OR**) will have an element of non-computability, even though evolution of its quantum coherence had been linear and computable. A quantum superposed state collapsed by external environment or observation (**SR** or **R**) lacks a non-computable element, and would thus be unsuitable for consciousness.<sup>195</sup>

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<sup>192</sup> Penrose 1994, p. 16.

<sup>193</sup> Roger Penrose & Stewart Hameroff, "Orchestrated reduction of quantum coherence in brain microtubules: A model for consciousness" *Elsevier: Mathematics and Computers in Simulation*, 40, (1996) pp. 453-480, p.457-458.

<sup>194</sup> Penrose & Hameroff 1996, p. 455.

<sup>195</sup> Penrose & Hameroff 1996, p.464.

Because the superposition preceding this collapse is taken by Penrose and Hameroff to be a pre-conscious development which, when reached its threshold, creates a conscious experience, it needs the ability to remain in coherence:

An essential feature of consciousness might be a large-scale quantum coherent state maintained for a considerable time. **OR (Orch OR)** then takes place because of a sufficient mass displacement in this state, to that it indulges in a self-collapse which somehow influences or controls brain function.<sup>196</sup>

For a system to remain in coherence it is required that it is isolated however, or otherwise decoherence will be caused as a result of interaction with its environment:

[quantum coherence] refers to circumstances when large numbers of particles can collectively cooperate in a single quantum state which remains essentially unentangled with its environment.<sup>197</sup>

A biological system, being very much entangled with its environment in the manner discussed above, would have its *own* state continually reduced because of the continual reduction of this *environment*... We may imagine, on the other hand, that for some reason it might be favorable to a biological system that its state remain *unreduced* for a long time, in appropriate circumstances. In such cases it would be necessary for the system to be, in some way, very effectively insulated from its surroundings.<sup>198</sup>

The problem however, is that quantum coherence rarely occurs in biological systems:

Such states occur most dramatically in the phenomena of superconductivity (where electrical resistance drops to zero) and superfluidity (where fluid friction, or viscosity drops to zero). The characteristic ingredient in such phenomena is the presence of an *energy gap* that has to be breached by the environment if it is to disturb the quantum state. If temperature in that environment is too high, so that the energy of many of the ambient particles is great enough for them to breach this gap and entangle with the state, then the quantum coherence is destroyed. Consequently, phenomena of the nature of superconductivity and superfluidity have been found normally to occur only at very low temperatures, just a few degrees above absolute zero. For reasons such as this, there had been a general skepticism about the possibility of quantum coherence effects having any relevance to such a 'hot' object as the human brain – or indeed, any other biological system.<sup>199</sup>

Luckily, Penrose finds contemporary proof of suggestions made in 1968 by Herbert Fröhlich that would allow them to imagine quantum coherence in a biological system such as the brain:

He argued that so long as the energy of metabolic drive is large enough, and the dielectric properties of the materials concerned are sufficiently extreme, then there is the possibility of large-scale quantum coherence similar to that which occurs in the phenomena of superconductivity and superfluidity – sometimes referred to as *Bose-Einstein* condensation – even at the relatively high temperatures that are present in biological systems.<sup>200</sup>

The place which bears the right conditions for this to happen, Hameroff believes, is within the microtubules of our cells' cytoskeletons. Microtubules are protein-like molecules which are responsible for the intelligent organization of cytoskeletons, that is, the structure of our cells. They are interconnected by protein – microtubule associate protein (MAP) – to other

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<sup>196</sup> Penrose & Hameroff 1996, p. 458.

<sup>197</sup> Penrose 1994, p. 351.

<sup>198</sup> Penrose 1994, p. 343.

<sup>199</sup> Penrose 1994, p. 351.

