

## ***THE MYTH OF A PURELY RATIONAL LIFE***

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*Abstract: The idea of a purely rational life is a myth. Inter alia, faith and hope, emotions and values shape how we make decisions, and provide a far richer basis for life than the kind of purely intellectual approach that scientism invokes. Such a viewpoint must include a realistic view of the nature of reality, allowing for more kinds of existence than merely material things. Data needed to assess this kind of proposal includes the specific features of individual lives as well as the universal results of strictly repeatable experiments.*

### **1: A purely rational life:**

Since the time of the Greek philosophers, there has been a perception by some that one could live a purely rational life: that emotion, faith, and hope simply get in the way of rationally desirable decisions.<sup>1</sup> This view was particularly promoted by Descartes, and attained ascendancy with the rise of the natural sciences, with physics taken as a paradigm for the social sciences and rational choice theory an idealised model for human behaviour. It is this viewpoint that underlies much of present day scientism, views that are taken to deny any spiritual or religious reality.<sup>2</sup> Given such a rationalist view, how can one reasonably have an alignment of religious faith and scientific commitment? How does one hold without contradiction a deep and intrinsic respect for evidence and reason, and an equally deep respect for matters of belief?

### **2: A more profound view**

It is my contention that this view of a purely rational way of existence is a deeply flawed view of how we can conduct both personal and social life. It is not possible to reason things out and make decisions purely on a rational basis. The true situation is much richer than that (see Figure 1).

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<sup>1</sup> **Rational**, *adj.* **1:** (of behaviour, ideas, etc) – based on reason rather than emotions: a *rational argument/ choice/ decision – rational analysis/ thought. **2:** (of a person) able to think clearly and make decisions based on reason rather than emotions (*Oxford Advanced Learner Dictionary of Current English*. Oxford University Press, 2000).*

Firstly, in order to live our lives we need faith and hope,<sup>3</sup> because we always have inadequate information for making any real decision. When we make important decisions like whom to marry, whether to take a new job, or whether to move to a new place, we never have enough data to be certain of the outcome. We can keep gathering evidence as long as we like, but we will never be truly sure as to how many people will buy our product, what the weather will be like, how people will treat us, and so on. Thus our choices in the end have to be concluded on the basis of partial information and are necessarily to a considerable degree based in faith and hope, faith about how things will be, hope and trust that it will work out all right. This is true even in science. When my scientific colleagues set up research projects to look at string theory or particle physics, they do so in the belief that they will be able to obtain useful results when their grant applications have been funded. They do not know for sure that they will succeed in their endeavours. They believe that their colleagues will act honestly. So embedded in the very foundations even of science there is a human structure of faith, hope, and trust<sup>4</sup>.

Together with our attitudes to risk, perceptions of how things are now and will be in the future are crucial in making real-world decisions. Do we tend to see things in a threatening or optimistic way? Are we willing to act on the basis of little evidence, or do we demand very detailed analysis before proceeding? This sets the balance we make between rationality on the one hand and faith and hope on the other. Helping make decisions are intuition<sup>5</sup> and imagination<sup>6</sup>. The intuition of a doctor, a motor car mechanic, a football player, a financial analyst, is the deeply imbedded result of our previous experience and training. It is a fast-track ability to see the guts of the situation long before we have had time to figure it out rationally, embodying in rapid-fire form the results of previous experience and rational understanding. Imagination helps us think of the possibilities to be taken into account in making our rational choices and to envisage what might occur, setting the stage for our analysis

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<sup>2</sup> P W Atkins, "The limitless power of science". In *Nature's Imagination: The Frontiers of Scientific Vision*, Ed. J Cornwell. (Oxford: Oxford University Press, 1995), pp.122-132.

<sup>3</sup> George F R Ellis: "On Rationality, Emotion, Faith, and Hope: Being Human in the Present Age". In *Humanity in Science and Religion: the South African experience*, Ed Augustine Schutte. (Templeton Press, 2006).

<sup>4</sup> R P Crease, "The paradox of trust in science". *Physics World* (March 2004), 18.

<sup>5</sup> David G Myers, *Intuition: Its Powers and Perils* (New Haven: Yale University Press, 2003)

<sup>6</sup> Margaret Boden, *The Creative Mind: Myths and Mechanisms* (London: Abacus, 1994). Arnold H Modell, *Imagination and the meaningful Brain* (Cambridge, Mass: MIT Press, 2003).

of options and choices. But we can never imagine all the options: the completely unexpected often occurs and undermines the best laid plans of mice and men,<sup>7</sup> and even the widest lateral thinking only uncovers some of the possibilities.

