Consciousness as Feeling

A Theory of the Nature and Function of Consciousness

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Consciousness as Feeling: A Theory of the Nature and Function of Consciousness

by

Steve Minett, PhD

**To our wonderful granddaughter,
Emily Svea Minett-Richards.
She's had approximately a year to explore consciousness. My hope is that, one hundred years from now, she will know much more than we do today about the nature and function of consciousness. My belief is that that knowledge will be discovered to be consistent with the general theoretical direction indicated in this book.**

Acknowledgements and Notes on the Text

Since becoming financially independent, in 2004 (at the age of 53), I've devoted myself to my 'Third Age' project of studying theories of consciousness. This has involved thoroughly digesting more than a hundred books on the subject. (Not just reading them, but, as can be seen on my website, recording edited highlights and listening to them many times over.) As well these literature recordings, my website (https://consciousvm.wordpress.com) contains over two hundred audio-visual film clips, based on my courses (see below). All of these materials are freely downloadable.

The specific origins of this book can be traced back to a series of four presentation which I prepared to accompany four, eight-unit courses. I delivered these course, several times, at both the North London Buddhist Centre and East London's University of the Third Age. In order of their creation, the courses were entitled; 'The History and Development of Theories of Consciousness', 'Theories of Qualia', 'Theories of The Self' and 'Quantum Mechanics & the Problem of Consciousness'. I would like to thank a number of the regular attendees at these presentation and discussion sessions, whose comments and insightful questions definitely played a role in the formulation of this text; Dr Gareth Steel, Dr Leslie Clark, Lynn-Marie Harper, Martin Cox, Marolyn Burgess, Jim Healy and Hazel Beale.

In addition, I've been a member of three consciousness discussion groups; one in Cambridge and two in London. From the Cambridge group, I would like to thank; prof Brian Josephson (Nobel laureate in physics), prof Michael

Langford, Hazel Guest and Richard Michell. From the first London group (which used to meet in a pub in St Pancras station) my thanks go to; prof Jonathan Edwards, Simon Ragget, Peter Wyeth and Ted Dixon. The second London group is ongoing and meets in Belsize Park. From this group I'd like to thank; Dr Nigel Hall, Dr Penelope Rowlatt, David Rosenfeld and Xie Cheng.

Last, but definitely not least, my heartfelt thanks are due to my wife, Gunnel; not only for her patience during the production of this book, but also (and mainly) for her active help and assistance: firstly, in the form of constructive criticism from her reading and re-reading of this text, and secondly, from her enormous contribution to the proofreading and general practical preparation of the text. My final acknowledgement goes to my son, Michael, and his wife, Sarah, for their interest in, and encouragement, during this book project. But, above all, for their gift of our granddaughter, Emily, who (as per my dedication above) has been a great inspiration for me to complete the book.

I'd also like to draw the reader's attention to two (possibly unusual) features of this book's text: firstly, I've chosen to write the names of all schools of thought and academic doctrines with a capital letter, e.g. Behaviourism, Functionalism and Embodiment. The rationale for this is the fact that this book addresses the problem of consciousness by examining the philosophical, and specifically the ontological, assumptions which guide research and thinking in the many disciplines relevant to consciousness studies. The idea of the capital letter was to highlight these various doctrines and the comparisons and contrasts which I make between them.

The second (hopefully helpful) note to the reader concerns the footnotes. I have some sympathy with the French writer who described the modern development of footnotes as a ‘disease of the text’, so I’ve tried to minimise these ‘eruptions’: my strategy has been to try to restrict the citations to one per extended passage from a particular author. In other words, when I’m referring to, and commenting on a long passage (which I frequently do), I’ve paraphrased a page or so interspersed with direct quotations from the author in question. So, rather than attaching a note to every direct quote, I’ve tended to leave the note till the end of the passage and then cite a range of pages encompassing the entire passage. In the case of particularly long passages, I (usually) give this ‘passage note’ after the first direct quote and again after the last direct quote. Finally on footnotes, where they refer to electronic books, I’ve chosen to use location, instead of page numbers, because changing the font in such books frequently also changes the page numbers, but the location numbers always remain the same.

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Introduction: Our Dilemma over Consciousness

The dilemma referred to in the title above is as follows: on the one hand, we all have overpoweringly strong intuitions as to the nature and functioning of consciousness. We feel that a clearly definable self is in charge of our mind and body: it receives comprehensive information about what's going on in the environment around us and within our organism. Using this information, the self consciously decides what actions or decisions are necessary. It then issues commands to the brain and body to implement these. On the other hand, our modern scientific culture (which has proved itself to be enormously effective and successful in, for example, the areas of medical and technological progress) contradicts all of the assumptions above. In other words, our 'Folk Psychology' (which we'll look at in detail in chapter one) doesn't fit into, or even (it can be argued) is excluded by our contemporary scientific paradigm. But how can this be? Why is it that we find ourselves in this dilemma concerning such a vital issue which is so prominent in our direct and immediate experience? The answer I'm going to suggest in this book is; the ontological hegemony of 'Cart-Ton world' (explained below) within our current scientific paradigm. This answer may have the virtue of brevity, but, as I can empathise, it's probably very lacking (on first reading) in comprehensibility.