<sup>200</sup> Penrose 1994, p. 367.

microtubules, and these MAPS are believed to be what “orchestrates” collapse outcomes.<sup>201</sup> The important thing about these microtubules is that they are assumed to be able to exist in a superposition which is sufficiently isolated to remain in this state until some form of non-computable objective reduction occurs. The procedure of one OR in one cytoskeleton however is not enough for the global nature of consciousness, the larger unity of the mind and our ability to understand. Another important part of this procedure is therefore that the cytoskeletal state must appear in quantum-entanglement with other cytoskeletons, which magnifies the coherence to a macroscopic level:

We should bear in mind the *global* nature of consciousness. If it were merely the case that some 10<sup>11</sup> individual cytoskeletons were each separately supplying some none-computational input, it is hard to see that this would be of much use to us... [conscious] understanding is something that operates on a much more global scale; and if cytoskeletons are involved, then it must be some collective phenomenon which concerns very large numbers of cytoskeletons all at once.

...Here we envisage that not only must microtubules be involved in a relatively large-scale quantum-coherent state, but that such a state must extend from one microtubule to the next. Thus, not only must this quantum coherence stretch from the length of an entire microtubule...but a good many of the different microtubules in the cytoskeleton within a neuron, if not all of them, must together take part in this same quantum-coherent state. Not only this, but the quantum coherence must leap the synaptic barrier between neuron and neuron...The unity of a single mind can arise, in such a description, only if there is some form of quantum coherence extending across at least an appreciable part of the entire brain.

Such a feature would be a remarkable one – almost an incredible one – for Nature to achieve by biological means. Yet I believe that the indications must be that she has done so, the main evidence coming from the fact of our own mentality...We recall, moreover, that certain quantum-coherent effects over a distance of several metres – the EPR entanglements involved in pair of photons – have already been observed (by *physical* means) in the experiments of Aspect and others.<sup>202</sup>

The experiments of Aspect mentioned in this example refers to more recent experiments of the Bell’s theorem mentioned earlier, where non-local correlations between measurements were proved. What holds this global nature of consciousness together is therefore the non-local entanglement of several quantum-coherent states within the brain:

On the view that I am tentatively putting forward, consciousness would be some manifestation of this quantum-entangled internal cytoskeletal state and of its involvement in the interplay (**OR**) between quantum and classical levels of activity...

There is admittedly speculation involved in this picture, but it is not out of line with our current scientific understanding.<sup>203</sup>

The quantum-gravity that allegedly affects the collapse of the entire state and thus induces a conscious experience, is a combination of the quantum principles described above and Einstein’s theory of general relativity which describes gravity, or more specifically the curvature of space in the presence of mass and energy. Although Penrose imagines that this combination is a decisive “new physics”, it does not presently have any acceptable theoretical

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<sup>201</sup> Penrose & Hameroff 1996, p. 457.

<sup>202</sup> Penrose 1994, p. 372-373.

<sup>203</sup> Penrose 1994, p. 376-377.

candidate. One possible place to look for a solution however, is within the work of David Deutsch:

Let us return to the question of quantum gravity. It should be stressed that there is no accepted theory at present – there is not even an acceptable candidate. There are, however, many different and fascinating proposals. The particular idea that I wish to refer to now has...the requirement that quantum superpositions of different *space-times* are to be considered...The suggestion, due to David Deutsch, is that one must superpose, alongside the ‘reasonable’ space-time geometries in which *time* behaves fairly sensibly, ‘unreasonable’ space-times in which there are *closed timelike lines*... The significance of a *closed* timelike line is that one could contemplate an ‘observer’ who actually has that line as his own world-line, i.e. as the line that describes, within the space-time, the history of his own body.<sup>204</sup>

The sequence of the self-collapse described above combined with this closed timelike line creates a “flow of time” that Penrose believes is explicit for consciousness. The final model thus says that:

Quantum coherence emerges, and is isolated, in brain microtubules until the differences in mass-energy distribution among superpositioned tubulin states reaches a threshold related to quantum gravity. The resultant self-collapse (**OR**), irreversible in time, creates an instantaneous “now” event. Sequences of such events creates a flow of time, and consciousness.<sup>205</sup>

The theory presented by Deutsch is in no way beyond critique however, and includes more bizarre conclusions about time-travelling as well. Besides their own professional knowledge, Penrose and Hameroff must therefore rely on contested or less accepted research and speculations to give their theory the optimal attributes. Even though they do not yet have the entire theoretical or practical evidence to fully back it up, they still believe that it has potential which will eventually show. It is in accordance with such arguments that I initially interpreted them as a form of *bachelorhood*.