Secondly, our emotions are a major factor in real decision making – both the hard-wired primary emotions that are our genetic inheritance from our animal forebears, and the socially determined secondary emotions that are our cultural inheritance from society. As explained so well in Antonio Damasio’s writing,<sup>8</sup> no decisions are made purely as a result of rational choice; the first factor effecting what we tend to do is the emotional tag attached to each experience, memory, and future plan. For example, the hoped-for joy of successful achievement underlies most work in science; without it, science would not exist. In a full human life, love is one of the most important driving factors, determining how we deploy our rationality. The degree to which one loves another is not a scientifically ascertainable fact.<sup>9</sup> The importance of emotions derives from the fact that the primary emotions have evolved over many millions of years to give us immediate guidance as to what is good for our survival in a hostile environment; they then guide the further development of secondary emotions (telling us what is good for us in terms of fitting into society) and intellect.<sup>10</sup>

Thirdly, we need values to guide our rational decisions; ethics, aesthetics and meaning are crucial to deciding what kind of life we will live. They are the highest level in our goals hierarchy, shaping all the other goal decisions by setting the direction and purpose that underlies them: they define the ‘Telos’ (purpose) which guides our life.<sup>11</sup> They do not directly determine what the lower level decisions will be, but set the framework within which choices involving conflicting criteria will be made and guides the kinds of decisions which will be made.

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<sup>7</sup> “To a Mouse,” by Robert Burns. <http://www.robertburns.org/works/75.shtml>.

<sup>8</sup> Antonio Damasio. *Descartes’s error: Emotion, reason and the Human Brain*. (New York, Harper Collins: 2000); Antonio Damasio. *The Feeling of what happens: Body, emotion and the making of consciousness* (London: Vintage, 2000).

<sup>9</sup> This is memorably demonstrated in remarks made by Palmer Joss to Eleanor Arroway in the film *Contact*, directed by Robert Zemeckis (1997).

<sup>10</sup> George F R Ellis and Judith A Toronchuk. “[Neural Development: Affective and Immune System Influences](#).” In *Consciousness and Emotion: Agency, Conscious Choice, and Selective Perception* Edited by Ralph D. Ellis and Natika Newton (John Benjamins, 2005), pp. 81–119.

Our minds act, as it were, as an arbiter between three tendencies guiding our actions: first, what rationality suggests is the best course of action – the cold calculus of more and less, the economically most beneficial choice; second, what emotion sways us to do – the way that feels best, what we would like to do; and third, what our values tell us we ought to do – the ethically best option, the right thing to do. It is our personal responsibility to choose between them (Figure 2), on the basis of our best wisdom and integrity making the best choice we can between these usually conflicting calls, informed by the limited data available, and in the face of the pressures from society on the one hand and from our inherited tendencies on the other. Our ability to choose and thus express our will is a crucial human capacity.<sup>12</sup>

### **3: The nature and source of values**

It is not possible to reason things out only on a rational basis because, apart from anything else, there are value choices that come in and guide the decisions made. Rationality can help when we have made these value choices, but the choices themselves, the ethical system, must come from outside science. Science cannot provide it, for the simple reason that there is not any scientific experiment that relates to right and wrong, to good and bad. These are outside the domain of scientific experimentation.

Two things are crucial here. Firstly, values are not the same as emotions; what we feel like doing at some instant may or may not be what is ethically right, 'road rage' being a classic example. Some evolutionary psychologists seem to tend to confuse these issues, assuming values are subsumed under emotions; but this is not the case. They are crucially different. Ethical values have a normative dimension that cannot be present in emotions *per se* (although emotions are one of the factors helping us understand normative values).

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<sup>11</sup> Nancey Murphy and George F R Ellis. *On The Moral Nature of the universe: Cosmology, Theology, and Ethics*. (Minneapolis: Fortress Press, 1996),

<sup>12</sup> Jacj Martin, Jeff Sugarman, and Janice Thompson. *Psychology and the question of agency*. (Albany: State University of New York Press, 2003). Robert Kane: *A Contemporary Introduction to Free Will* (New York: Oxford University Press, 2005). Alicia Juarrero: *Dynamics in Action: Intentional Behaviour as a complex system*. (Cambridge, Mass: MIT Press, 2006).