About half of this book will comprise an effort to 'unpack' this explanatory phrase. The other half will present an alternative, quantum-based ontology, drawing heavily on the later philosophy of Alfred North Whitehead. (In other words, I'm taking an ***ontological*** approach to solving the problem of consciousness.) We can start this unpacking process by looking at the concept of 'Cart-Ton world'. This is my own abbreviation for the Cartesian-Newtonian worldview. We'll look at exactly what this means in detail in part one, but we can sketch here a basic outline of Cart-Ton world. Rene Descartes split actuality into two realms: mental and physical. The mental realm included God and the divinely implanted human soul and it was the province in which religious authorities could pronounce as to the realities which prevailed within it. The physical realm, on the other hand, could safely be left to the mechanist, materialist, deterministic modern science, which was arising within Descartes' lifetime, with Newton as its chief spokesperson. Cartesianism morphed into Cart-Ton world as a result of the widespread demise, during the second half of the Nineteenth Century, of belief (within scientific culture) in the mental and/or spiritual half of Cartesian dualism. This left only the mechanist, materialist, determinist half of Cartesianism: the half populated exclusively by the 'hard, massy billiard balls' of Newton's conception of matter, plus the abstract forces which acted on the passive atoms of Newtonian mechanics. In this Cart-Ton world there was no place for mind and consciousness, unless they could be reduced to byproducts of these passive atoms and the predictable forces acting on them.

Much of the theoretical work undertaken by Cart-Ton world in its overthrow of Folk Psychology has centred on deconstructing the two core components of consciousness (as identified by philosophical tradition); 'qualia' and the self. In fact, so prominent are these two 'components' of consciousness that I devote six chapters to them: examining each of them, first from a Cart-Tonist perspective, then in the light of contemporary but radical, 'anti-Cart-Tonist' research and finally from within Whit-Tumist (explained below) ontology. In part one, we'll look at what the term 'qualia' means and how, in detail, Cart-Ton world has undermined both it and the concept of the 'self' in the Folk Psychological sense. The argument I'm going to make is that all of these chains of reasoning, which seem to lead logically (and inevitably) to the conclusion that mind and consciousness are illusions and, consequently, should be eliminated from scientific discourse, are all based on, and justified by the ***ontological assumptions*** of Cart-Ton world. In other words, Cart-Ton world's dismissal of consciousness is not (ultimately) based on the results of rigorously scientific experimentation. Rather, it comes from unproven (and unprovable) ***metaphysical speculations***. Given this premise, it follows that if the ontology of Cart-Ton world can be challenged (especially by scientific advance) and demonstrated to be flawed, then Cart-Ton world's rejection of consciousness must also be questioned. It is precisely this strategy that I intend to pursue in the course of this book, i.e. I'm attempting to solve the problem of consciousness by going 'all the way down' to the level of ontology. The etymological meaning of 'ontology' is the 'study of being'. This can usefully be interpreted as speculation as to the nature of the ultimate entities which compose 'reality': what are they 'like' and how do they interact with each other to produce the world which we are able to perceive.

In mounting an ontological challenge to Cart-Ton world, we can (I believe) start with the emergence of quantum physics combined with the ontology developed by Alfred North Whitehead. Despite the enormous predictive success of the mathematical models of quantum physics, its founders discouraged speculation as to the ontology underlying these models. (As above, 'ontology' refers to the ultimate nature of reality in itself, as rationally constructible and independent of the empirical observations in themselves.) Students of quantum physics have, since its inception, been encouraged to adhere to the slogan; 'calculate, don't ask!' This attitude can, I submit, be described as 'a failure of ontological nerve'. I believe that Whitehead's work provides an excellent basis for this 'missing' quantum ontology, given its consistency with the findings of quantum physics. I further believe that it provides the philosophical grounds for an acceptance of the reality and significance of many of the phenomena of consciousness, such as our experience of qualia, affects, a sense of self, etc. (though not necessarily of Folk Psychology in its entirety, see chapter one). Given that I'm invoking this combination of the concepts of quantum physics and the ontology of Whitehead, I shall give this worldview a convenient abbreviation (as with 'Cart-Ton world'); namely, 'Whit-Tum world'.

Consciousness: 'The Final Frontier'

Consciousness can be called 'the final frontier' of modern scientific culture. This is because consciousness is the only 'obvious' problem that has yet to be satisfactorily solved within the modern scientific worldview. Where then should we look for an explanation of the problem of consciousness? Theoretical efforts have been made in many fields (as we shall see), including computer science and artificial intelligence, neurophysiological functioning, cell biology, physics and the philosophy of mind. But, given that there is no consensually agreed definition of consciousness and no one has succeeded in 'operationalising' the concept, we can agree that there has been no success comparable with the monumental breakthroughs achieved when science has addressed other significant questions. As we shall see, the Cart-Tonist strategy for adapting to this failure is simply to deny the reality of consciousness, however much this violates our Folk Psychological intuitions. So, I'm adopting the strategy of exploring an ontological solution in order to try to break out of this theoretical impasse.