The latter category is strengthened by the metaphor present at the background of Penrose’s thesis in *Shadows of the Mind*. In the prologue Penrose tells a story about a scientist father and his daughter pondering on the question of what life would be if trapped inside a cage. The father argues that if there was a brick in the wall then one could calculate the outside world through the shadows created on the wall by the objects outside, and eventually learn something about them. While this would be a time-consuming project, all knowledge must begin somewhere. It would not be entirely easy to convince other people living in the cage, about the discoveries made of the outside world either. If one would propose, by careful calculation of the sun, that the earth and thus the cave was moving around it, people would not accept it as true, since the more “common-sense” perception would be that the cave was standing still. Throughout the text Penrose tries in analogy, to argue that his

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<sup>204</sup> Penrose 1994, p. 381-382.

<sup>205</sup> Penrose & Hameroff 1996, p. 456-457.

theory represents the shadows of the mind. Although some theories might seem strange or even crazy at first, some day they might prove to be the only lasting ones. This he argues has been the case with large discoveries before:

My own inclinations are to try to hang on to both – quantum realism *and* the spirit of the relativistic space-time view. But to do so will require a fundamental change in our present way of representing physical reality. Rather than insisting that the way in which we describe a quantum state (or even space-time itself) must follow the descriptions that are familiar to us now, we should seek, instead, something that looks very different, though (initially at least) it would be mathematically equivalent to the familiar descriptions.

In fact there is a good precedent for this kind of thing. Before Einstein discovered general relativity, we had become thoroughly used to Newton’s wonderfully accurate theory of gravity in which particles, moving about in a flat space, attracting each other according to the inverse square law of gravitational force. One would have thought that introducing any fundamental change into that picture would be bound to destroy the remarkable accuracy of Newton’s scheme. Yet, such a fundamental change is just what Einstein did introduce... Was the remarkable accuracy of Newton’s theory destroyed? Not at all; it was even improved upon, to an extraordinary degree!

Might we expect that something of a similar kind could occur with quantum theory? I think that it is extremely likely. It will need a *profound* change of viewpoint, which makes it hard to speculate on the specific nature of the change. Moreover, it will undoubtedly look crazy!<sup>206</sup>

He even goes on to finish the chapter by mentioning “two crazy-looking ideas”,<sup>207</sup> one of which has a teleological feature:

To end this section, I shall mention two crazy-looking ideas, neither of which is crazy enough, but each of which has its merits. The first is due to Yakir Aharonov and Lev Vaidman (1990) and to Costa de Beauregard (1989) and Paul Werbos (1989). According to this idea, quantum reality is described by *two* state vectors, one of which propagates forward in time from the last occurrence of R, in the normal way, and the other propagates *backwards in time*, from the next occurrence of R in the future. This second state vector behaves ‘teleologically’ in the sense that it is governed by what is going to happen to it in the future, rather than what happened to it in the past, a feature that some might feel would be unacceptable. But the implications of the theory are precisely the same as in standard quantum theory, so it cannot be ruled out on the grounds of this nature. Its *advantage* over standard quantum theory is that it enables one to have a completely objective description of the state in EPR situations which can be represented in space-time terms consistently with the spirit of Einstein’s relativity. Thus it provides a (kind of) solution to the puzzle referred to at the beginning of this section – but at the expense of having to have a teleologically behaving quantum state, which many may find worrying. (For myself, these teleological aspects of descriptions are perfectly acceptable so long as they do not lead to problems with actual physical behavior).<sup>208</sup>

By naming such examples he wishes to show that “there are various possibilities of changing our already extraordinarily accurate picture of the physical world into something that looks quite different from the pictures we hold to today”.<sup>209</sup> As is apparent with many of the quotes above, their negotiations or territorializations are admitted to be merely “in their infancies” or at the level of “speculations” but still expected to yield promising results in the future.