Secondly, guiding values cannot be arrived at purely rationally.<sup>13</sup> They are decided on the basis of an interlocking set of factors that include emotions and rationality, but also a broad-based understanding of meaning based in our total life experience, which is surely data about the way things are. Humans have a great yearning for meaning,<sup>14</sup> and ethics embodies those meanings and guides our actions in accordance with them; but ethics, aesthetics, metaphysics, and meaning are outside the competence of science because there is no scientific experiment which can determine any of them. Science can help illuminate some of their aspects, but is fundamentally unable to touch their core. Thus there are major areas of life, incredibly important to humanity, which cannot be encompassed in science. They are the proper domain of philosophy, of religion, and of art, but not of science.

Sociobiology and evolutionary psychology produce arguments which claim to explain where our ethical views come from. There are many problems with those attempts, one being they do not explain ethics, they explain it away, another being that these arguments ignore key social effects and culture, as well as the role of our individual religious and moral experiences.

If the true origin of our ethical beliefs lay in evolutionary biology, ethics would be completely undermined, because you would no longer believe that you had to follow its precepts; you could choose to buck the evolutionary trend. Furthermore, if you did follow those precepts you tend to rapidly end up in dangerous territory, the domain of eugenics and social Darwinism. That has been one of the most evil movements in the history of humanity<sup>15</sup> (a fact that Darwinian propagandists conveniently ignore, when extolling the evils of religion). In recent times, the possibility of evolutionary psychology explaining altruism via kin selection has been a major theme.<sup>16</sup> There are two problems with this as a proposal for the origin of

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<sup>13</sup> George F R Ellis. *In faith and hope: science, religion and their interaction*. (Quaker Books: Britain Yearly Meeting, 2004).

<sup>14</sup> Viktor Frankel: *The Doctor and the Soul: From Psychotherapy to Logotherapy*. (London: Souvenir Press, 2004).

<sup>15</sup> Richerd Weikart, *From Darwin to Hitler : Evolutionary Ethics, Eugenics, and Racism in Germany* (Palgrave Macmillan, 2004).

<sup>16</sup> W D Hamilton, "The Evolution of Altruistic Behavior". *The American Naturalist*, **97**:354-356 (1963). Robert Axelrod, *The Evolution of Cooperation* (London: Penguin, 1990). P J B Slater, "Kinship and Altruism", in *Behaviour and Evolution*, Ed. P J B Slater and T R Halliday (Cambridge: Cambridge University Press, 1994).

'deep' (kenotic) ethics, which one can argue is the quality of a realist ethics underlying the nature of the universe.<sup>17</sup> Firstly, if altruism extends only to kin and those whose genes will be preserved by acts of sacrifice, then by definition it excludes all outgroups – and hence cannot by its very nature explain the kind of ethic that says “Love your enemy”. It implies hostility to those with competing genes – hence by its nature providing a basis for enmity and hostility to outsiders, and ultimately for war against others. Secondly, the concept of altruism invoked by the evolutionary psychologists is a pale cousin of the true thing as envisaged in religion, where altruism by its very nature is conceived of as having no reward.<sup>18</sup> This means that it is not possible to explain its origin by evolutionary psychology, because the key causal link in terms of promoting specific genes – based on a reward mechanism that tends to preserve those genes - is missing, by the very definition of the nature of deep altruism. This kind of argument can only explain shallow altruism.<sup>19</sup>

In the end, challenging evolutionary biologists on this issue is simple. If a scientist claims that science can provide a basis for ethics,<sup>20</sup> say to them, “Tell me, what does science say should be done about Iraq today?” You will get a deafening silence, because science cannot handle ethical questions. There is no experiment which says that an act is good or bad. There are no units of good and bad, no measurements of so many milli-Hitlers for an action. Correspondingly, aesthetics is outside the boundaries of science. No scientific experiment can say that something is beautiful or ugly. There are areas of life, incredibly important to humanity, which cannot be encompassed in science. They are the proper domain of philosophy, of religion, of art, but not of science.

#### **4: The nature of evidence**

Why are there these boundaries? Because experimental science deals with the generic, the universal, in very restricted conditions: circumstances so tightly

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<sup>17</sup> Temple, G F R Ellis: "The theology of the Anthropic Principle". In *Quantum Cosmology and the laws of nature* Ed R J Russell, N Murphy and C J Isham (Vatican Observatory, 1993), pp 367-406. . : N Murphy and G F R Ellis. *On The Moral Nature of the universe: Cosmology, Theology, and Ethics*. (Fortress Press, Minneapolis, 1996).