Given the lack of success of the modern scientific worldview (i.e. Cart-Ton world) in addressing the problem of consciousness, it's clearly not the place to start, indeed I believe that it's part of the problem. I shall also refer to a second highly influential scientific 'ontology', which I call 'Ideological Empiricism'. I put 'ontology' here in scare quotes because Ideological Empiricism might be better defined as an 'anti-ontology' in the sense that it radically discourages any speculation, or even theory building, which goes beyond the immediate and direct empirical observations. In a nutshell, the thrust of its outlook can be summed up in the slogan: 'Let the facts speak for themselves!' (In philosophy Ideological Empiricism is closely related to Logical Positivism and in psychology to Behaviourism.) What I'm suggesting here is that solving the problem of consciousness will involve; a) examining and questioning these prevailing ontologies, i.e. Folk Psychology at the level of mass culture, and Cart-Tonism and Idealogical Empiricism at the level of contemporary scientific culture; and b) adopting a radically different, alternative ontology. I will later introduce a third ontological worldview, which

I'm calling 'Whit-Tum world'. This consists of a philosophical reaction to the findings of quantum mechanics and can properly be called an 'ontology'. It was devised by the prominent Cambridge mathematician, Alfred North Whitehead, and I believe that it provides an effective theoretical context within which a persuasive solution to the problem of consciousness may be sought.

So, to return to the beginning of the story, where did the emergence of Cart-Ton world leave consciousness? Marvin Minsky is a prominent artificial intelligence researcher and can also be described as a spokesperson for Cart-Ton world. He characterises consciousness as a 'suitcase concept', meaning that it is (in his view) a jumble of more than twenty different phenomena concealed and confused within a single rather vague and meaningless concept. And indeed, it is certainly the case that there is no consensually agreed, single, scientific definition of consciousness. On the other hand, however, no amount of Cart-Tonist ontology could expunge Folk Psychology from the mass populations of the earth. Thus, with the decline of dualism and rise of Cart-Ton world, the suitcase of consciousness, kept stubbornly airborne by the popular appeal of Folk Psychology, floated free from the high-rise structure of Cart-Ton ontology. As a consequence, the modern, 'scientific' problem of consciousness became how to 'lasso' the suitcase of consciousness onto the reductive structure of Cart-Ton world. All such efforts have invariably involved mangling and diminishing the very concept of consciousness, till it was scarcely recognisable to Folk Psychology.

Opening the 'Suitcase' of Consciousness

I am rather less pessimistic than Minsky regarding the irredeemability of the jumble within the suitcase of consciousness. If we open it up, I believe that we can impose at least some kind of conceptual order on its chaotic contents. Firstly, amongst the various interpretations of consciousness, we can identify two extremes (which can be equated to the Cart-Ton/Whit-Tum split) along a spectrum of notions: at one end lies Behaviourism, with its very reductive, 'stimulus-and-response' model of human behaviour. Behaviourism is almost certainly the most thorough-going and persistent of scientific doctrines in its denial of, and attempts to entirely eliminate consciousness from the discourse of science. As we shall see, the Cognitive Revolution (in the mid-Twentieth Century) went a long way toward discrediting Behaviourism. However, the doctrine is far from extinct, especially in philosophy, where Daniel Dennett, the leading philosopher on theories of consciousness, still adheres to a version of it. At the other extreme of the ontological spectrum are what can be called 'Qualiophiles'. We shall look later, and in great detail, at the philosophical concept of 'qualia', but here in the introduction we can define it as our ability to have direct, conscious, sensory experience of the external world. Of course, Cart-Ton world is incorrigibly 'Qualiophobic', denying or dismissing such abilities. Qualiophiles, however, accept the reality of qualia, see them as possibly causal and as definitely requiring a scientific explanation.

We can also, I believe, map the territory between these two opposing camps. This division is based on the generally agreed position in philosophy that the problem of consciousness can be reduced to two questions; namely, the nature of Self and the nature of qualia. The New Zealand psychologist, Ming Singer, argues[1] that the Behaviourist ('Cart-Tonist' in my terminology) camp focuses on what she calls the 'Agentic Self'. This is the view that consciousness is chiefly concerned with information processing, awareness, appropriate reactivity and flexibility of behaviour. It's a functional view of the self, as the 'chief executive controller', similar to what Dennett calls the 'engaged agent'. This has some similarities with Folk Psychology's 'Command and Control' model for the self and consciousness, but with the very major difference that in mainstream cognitive science the vast majority of the activities of this controlling self are carried out without the aid of consciousness. In opposition to these 'Agentic' theories of the self are the theories of the 'Sentient Self', experiencing ***real*** qualia. These theories insist on sensory phenomenology as the basis of consciousness: for example, John Searle has often repeated that 'the problem of consciousness ***is*** the problem of qualia'[2] and trying to explain qualia is the essence of what David Chalmers described as 'The Hard Problem' of consciousness[3].