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<sup>206</sup> Penrose 1994, p. 389.

<sup>207</sup> Penrose 1994, p. 389.

<sup>208</sup> Penrose 1994, p. 389-390.

<sup>209</sup> Penrose 1994, p. 390.

Although it is less central, Penrose also seems to have a philosophical worldview that permeates the above technicalities, one which is best described as a form of *metaphysical optimism*:

We shall find ourselves driven toward a *Platonic* viewpoint of things. According to Plato, mathematical concepts and mathematical truths inhabit an actual world of their own that is timeless and without physical location. Plato's world is an ideal world of perfect forms, distinct from the physical world, but in terms of which the physical world must be understood. It also lies beyond our imperfect mental constructions; yet, our minds do have some direct access to this Platonic realm through an 'awareness' of mathematical forms, and our ability to reason about them. We shall find that whilst our Platonic perceptions can be aided on occasion by computation, they are not limited by computation. It is this potential for the 'awareness' of mathematical concepts involved in this Platonic access that gives the mind a power beyond what can be achieved by a device dependent solely upon computation for its action.<sup>210</sup>

Our mental faculties which consist of the ability to understand and create mathematical concepts, seems therefore to be what allows us to experience the Platonic realm. Believing that there is a realm for pure mathematical form which we have access to by our ability to understand, leads Penrose to wonder whether it is this that gives consciousness its non-computational character. Even if it sounds paradoxical, it is "within mathematics that we find the clearest evidence that there must actually be something in our conscious thought processes that eludes computation".<sup>211</sup> In conclusion, thus, Penrose is pessimistic toward dominating trends in science because of their inability to describe this "something else" of human consciousness, and believes more philosophically that this conscious awareness shares a link to a depth of reality composed only by mathematical forms.

## 9. Conclusions

The purpose of this essay was initially to find out two things: what are the ideas presented by scientists on New Age conferences and what are their position in relation to science and religion? What I found was that the common understanding of New Age science as a form of re-enchantment and as a harmonization between science and religion could not fully account for neither the content of these ideas, nor their position. In the hopes of finding a more adequate explanation I opted for a radically revised re-enchantment paradigm and a suggestion for studying minor sciences, which I used as an analytical framework in the previous section. In this concluding chapter I wish to highlight the central results and to suggest a few more general inferences that can be made of the above analysis.

To begin with, the ideas developed by these scientists can be described more generally as forms of metaphysics or ontologies. They are descriptions of reality based on physical

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<sup>210</sup> Penrose 1994, p. 50-51.

<sup>211</sup> Penrose 1994, p. 64.

theories and are sometimes developed to solve specific problems such as the mind-brain relationship. The depth of this description often goes all the way to the foundation and essence of reality and most of them are thus expressing a metaphysical optimism even though its centrality to their ideas or theories varies. The single most important subject to these ontologies is the measurement problem and how to interpret it. In the analysis above we have at least three variations, firstly we have Kafatos who defends the Copenhagen interpretation where the measurement problem is merely a heuristic and where its emphasis on complementarity and insecurity is used to suggest a holistic view of reality. Secondly, we have the von Neumann interpretation manifested by Stapp where everything that happens during measurement is taken to represent physical reality itself, which he transforms into a two-process explanation of physical reality and the mind-brain relationship. Thirdly and lastly, we have the Orch OR theory presented by Penrose and Hameroff, where the reduction of the wave-function is viewed as an objective phenomenon and a self-collapse, caused by a pre-conscious faculty working by the forces of gravity.

Another initial inference about how they relate to science, is therefore that their ideas are negotiations of the territory of physics and more particularly the measurement problem and the question of gravity. While this negotiation is more briefly expressed by Schäfer to enable his worldview on quantum potentiality, I would suggest that it is fundamental to the others. Not only do their solutions to the mind-brain dilemma or understandings of physical reality necessitate a certain negotiation of these interpretations, but it seems like much of their written and spoken words are motivated by an urge to discuss them.