<sup>18</sup> J Neusner and B Chilton (eds), *Altruism in world religions* (Washington DC: Georgetown University Press, 2005).

<sup>19</sup> Stephen G Post, *Unlimited Love: Altruism, Compassion. And Service* (Philadelphia, Templeton Foundation Press: 2003).

<sup>20</sup> Jacques Monod made this claim in his book *Chance and Necessity* (Vintage, 1972).

prescribed that effects are strictly repeatable. Most things which are of real value in human life are not repeatable. There are individual events which may have crucial meaning for us, but which occur only once. So repeatable science does not encompass either all that is important, or all that can reasonably be called knowledge. The kind of data it takes into account is strictly limited, and does not include the kinds of world experience we each have – which are certainly data on the nature of reality, because we live in and indeed are part of reality.

For many, a deeply religious worldview is often crucial in understanding our lives and setting such values, this worldview being based in our personal life experience, including our experience of a faith tradition and community, religious texts, and inspiring leaders. All of this is data that helps us understand our situation and our lives. Something of this kind is essential to our well-being and proper fulfilment, because ethics and meaning are deeply intertwined. This does mean taking a stand as regards the different interpretations of the various religious traditions: for example relating to the generous and loving nature of the heart of true Christianity,<sup>21</sup> rather than the oppressive nature of some of its manifestations. That self-emptying vision embodied in the life of the great religious and spiritual leaders of all faiths<sup>22</sup> provides an inspiring basis for a deep ethics, based in love, that is generous and sacrificial in nature. It can provide a deeply meaningful vision of the nature of reality. It cannot be *proved* to be true – but this view can be supported by an interlocking set of arguments that have persuasive power as a whole.

### **5: The nature of reality**

Is the kind of view proposed here undermined by a plausible materialist view of the nature of existence? We will never be able to prove the nature of ultimate reality or of all the dimensions of existence. Belief will always enter here and complement our scientifically based rational understanding so as to provide a holistic view of existence and our nature. But to recognise these aspects and see their full implications, you have to be open to the possible existence of deeper layers of reality

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<sup>21</sup> Temple, G F R Ellis: "The theology of the Anthropic Principle". In *Quantum Cosmology and the laws of nature* Ed R J Russell, N Murphy and C J Isham (Vatican Observatory, 1993), pp 367-406. . : N Murphy and G F R Ellis. *On The Moral Nature of the universe: Cosmology, Theology, and Ethics*. (Fortress Press, Minneapolis, 1996).

than just material reality. To make a plausible case here, I *take as given the reality of the everyday world* – tables and chairs, and the people who perceive them – and then assign a reality additionally to each kind of entity that can have a demonstrable causal effect on that every day reality. The problem then is to characterise the various kinds of independent reality which may exist in this sense. I have suggested as a possible completion of the proposals by Popper and Eccles<sup>23</sup> and Penrose<sup>24</sup> that there are four kinds of existence or worlds that are ontologically real.<sup>25</sup> These are not different causal levels within the same kind of existence, rather they are quite different kinds of existence, but related to each other through causal links. The different worlds needed by science in order to have causal completion are

- **World 1: Matter and Forces**
- **World 2: Consciousness**
- **World 3: Physical and biological possibilities**
- **World 4: Mathematical reality**

The proposal<sup>24</sup> is that *all these worlds must exist – Worlds 1 to 4 are ontologically real and are distinct from each other*. These claims are justified in terms of the effectiveness of each kind of reality in influencing the physical world. In more detail, I claim existence of the following:

**World 1:** *The Physical World of Energy and Matter*, hierarchically structured to form lower and higher causal levels whose entities are all ontologically real.

This is the basic world of matter and interactions between matter, based at the micro level on elementary particles and fundamental forces, and providing the ground of physical existence. It comprises three major parts:

*World 1a: Inanimate objects* (both naturally occurring and manufactured).

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<sup>22</sup> J Neusner and B Chilton (eds), *Altruism in world religions* (Washington DC: Georgetown University Press, 2005).

<sup>23</sup> K Popper and J Eccles. *The Self and its Brain: An Argument for Interactionism* (Springer, Berlin, 1977).