The Computational Theory of the Mind

If we move across the spectrum territory, starting at Behaviourism and moving toward the qualiophile end, the next major theoretical milestone we come to is 'Computationalism'. Like many other technological developments before it, the advent of the computer provided researchers on mind

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[1] Singer, Ming, 'Unbounded Consciousness', 2001, Free Association Books

[2] Searle, John, 'The Mystery of Consciousness', 1997, The New York Review of Books

[3] Chalmers, David, 'Facing up to the Problem of Consciousness', 1995, Journal of Consciousness Studies, 2 (3): 200–219

and consciousness with a man-made model of the brain-major theoretical milestone we come to is 'Computationalism'. Like many other technological developments before it, the advent of the computer provided researchers on mind and consciousness with a man-made model of the brain-mind. Indeed, Herbert Simon, one of the fathers of the digital computer, considered it to be an accurate and realistic model of the human mind. He argued that its invention and the form it took were not coincidental. As one critic complained, Simon tended to; "… confuse machine psychology with human psychology!" (Earlier examples of the technological model tradition include Descartes references to mechanical toys and hydraulic systems, and, more generally, the idea in the early Twentieth Century that the telephone exchange provided a feasible model for the brain-mind.)

Despite encouraging all the limiting features of the Cart-Ton worldview, such as materialism, reductionism, mechanism and determinism, the advent of the computer also had some positive effects: firstly, it broke down Behaviourism's resistance to the 'innerness' of mind. If engineers were now designing machines which clearly had 'goals' and inner processes, it seemed absurd to deny that humans also had these. Secondly, it undermined the Cartesian dualist dogma of the mind as 'immaterial' and located outside of space and time: for the first time the computer model of the mind asserted that the mind was based on physical entities and material processes. In addition, the Computational theory of mind also gave rise to the doctrine of 'Functionalism'. This, in essence, posited that the mind, although completely dependent on brain, is, once generated, a separate entity with its own independent existence and modes of being. Functionalism, therefore, can be located on the border between the 'command-and-control' and the sentience theories of consciousness. There are different favours of Functionalism, many of which grudgingly accept the existence of qualia, generally defined in a Behaviourist way. So, in many ways, Functionalism can be seen as a covert compromise with dualism, though rather than Descartes' mental and spiritual realm, the mind exists in a sort of Platonic other world of mathematics. Part of this dualistic tendency of Functionalism manifests itself in its claim that the actual material out of which the material base of the mind is constructed is irrelevant: according to Functionalism, the mind is the product of causal relations between material entities. This principle is what enabled machines to process information using electronic valves or (later) silicon chips. Computers, therefore, denied neurones a monopoly on computation. In other words, Functionalism denied that the mind could be explained by some sort of 'organic magic' residing in neurones.

In detail, the first model for the computational mind was Alan Turing's Universal Machine. As interpreted by Functionalism, the mind was generated by the 'software' programs operating on the brain's 'hardware': different mental states were produced by different programs. Just as Turing's computer could run an infinite number of programs, so the brain can generate an infinite number of mental states. From my experience of presenting courses on this subject, I've observed that many people find the Computational theory of mind and consciousness both counter-intuitive and deeply unappealing. Why then has it secured such a firm foothold within modern scientific culture? The answer, I believe, is the entrenched cultural prestige in the West of mathematics and logic, starting with the ancient Greeks. The fact that computers proved to be better than humans at mathematical tasks, such as solving equations and winning at chess, made them seem like paragon models of the human mind, given that such activities have traditionally been seen as our 'highest' achievements.

However, Computationalism is not without its critics. A number of researchers have urged a 'turn to biology'. For example, the American philosopher, John Searle has promoted what he calls 'Biological Naturalism', arguing that neurones have, as yet, undiscovered powers to generate consciousness. (We'll look at his famous thought experiment, the 'Chinese Room' in chapter three.) Other variants of this 'biological turn' include the 'embodied' theories of mind and cognition, as articulated for example by the Chilean researchers, Francisco Varela and Humberto Matur ana. All these biological approaches see mind and consciousness as a 'natural' emergence from our neuroanatomy and physiology, rather than the brain's computational power. But, of course, these critiques have failed to make significant inroads into Cart-Ton world's secure citadel. The Behaviourist philosopher Dennett dismissed all such biological theories as nothing more than an unscientific belief in 'wonder tissue'. We can also conclude that despite all these efforts to raise the profile of the biological dimensions of mind and consciousness, the partisans of Cart-Ton world, such as Behaviouralists, Functionalists and AI researchers, still have virtually zero interest in neuroanatomy and physiology.

A typical example of this unruffled supremacy of Cart-Ton world's confident conviction that consciousness is a product of computation can be taken from a recent tv documentary on robots. One of the researchers made the unequivocal statement that: "Of course, robots will inevitably become conscious when their systems are complex enough!" This is the real faith of Cart-Ton world's ontology; that information-processing and symbol manipulation all conducted via material, mechanistic, reductive and predetermined processes, when carried out at a sufficient level of complexity, will magically produce 'consciousness' (of some variety or other). In other words, a common Cart-Ton belief is that starting with passive, non-sentient 'particles of matter' and employing nothing but well-understood electro-chemical processes, 'consciousness' will eventually appear when a certain threshold of complexity has been crossed. For the Cart-Ton faithful, this would be a merely Epiphenominal version of consciousness: the electro-chemical processes in the brain take care of all the causality involved, but (for them) it's satisfying to be able to explain (or explain away) the phenomenon of consciousness.