Creating an ontology of the measurement problem might not be unorthodox but it is still beyond the rules of procedure, or in Wolf-Meyer and Cochran's words, it is irrelevant to state science. Together with the fact that they are inherently critical to both a classical and positivistic epistemology and the bureaucracy of science reproducing it, this is possible to define as a form of politicisation. On the first hand, singular subjects such as how to understand the mind-brain relationship through quantum physics and gravity, is often motivated by a disbelief in certain scientific paradigms and their inability to account for what they are interested in. In Stapp's case this inability is expressed by neurobiologists and their employment of classical physics, while in Penrose's case the focus is on the computational approach to consciousness. On the other hand, this form of politicization is also seen together with the defense of certain worldviews or perspectives on physical reality. Kafatos for example makes a substantial case against the "hidden ontology of classical epistemology" to argue for a more holistic interpretation, and Schäfer claims physicists are brainwashed by the

classical epistemology because they will not accept what he calls the non-empirical realm of reality. If the minor sciences concepts are meant to denote a status as science, then I would argue that the former two are more reasonably labelled politicizations. It is also in relation to such specific suggestions that we find the belief in one's future significance to the scientific community, something which is seen in the writings of Penrose who motivates his speculations by arguing that even though new theories may seem radical or crazy, they sometimes prove to be significant improvements.

While the critique against positivism and classical epistemologies are possible to frame against the politicization and bachelorhood, they sometimes merge with Asprey's problem of disenchantment and more particularly the epistemic pessimism. As many of them conclude, the epistemology of dominating science is not enough to encompass the physical reality they believe in. We see this in Schäfer's non-empirical realm which is something else than visible matter, in Kafatos emphasis on the inability to deduce reality because of its complementary aspects, and in Stapp's rejection of randomness. In hindsight, I would also say that it is visible to some degree in Penrose's notion of consciousness and his opposition toward those who argue that it is calculable. However, this would necessitate that the mysterious undertones of the epistemic pessimism were questioned. It is, in any case, possible to emphasise that "incalculable" does not automatically make something teleological or mysterious. The critique against the workings of science and its dominant views of knowledge, rarely expresses itself as an explicit belief in "mysterious forces" but more as a disbelief in older scientific paradigms – which might include an acknowledgement of forces that are hard to explain or seems paradoxical and strange, but which do not necessarily entail beliefs in extraordinary or supernatural powers.

Occasionally these ideas are stretched to express something about values and meaning, and more specifically about the welfare of humans and our environment. This form of axiological openness between facts and values varies in terms of how central it is to their ideas however. For Schäfer it seems fundamental, his whole idea is built on the premises that quantum physics has something important to say about our lives and potentials to develop. Kafatos on the other hand, stresses that these types of entanglements must be personal convictions and have nothing to do with science, although simultaneously speaks about how natural sciences and humanities and religion all must collaborate. Stapp in turn, views science as an important aspect of the political and moral underpinnings of society, and believes that quantum physics provides a healthier alternative to classical physics. The two latter also



occasionally lends their knowledge of physical theories to those with monistic or pantheistic beliefs. When it comes to Penrose's idea however, such entanglements seem absent.

After analysing these ideas, it becomes apparent that their participation on new age conferences may be the result of having ideas that presently goes beyond "state science". It is not necessarily because they have spiritual ideas, nor entirely because they are unorthodox, but because their ideas go beyond the protocols of conventional science. Besides working as scientists and belonging to the professional discipline of physics thus, they also have interests which cannot be met within these hallways. Although these ideas are something else than mere reproductions of state or conventional science, and although they are obviously not hostile to the idea of collaborating with New Age conferences, they do not seem motivated by an urge to disrupt the separation of science from spiritual or metaphysical thought. A central aspect is therefore that they confirm the borders between state science and ideas that go beyond. Sometimes they even explicitly proclaim that these two realms should not be confused – institutionally speaking – even though subjects of science and things beyond can be entangled on a personal level. In fact, I would suggest that their very appearances on new age conferences are proof, not of being spiritually inclined, but of keeping state science clear from speculative or metaphysical ideas. In addition to the self-labelling as either an embarrassment or as a science in its infancy, not yet worthy of the appreciation of state science, their challenging notions do not intrude on "true science" since they mostly appear in popular books and on New Age conferences. State science seldom allows extravagant thoughts on the real essence of nature or the mysteries of consciousness, and such things are left to the margins.<sup>212</sup> If one, as a scientist, which to venture into these deeper questions, one will be forced to become a nomad, a minor science fighting for success through alternative mediums. One conclusion is therefore that the borders between science and minor science and therefore also the realms of science and religion, are kept intact, thereby forcing us to reconsider the value of the re-enchantment paradigm that assumes their entanglement.