<sup>24</sup> Roger Penrose. *The Large, The Small, and the Human Mind* (Cambridge University Press, Cambridge, 1997). Roger Penrose, *The Road to Reality* (London. Jonathan Cape. 2004)

<sup>25</sup> George F R Ellis: “True Complexity and its Associated Ontology”. In *Science and Ultimate Reality: Quantum Theory, Cosmology and Complexity*. Edited by John D. Barrow, Paul C.W. Davies, and Charles L. Harper, Jr. Cambridge University Press, 2004.

*World 1b: Living things*, apart from humans (amoeba, plants, insects, animals, etc).

*World 1c: Human beings*, with the unique property of being self-conscious.

All these objects are made of the same physical stuff, but the structure and behaviour of inanimate and living things (described respectively by physics and inorganic chemistry, and by biochemistry and biology) are so different that they require separate recognition, particularly when self-consciousness and purposive activity (described by psychology and sociology) occurs. The hierarchical structure in matter is a real physical structuration, and is additional to the physical constituents that make up the system themselves. It provides the basis for higher levels of order and phenomenology, and hence of ontology.

There is ontological reality at each level of the hierarchy. Thus we explicitly recognise as being real, quarks, electrons, neutrinos, rocks, tables, chairs, apples, humans, the World, stars, galaxies, and so on. The fact that each is comprised of lower level entities does not undermine its status as existing in its own right. We can attain and confirm high representational accuracy and predictive ability for quantities and relations at higher levels, independent of our level of knowledge of interactions at lower levels, giving well-validated and reliable descriptions at higher levels accurately describing the various levels of emergent non-reducible properties and meanings.

**World 2:** *The World of Individual and Communal Consciousness*: ideas, emotions, and social constructions. This again is ontologically real (it is clear that these all exist), and causally effective.

This world of human consciousness can be regarded as comprising three major parts:

*World 2a: Human Information, Thoughts, Theories, and Ideas.*

*World 2b: Human Goals, Intentions, Sensations, and Emotions.*

*World 2c: Explicit Social Constructions*

These worlds are different from the world of material things, and are realised through the human mind and society. They are not brain states, although they can be represented as such, for they do not reside exclusively in any particular individual mind. They are not identical to each other: World 2a is the world of rationality, World 2b is the world of intention and emotion, and so comprehends non-propositional knowing, while World 2c is the world of consciously constructed social legislation

and convention. Although each individually and socially constructed in a complex interaction between culture and learning, these are indeed each capable of causally changing what happens in the physical world, and each has an effect on the others. In more detail:

*World 2a: The world of Human Information, Thoughts, Theories, and Ideas.* This world of rationality is hierarchically structured, with many different components. It includes words, sentences, paragraphs, analogies, metaphors, hypotheses, theories, and indeed the entire bodies of science and literature, and refers both to abstract entities and to specific objects and events. It is necessarily socially constructed on the basis of varying degrees of experimental and observational interaction with World 1, which it then represents with varying degrees of success. World 2a is represented by symbols, particularly language and mathematics, which are arbitrarily assigned and which can themselves be represented in various ways (sound, on paper, on computer screens, in digital coding, etc).

Thus each concept can be expressed in many different ways, and is an entity in its own right independent of which particular way it is coded or expressed. These concepts sometimes give a good correspondence to entities in the other worlds, but the claim of ontological reality of entities existing in World 2a makes no claim that the objects or concepts they refer to are real. Thus this world equally contains concepts of rabbits and fairies, galaxies and UFOs, science and magic, electrons and aether, unicorns and apples; the point being that all of these certainly exist *as concepts*. That statement is neutral about whether these concepts correspond to objects or entities that exist in the real universe (specifically, whether there is or is not some corresponding entity in World 1) or whether the theories in this world are correct (that is, whether they give a good representation of World 1 or not).

All the ideas and theories in this world are ontologically real in that they are able to cause events and patterns of structures in the physical world. Firstly, they may all occur as descriptive entries in an encyclopaedia or dictionary. Thus each idea has causal efficacy as shown by existence of the resulting specific patterns of marks on paper (these constellations of micro-particles would not be there if the idea did not exist, as an idea). Secondly, in many cases they have further causal power as shown by the examples of the construction of the Jumbo Jet and the destruction of Dresden. Each required both an initial idea, and resulting detailed plan and an intention to carry

it out. Hence such ideas are indubitably real in the sense that they must be included in any complete causal scheme for the real world. You can if you want to deny the reality of this feature - and you will end up with a causal scheme lacking many causal features of the real world (you will have to say that the Jumbo Jet came into existence without a cause, for example!).