An Ontology to Challenge Cart-Ton's Realism?

But, when searching for a scientific theory of consciousness, how can we escape this Cart-Tonist cul-de-sac? The first step is to recognise Cart-Ton world for what it truly is: simply the ontology of classical physics, long since surpassed by the empirical findings of quantum physics, but persisting because no widely accepted ontology for quantum mechanics has managed to displace it. A further step is to challenge Cart-Ton world's philosophical 'Realism'. This is an essential part of Cart-Ton's ontology; the belief that the external world exists in and of itself, entirely independent of mind and consciousness. Ironically, this challenging of 'Realism' is exactly what quantum mechanics has done empirically, but failed to follow up ontologically. As Stapp points out the traditional, philosophical notion of substance does not apply to the; "… natural ontological character of the 'physical' aspect of quantum theory." This part, he says is described in terms of; "… a wave function or quantum state". It is, "… a 'potentia' or 'tendency' for an event to happen. Tendencies for events to happen are not substance-like: they are not static or persisting in time. When a detection event happens in one region, the objective tendency for such an event to occur elsewhere changes abruptly. Such behaviour does not conform to the philosophical conception of a substance."[4] As the science writer, Arthur Koestler, once remarked; "Matter has disappeared in the hands of the materialists!" Given this deconstruction of our traditional notion of matter, Stapp says that: "the state of the brain represents not an evolving material substance but rather an evolving set of potentialities for a psychophysical event to occur."[5]

Consistent with these views of Stapp, the philosopher Galen Strawson insists that we know exactly what consciousness is! And, he also provides a pragmatic definition of 'consciousness'; "… experience of any kind whatever. It's the most familiar thing there is, whether it's experience of emotion, pain, understanding what someone is saying, seeing, hearing, touching, tasting or feeling. It is in fact the only thing in the universe whose ultimate intrinsic nature

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[4] Stapp, Henry, 'Mindful Universe', 2007, New York: Springer, loc: 1194

[5] Ibid, loc: 1316

we can claim to know. It is utterly un-mysterious." On the other hand, Strawson claims that the nature of physical stuff is mysterious except insofar as consciousness is itself a form of physical stuff. This point, which is at first extremely startling, was well put by Bertrand Russell in the 1950s in his essay 'Mind and Matter': "We know nothing about the intrinsic quality of physical events," he wrote, "except when these are mental events that we directly experience." In having conscious experience, he claims, we learn something about the intrinsic nature of physical stuff, for conscious experience is itself a form of physical stuff. According to Strawson, consciousness is a sort of 'self-confirming' phenomenon: he says; "We know what conscious experience is because the having is the knowing: Having conscious experience is knowing what it is. You don't have to think about it (it's really much better not to). You just have to have it. It's true that people can make all sorts of mistakes about what is going on when they have experience, but none of them threaten the fundamental sense in which we know exactly what experience is just in having it." When it comes to matter, however, we don't have this privileged, self-confirming access. Strawson says: "We don't know the intrinsic nature of physical stuff, except - Russell again - insofar as we know it simply through having a conscious experience."[6]

Whitehead's Ontology

So, is there an ontology which could philosophically accommodate consciousness? The answer is, I believe, ***yes!*** and it comes, not from a New Age guru, but from the work of the prominent English mathematician and philosopher, Alfred North Whitehead. As a professor at Cambridge, in

[6] Galen Strawson, New York Times article, May 16, 2016

the late Nineteenth Century, he was the doctoral supervisor of Bertrand Russell. The two men later cooperated in writing, 'Principia Mathematica', a three-volume attempt to examine the foundations of mathematics, which was published over the period 1910 to 1913. Following his contribution to this major milestone of intellectual history, Whitehead devoted the remainder of his life to formulating an ontology compatible with findings of modern science, especially quantum mechanics. A major problem for quantum theory has been its lack of, and indifference to, ontology: in other words, it doesn't ask what's really going on behind the observations. Stapp and others have suggested that these lacunae could be filled by Alfred North Whitehead's process ontology. Essentially, Whitehead took the very simple step of giving himself permission to speculate as to what's going on beneath the empirical observation: As Victor Lowe puts it: "The permission to speculate is also a permission to go in thought 'behind the scenes' … - to explain what is perceived by something conceived."[7] (In my mind, this type of speculation isn't really so different from formulating a scientific theory. After all, such theories are never ***directly*** tested. It's only the highly simplified ***hypotheses*** extracted from them which get empirically tested. So, in this sense, an ontology such as Whitehead's could be described as a very grand and comprehensive scientific theory.)