A second conclusion is that the practical usefulness of the re-enchantment fails when trying to analyse these ideas. It may be applicable to the contemporary culture of New Age beliefs more generally, but if you wish to go into detail and study specific texts of scientists popular within New Age conferences, it is ineffective. The theories of how to understand mind and brain more clearly show this incongruity, since they have nothing to do with any kind of re-enchantment. As I hope to have demonstrated, the above ideas are no irrational

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<sup>212</sup> See "metaphysical optimism" and "politicization".

oppositions to science nor any romantic upheavals, but mostly just alternatives to physical theories, formed either to present better informed ontologies or to solve specific problems. While they do express ethical viewpoints, or more broadly, extrapolate values from science, these are not central enough for us to employ the re-enchantment paradigm on the entirety of their ideas. I think it has become clear by now that this would have severely misrepresented what their ideas and theories are.

If we wish to highlight that they are somehow less than disenchantment, it is first by expressing it as a set of epistemological and ontological perspectives – seen in Asprey’s problem’s approach – that this becomes possible. For these physicists, however, it is not a problem with the decreasing mysteries of nature or separation of science and religion that is usually referred to as disenchantment, but rather, a problem with classical physics. I would argue, that since the disenchantment idea itself is wedded with the enlightenment ideals of its time it is suggestable that their ideas might primarily be problematic to older ideals of science rather than to the disenchantment paradigm that supersedes it. I would therefore make the case that it is not entirely one’s direct attitudes toward disenchantment, that make one challenging to it. The point of emphasising this is that, if the disenchantment rests on enlightenment values, in which classical physics emerged, then it might automatically become problematic for modern physicists. That is, they will automatically express problems to disenchantment even if they do not display beliefs in something divine or mysterious simply because disenchantment is founded upon scientific values that the new physics have come to replace. When we speak about their challenge to disenchantment it is therefore necessary to define it as varying between secondary and primary oppositions. In Schäfer’s case we may speak of it as primary, but in Stapp and Penrose’s case I would say that it is secondary. If I would have read them from the perspective of re-enchantment, or sometimes even the revised version of it used here, more secondary assumptions such as their philosophical or political conclusions, would have been made central, even for scientists such as Stapp and Penrose. Sometimes therefore it seems more compelling to describe them as minor sciences, because this describes their challenges as primarily addressing science and not the specific worldview of disenchantment. In conclusion thus, although some physicists are visibly informed by a New Age rhetoric, such as Schäfer, and possibly recognizable through a traditional re-enchantment paradigm, others, like Stapp and Penrose, and occasionally also Kafatos, need another explanatory framework.

While it has not been my intention to criticise the re-enchantment paradigm in general, that is, for its explanatory value in relation to popular culture, it is therefore possible to say

that it lacks the substantial analytical framework to explain these ideas adequately. Although the subject of this essay occupies a small and less studied area of religious studies however, and while it might seem like a small detail, significant only in the narrow theme of New Age science, it is my opinion that it is valuable for several other reasons. If sciences in minority occupy the New Age movement, it becomes significant also, for disciplines such as sociology of scientific knowledge, and for philosophy and history of science. By asking questions about whether science develops through radical paradigm shifts within its own community, or by subtle movements without, the subject of this essay becomes a continued project of understanding, not only scientists as individuals, but the very production of knowledge itself.

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