*World 2b: The world of Human Goals, Intentions, Sensations, and Emotions.* This world of motivation and senses is also ontologically real, for it is clear that they do indeed exist in themselves, for example they may all be described in novels, magazines, books, etc, thus being causally effective in terms of being physically represented in such writings. Additionally many of them cause events to happen in the physical world – for example the emotion of hate can cause major destruction both of property and lives, as in Northern Ireland and Israel and many other places. In World 2b, we find the goals and intentions that cause the intellectual ideas of World 2a to have physical effect in the real world.

*World 2c: The World of Explicit Social Constructions.* This is the world of language, customs, roles, laws, money, etc, which shapes and enables human social interaction. It is developed by society historically and through conscious legislative and governmental processes. It gives the background for ordinary life, enabling Worlds 2a and 2b to function, particularly by determining the means of social communication (language is explicitly a social construction). It is also directly causally effective, for example speed laws and exhaust emission laws influence the design both of automobiles and road signs, and so get embodied in the physical shapes of designed structures in World 1; the rules of chess determine the space of possibilities for movements of chess pieces on a chess board. It is socially realised and embodied in legislation, roles, customs, etc.

**World 3:** *The world of Aristotelian Possibilities.* This characterizes the set of all physical possibilities, from which the specific instances of what actually happens in World 1 are drawn.

This world of possibilities is ontologically real because of its rigorous prescription of the boundaries of what is possible - it provides the framework within which World 1

exists and operates, and in that sense is causally effective. It can be considered to comprise two major parts:

*World 3a: The world of physical possibilities*, delineating possible physical behaviour .

*World 3b: The world of biological possibilities*, delineating possible biological organisation.

These worlds are different from the world of material things, for they provide the background within which that world exists. In a sense they are more real than that world, because of the rigidity of the structure they impose on World 1. There is no element of chance or contingency in them, and they certainly are not socially constructed (although our understanding of them is so constructed). They rigidly constrain what can happen in the physical world, and are different from each other because of the great difference between what is possible for life and for inanimate objects. In more detail:

*World 3a: The world of physical possibilities*, delineating possible physical behaviour (it is a description of all possible motions and physical histories of objects). Thus it describes what can actually occur in a way compatible with the nature of matter and its interactions; only some of these configurations are realised through the historical evolutionary process in the expanding universe. We do not know if laws of behaviour of matter as understood by physics are prescriptive or descriptive, but we do know that they rigorously describe the constraints on what is possible (you cannot move in a way that violates energy conservation; you cannot create machines that violate causality restrictions; you cannot avoid the second law of thermodynamics; and so on). This world delineates all physically possible actions (different ways particles, planets, footballs, automobiles, aircraft can move, for example); from these possibilities, what actually happens is determined by initial conditions in the universe, in the case of interactions between inanimate objects, and by the conscious choices made, when living beings exercise volition.

*World 3b: The world of biological possibilities*, delineating all possible living organisms. This defines the set of potentialities in biology, by giving rigid boundaries to what is achievable in biological processes. Thus it constrains the set of possibilities from which the actual evolutionary process can choose - it rigorously delineates the

set of organisms that can arise from any evolutionary history whatever. This ‘possibility landscape’ for living beings underlies evolutionary theory, for any mutation that attempts to embody a structure that lies outside its boundaries will necessarily fail. Thus even though it is an abstract space in the sense of not being embodied in specific physical form, it strictly determines the boundaries of all possible evolutionary histories. In this sense it is highly effective causally.

Only some of the organisms that can potentially exist are realised in World 1 through the historical evolutionary process; thus only part of this possibility space is explored by evolution on any particular world. When this happens, the information is coded in the hierarchical structure of matter in World 1, and particularly in the genetic coding embodied in DNA, and so is stored via ordered relationships in matter; it then gets transformed into various other forms until it is realised in the structure of an animal or plant. In doing so it encodes both a historical evolutionary sequence, and structural and functional relationships that emerge in the phenotype and enable its functioning, once the genotype is read. This is the way that directed feedback systems and the idea of purpose can enter the biological world, and so distinguishes the animate from the inanimate world. The structures occurring in the non-biological world can be complex, but they do not incorporate ‘purpose’ or order in the same sense. Just as World 3a can be thought of as encoded in the laws of physics, World 3b can be thought of as encoded in terms of biological information, a core concept in biology distinguishing the world of biology from the inanimate world.