The first principle in this ontology is that the world is built out of actual entities or occasions: Whitehead says: "'Actual entities' - also termed 'actual occasions' - are the final real things of which the world is made. … The final facts

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[7] Lowe, Victor, 'Understanding Whitehead', 1962, Johns Hopkins U.P., 308

are, all alike, actual entities, and these actual entities are drops of experience, complex and interdependent."[8] Whitehead took this concept of the drop-like (atomic or indivisible) character of experience from William James: "Either your experience is of no content, of no change, or it is of a perceptible amount of content or change. Your acquaintance with reality grows literally by buds or drops of perception. Intellectually and on reflection you can divide them into components, but as immediately given they come totally or not at all (W. James, 1911)."[9] Stapp claims that Whitehead's ontology is particularly relevant for relativistic quantum field theory. He says: "Both are built around psychophysical events and objective tendencies (Aristotelian 'potentia', according to Heisenberg) for these events to occur. On Whitehead's view, as expressed in his 'Process and Reality' (Whitehead 1978), reality is constituted of 'actual occasions' or 'actual entities', each one of which is associated with a unique extended region in spacetime, distinct from and non-overlapping with all others. Actual occasions actualise what was antecedently merely potential, but both the potential and the actual are real in an ontological sense. A key feature of actual occasions is that they are conceived as 'becomings' rather than 'beings' - they are not substances such as Descartes' res extensa and res cogitans, or material and mental states: they are processes."[10]

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[8] Whitehead, Alfred North, 'Process and Reality', 1927/1979, Macmillan, p.18

[9] Stapp, Henry, 'Mindful Universe', 2007, New York: Springer, loc: 1038

[10] Ibid, loc 1187

According to Whitehead's quantum ontology, objective and absolute actuality consists of a sequence of psychophysical quantum reduction events. These events can also be described as Whiteheadian actual entities or occasions. The accumulation of these events create a growing 'past' of fixed and settled 'facts'. Each 'fact' is specified by an actual occasion or entity which has both a physical aspect and a mental aspect, and also a region in spacetime from which it views reality.[11] Stapp draws attention to Whitehead's basic distinction between the two kinds of realities upon which his ontology is based: Whitehead describes these as; "'continuous potentialities' versus 'atomic actualities': Continuity concerns what is potential, whereas actuality is incurably discrete."[12] Whitehead is clear that the conversion from potential to actual is what decides things. For example, transforming a business idea into an actual commercial empire: "Actual entities … make real what was antecedently merely potential."[13] And again: "Every decision is referred to one or more actual entities… Actuality is decision amid potentiality."[14] And, most decisively, Whitehead says; "Actual entities are the only reasons."[15] Stapp contrasts Whitehead's idea of the growing 'past' with the corresponding idea in non-relativistic quantum physics: "In non-relativistic quantum physics the growing 'past' lies be-

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[11] Ibid, loc:1101

[12] Whitehead, Alfred North, 'Process and Reality', 1927/1979, Macmillan, p.61

[13] Ibid, p.72

[14] Ibid, p.43

[15] Ibid, p.2

hind an advancing (into the future) sequence of constant-time instants 'now'."[16]

I'm coining the abbreviation 'Whit-Tum world' for the synthesis I have attempted to make by combining Whitehead's ontology with various discussions of the ontological implications of quantum mechanics, particularly those of Stapp, Hodgson and d'Espagnat. Within Whit-Tum world (as Whitehead claims) 'experience', 'goes all the way down' to the fundamental components of reality: it's built-in to all phenomena in the universe. But, importantly, Whit-Tum world is 'Pan-Experiential' rather than 'Pan-Psychic'. In other words, it's not 'consciousness' that's present everywhere, but (according to Whitehead) 'experience'. I prefer to call this basic substance, which is built into the fundamental building blocks of everything, the 'raw material' of consciousness, rather than consciousness itself. In addition, my own view is that 'feeling' might be a better label for this 'raw material' than 'experience' because it avoids the complexity of human consciousness, as we continually experience it. This complexity is the product of the vast elaborations which language and culture (among other factors) exert on primordial human feelings. So, for example, the obvious refutation of Panpsychism to be had by asking the rhetorical question, 'how can a rock have consciousness?' is dealt with. In Whit-Tum world, therefore, the 'raw materials' of consciousness are a fundamental property of all reality. This assertion solves the 'Hard Problem': if we ask the question; "Why should anything feel like anything?" Whit-Tum world's answer is; 'because feel

[16] Stapp, Henry, 'Mindful Universe', 2007, New York: Springer, loc: 1069

ing has been built into all things from the very beginning!' Cart-Ton world, on the other hand, famously, ***has*** no answer to the 'Hard' question.

The Plan of the Book

Let me finally, in this introduction, say something about the plan of this book. An obvious place to start an examination of theories of consciousness is the 'native' theory of consciousness which is universal to our species: this has been called, 'Folk Psychology' (often with a dismissive intent). So, part one of the book consists of an examination of the journey of scientific culture away from Folk Psychology and towards Cart-Ton world. The first chapter contains a detailed account of Folk Psychology. Next, I'll move on to the 'collision' between Folk Psychology and Cart-Ton world, as it emerged during the Nineteenth Century. I'll then give a detailed account of exactly what I mean by the term 'Cart-Ton world'. The final two chapters of part one will present Cart-Ton world's conceptualisation of first qualia and then the self. The second part of the book will look at how much of contemporary research in science and philosophy has been working to undermine Cart-Ton world. The first chapter here consists of a critique of what I call 'Infomania'. This is the typical Cart-Tonist ontological strategy of trying to limit the basis of consciousness to nothing but the processing of information. In other words, leaving out what I regard as the most essential characteristic of consciousness, namely - ***sentience***! The remaining two chapters in part two present contemporary research which challenges Cart-Ton world's conceptualisation of firstly qualia and then the self. Part three presents what I see as a viable transition from Carton world to Whit-Tum world: in this chapter I look at the quantum challenge to

Cart-Ton world. In the next two chapters, I take this analysis deeper by looking in detail first at the quantum measurement problem and secondly at the implications of quantum mechanics for our conceptualisations of ‘reality’ and ‘experience’. The next chapter presents Whitehead’s ontology and the final one draws together this with the previous discussions of quantum ontology to produce the synthesis I’m calling ‘Whit-Tum world’. Part four comprises a theory of the nature and function of consciousness as constructed within the ontology of Whit-Tum world. I first consider the ‘quantum theory’ of consciousness as promoted by Roger Penrose and Stuart Hameroff and find it somewhat lacking in ontological depth. I then present a fully Whit-Tumist account of first qualia and then the self. The penultimate chapter deals the Whit-Tumist version of free will, especially in relation to Compatibilism. The final chapter presents my account of the evolutionary function of consciousness.

Part One:
From Folk Psychology
to Cart-Ton World

The five chapters of part one examine the transition of scientific culture from Folk Psychology towards Cart-Ton world. The concepts of 'Folk Psychology' and 'Cart-Ton world' are presented and described in detail. The idea that consciousness is an amalgam of 'qualia' and the self is presented, as is the two ontologies differing takes on these entities.

Chapter One:
The First 'Theory' of Consciousness - 'Folk Psychology'

Let me suggest that the first place to visit during any consideration of theories of consciousness has to be 'Folk Psychology'. This term comprises the intuitive theory of mind and consciousness, which people instinctively employ when interacting with each other on a daily, unreflective basis. Folk Psychology constitutes a pre-scientific, and even a pre-philosophical theory of human mentality, including ideas about beliefs, desires, motivations, notions about the effects of sensations and a particular model of the self. From the very dawn of our species (and possibly even further back) Folk Psychology has served as a great repository of (generally implicit) explanations of the operations of mind and consciousness. And, even today, whenever we think, in a practical and instrumental way, about how other people's minds work, we are initially going to be trapped within this particular set of concepts. This 'entrapment' within an intuitive conceptual system is true of the study of consciousness, in a way that's not true of any other research topic. (It could be described as a 'Folk Ontology' for consciousness.)

Folk Psychology can, therefore, be called the 'starting place' for thinking about consciousness for the following reasons: If randomly asked for their ideas about consciousness, Folk Psychology is the framework of concepts within which the average person, who has never seriously thought about, or studied the subject, would begin their reflections. In addition to its historical foundationalism and universality, there are two particular advantages to starting with Folk Psychology: Firstly, as with other 'folk theories', such as 'Folk Physics' and 'Folk Medicine', when modern science enters their domains, the question arises as to how much of the folk theory can be adapted and absorbed and how much has to be simply abandoned. (As we shall see, the answer for 'Eliminativist' philosophers is all of it! Whereas other researchers have been more optimistic regarding the future of Folk Psychology.) Secondly, there's also the consideration that any theory of consciousness will have to compete with, not just existing scientific theories, but with Folk Psychology. And, if the theory contradicts Folk Psychology, it will be very difficult to 'sell' it to the general public.

So, what is Folk Psychology? It consists, in my view, of two components: firstly, a particular set of psychological outlooks and dispositions which is characteristic of human beings and is believed to have a biological base. I call this 'Evolved Psychology' and it provides a theory of consciousness as created by natural selection. Evolved Psychology has been 'designed' to enable us to function as a 'eusocial' species, i.e. to function efficiently and effectively in groups of between 30 to 150 people. For example, an anthropologist[17] has pointed out that, unlike human beings, 350 chimpanzees couldn't routinely fly in Jumbo jets for seven hours without severely injuring or killing each other! The psychological outlooks and dispositions of Evolved Psychology are what makes this possible for us. These

[17] Hrdy, Sarah Blaffer, 'Mothers and Others' 2011, Belknap Press of Harvard U.P., loc:69

characteristics arise from certain features of human anatomy and neurophysiology, for example, a fixed and universal range of emotions, our capacities for facial recognition and interpretation, mirror neurones, etc. The other half of Folk Psychology, however, is cultural rather than biological, I'm calling it 'Ethno-Psychology'. Again, unlike Evolved Psychology, it differs between cultures. In the Western World, our version of Ethno-Psychology can be identified as largely based on Cartesian Dualism. Descartes' theory made two major assumptions relating to mind and consciousness: firstly, it split the world between a 'mental' and a 'physical' realm. Secondly, it assumed that consciousness has a 'command and control' function within the human organism. Both assumptions are, I believe, profoundly wrong. Folk Psychology's admixture of biological and cultural components causes problems and confusion: for example, because the evolutionary part is inbuilt and we feel it so deeply, we tend to accept the cultural part without question.