**World 4:** *The Platonic world of (abstract) realities that are discovered by human investigation but are independent of human existence. They are not embodied in physical form but can have causal effects in the physical world.*

The existence of a Platonic world of mathematical objects is strongly argued by Penrose,<sup>26</sup> the point being that major parts of mathematics are discovered rather than invented (rational numbers, zero, irrational numbers, and the Mandelbrot set being classic examples). They are not determined by physical experiment, but are rather arrived at by mathematical investigation. They have an abstract rather than embodied character; the same abstract quantity can be represented and embodied in many

symbolic and physical ways. They are independent of the existence and culture of human beings, for the same features will be discovered by intelligent beings in the Andromeda galaxy as here, once their mathematical understanding is advanced enough (which is why they are advocated as the basis for inter-stellar communication).

This world is to some degree discovered by humans, and represented by our mathematical theories in World 2; that representation is a cultural construct, but the underlying mathematical features they represent are not - indeed like physical laws, they are often unwillingly discovered, for example irrational numbers and the number zero. This world is causally efficacious in terms of the process of discovery and description (one can for example print out the values of irrational numbers or graphic versions of the Mandelbrot Set in a book, resulting in a physical embodiment in the ink printed on the page).

These claims are justified in terms of the effectiveness of each kind of reality in influencing the physical world. What then of epistemology? Given the existence of the various worlds mentioned above, **Epistemology** is the study of the relation between World 2 and Worlds 1, 3, and 4. It attempts to obtain accurate correspondences to quantities in all the worlds by means of entities in World 2a.

This exercise implicitly or explicitly divides World 2a theories and statements into (i) true/accurate representations, (ii) partially true/misleading representations, (iii) false/poor/misleading representations, and (iv) ones where we don't know the situation. These assessments range from statements such as 'It is true her hair is red' or 'There is no cow in the room' to 'electrons exist', 'Newtonian theory is a very good description of medium scale physical systems at low speeds and in weak gravitational fields' and 'the evidence for UFO's is poor'. This raises interesting issues about the relation between reality and appearance, for example everyday life gives a quite different appearance to reality than microscopic physics- a table is actually mostly empty space between the atoms that make up its material substance, but in our experience is a real hard object. As long as one is aware of this, it can be adequately handled.

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<sup>26</sup> Roger Penrose. *The Large, The Small, and the Human Mind* (Cambridge University Press,

Given this understanding of the nature of existence, it is not unreasonable to suppose a further kind of existence, completing these worlds: that a foundation for all is

• **World 5: Ethics and Meaning**

This provides the foundation for a moral realist view of the nature of things: known to exist to us via intimations of a transcendent reality which are widely experienced by humanity in a religious context, and are even evident in everyday life. This is the world underlying the claim of a moral realism, and from a religious viewpoint expresses an underlying purpose to existence that many identify as the nature and will of God. Many would include here a concept of beauty, because ethereal beauty often conveys an idea of underlying transcendence, while religious images can to some degree convey an idea of the nature of love and an underlying purpose in creation.

One may argue either that the existence of God is expressed and contained in this world, or else that it takes place in a completely different kind of existence that cannot be expressed in the same kind of language – that a transcendent reality cannot be captured in the same kinds of terms as the other aspects of existence listed above. Here there is room for endless debate without an obvious way of obtaining a unique resolution on which all will agree – which is why there are so many views of the nature of God. Nevertheless there is some evidence that this broad kind of view may be correct; what I like to call intimations of transcendence. I will give just two examples that try to convey this sense of underlying meaning. First,

*"I like to walk alone on country paths, rice plants and wild grasses on both sides, putting each foot down on the earth in mindfulness, knowing that I walk on the wondrous earth. In such moments, existence is a miraculous and mysterious reality. People usually consider walking on water or in thin air a miracle. But I think the real miracle is not to walk on water or in thin air, but on earth. .... Every day we are engaged in a miracle which we don't even*

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Cambridge, 1997). Roger Penrose, *The Road to Reality* (London. Jonathan Cape. 2004)

*recognise: a blue sky, white clouds, green leaves, the black, curious eyes of a child - our own two eyes. All is miracle".<sup>27</sup>*

Second,

*"I say to myself as I watch the niece, who is very beautiful: in her this bread is transmuted into melancholy grace. Into modesty, into a gentleness without words ... Sensing my gaze, she raised her eyes towards mine, and seemed to smile: a mere breath on the delicate face of the waters, but an affecting vision. ... I sense the mysterious presence of the soul that is unique to this place. It fills me with peace, and my mind with the words: 'This is the peace of silent realms'. I have seen the shining light that is born of the wheat."<sup>28</sup>*

One can give many other examples of excess beauty and love, a sense that there is more than needs to be, that may be indications of deeper dimensions of existence underlying physical reality. They do not *prove* anything; but they give intimations of what may be, that we can recognise as such if we so choose.

## **6: Conclusion**

When you are willing to be sensitive to hints of transcendence embedded in everyday physical existence and experience, an underlying meaning embodied in the foundations of physical reality, science and religion can complement each other in a profound way. There is a vast array of data that must be taken into account that is not of a scientific nature and which can lead to a broadened understanding of existence beyond that envisaged by a purely rationalist and reductionist world view.

Cape Town,

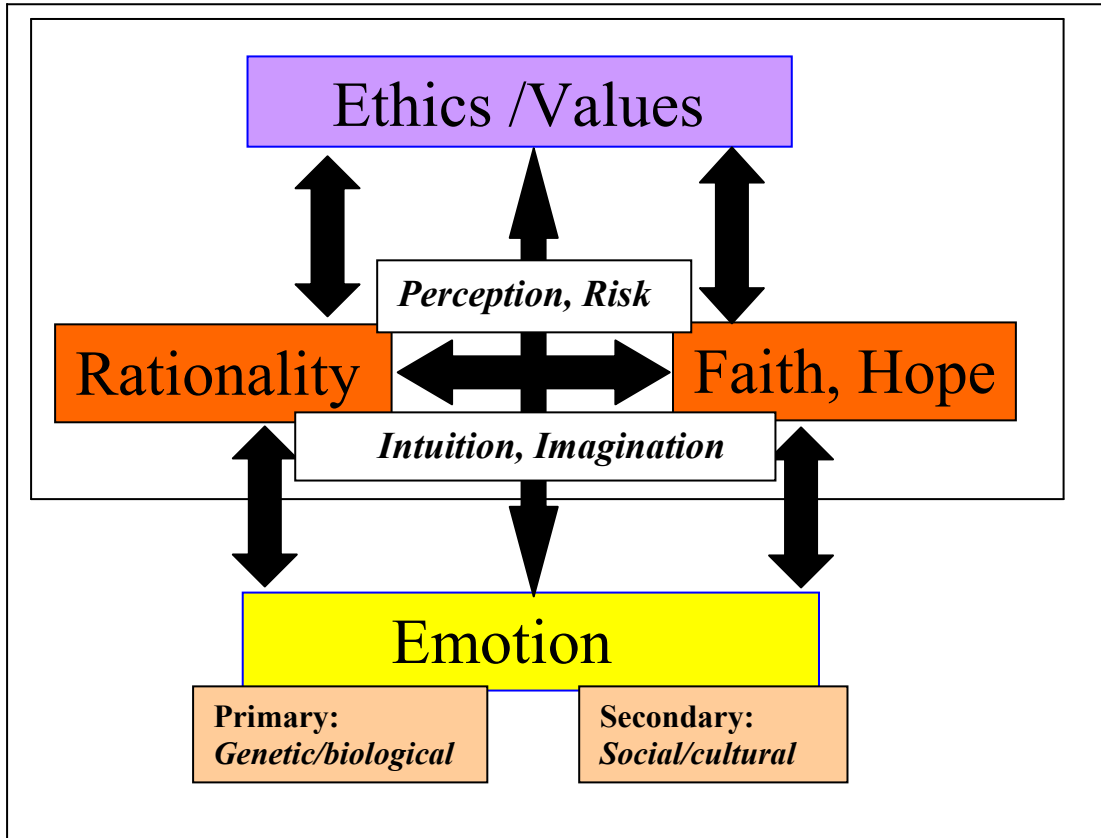
Easter 2006

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<sup>27</sup> Thich Nhat Hanh. *The Miracle of Mindfulness* (Beacon Press, 1999).

<sup>28</sup> Antoine de St. Exupery *Flight to Arras* (Harvest Books, 1969).

Figure 1



*Figure 2*