Folk Psychology's Account of Consciousness

So, what does Folk Psychology have to say about consciousness? The answer can be summarised in two distinct 'visions' or models: 1) a set of predispositions and assumptions for simplifying and facilitating social interaction, and 2) Folk Psychology's 'command and control' model. In the first model, the relatively simple and familiar categories of Folk Psychology greatly assists everyday communication and understanding between human beings. This is sharply illustrated if we try to replace Folk Psychological terminology with that of, say, neuroscience. The British psychologist, David Rose, for example, says that if we remove folk psychological notions from our everyday speech and replace them with ideas from neuroscience, couched in terms of brain states and neurophysiology; "… instead of saying 'I hate you', you would say something like 'Oh, you make cells fire in my left ventro-medial amygdala'; instead of saying 'I'm seeing red' you'd say 'My long-wave cones are overactive relative to my middle-wave cones'; instead of saying 'Maggie is insane' you would say 'Maggie has excess dopamine D2 receptors in her mesolimbic system'; and so on. We would learn a new vocabulary and a new interpretation of our minds in terms of neuroscience, that would eventually replace our folk psychological terminology and provide us with a more accurate understanding."[18] (Interestingly, many Psycho-analytic and Psychiatric terms, such as 'projection', 'complex' and 'paranoid', ***have*** entered everyday speech, but that's probably because they fit in with underlying Folk Psychological concepts much better than do neuroscience terms.) And, in fact, if we did seriously abandon Folk Psychology, the probability is that we would become deeply alienated from the 'lived-human-world' and fail to understand both ourselves and others. Finally, the terminology and categories of Folk Psychology are deeply embedded in our languages, attitudes and cultures. To take just two core examples; Shakespeare and the Bible are crammed full of Folk Psychological projection and analysis.

The second principal concept of consciousness within Folk Psychology can be described as the 'command and control' model. This involves the notion of consciousness exercising total control over the human organism. An autonomous, self-conscious will is a requirement of this model: each

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[18] Rose, David, 'Consciousness; Philosophical, Psychological and Neural Theories', 2006, Oxford U.P., p.37

individual consciousness is fully aware of, and has control over, all the behaviour emanating from his/her mind and body. Key to this notion is the idea of a fully competent, autonomous self, with completely adequate information: the self is the causal source of all actions emanating from the mind-body and the content of the mind is fully and directly accessible to the conscious self. This self is morally responsible for the thoughts produced by its mind and the behaviour produced by its body. Daniel Dennett has devised a metaphor, called the 'Cartesian Theatre', to represent this key idea in Folk Psychology: the idea is that all incoming sensory information is fed into a single 'control centre' in the brain where the self can perceive it. Having thus become informed as to what's going on in the environment, the self then issues commands to the body as to what to do. Whether or not the Cartesian Theatre is an accurate model, it's certainly true that people generally tend to believe - and feel - that this is the way in which their bodies and minds interact. (Daniel Wegner,[19] has suggested that, even if the conscious will is an illusion, we believe in it because we experience an 'emotion of authorship' when we are in the process of carrying out an action.)

The 'Folk Self'

The Western tradition's notion of a unified soul as a single locus of all our thinking and feeling probably originated with Plato. However, Plato's unification of the soul did not include the distinction between the internal world and the external world as conceived of in the Cartesian-Newtonian World (or Cart-Ton world for short). This split between the inner self and the outer world is a product of Descartes'

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[19] Wegner, Daniel, 'The Illusion of Conscious Will', 2002, MIT Press, p.187

philosophical method. He asked himself: “How can I be certain of the things I claim to know?” As Kenan Malik notes; “The only certainty he believed, was that he existed. He could imagine that he possessed no senses and that his body was but a figment of his imagination. He could deny his thoughts, but in that very denial their existence is affirmed. Hence Descartes was certain that he thought, and being certain that he thought he was certain that he existed.” This, of course, resulted in his famous slogan, ‘I think, therefore I am’ and this ultimately led to what philosophers call the ‘first person privilege’: “Descartes' conclusions concern only himself and his consciousness. It says nothing of an external or objective world. A distinction is therefore drawn between the 'inner' and the ‘outer’ world.”[20] As above, this Cartesian conception of the self in Folk Psychology resulted in its ‘command and control’ model: the self is seen as a very strong and robust ‘commander’ in full control of the entire human organism. This conception is reinforced by the fact that the self is our most immediate and intimate object of perception. We feel ourselves to be more familiar with and knowledgeable about it than anything else in the world. We identify with our self and regard it as defining the person we consider ourselves to be. All this, consequently, makes it a very difficult subject for scientific and philosophical investigation.

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[20] Malik, Kenan,, ‘Man, Beast and Zombie’, 2000, W&N, p.44

As a starting point, the neurologist, Vilayanur Ramachandran has tried to identify five definable, characteristics of the self that we all experience. The first is unity and coherence: our sense of having a self is what enables us to experience ourselves as a single, continuously existing person; despite the enormous variety of our sensations, memories, beliefs and thoughts. Even though we're capable of this vast range of experiences, we have an awareness, over a life time, of the unity of the self. Second, is continuity; we experience the self as an unbroken thread running through our lives, linking together our feelings of the past, present and future: we feel that we have the ***same*** self throughout life. It may change somewhat, given the life-experiences we have, but, in some fundamental sense, we believe that there's an unbroken continuity between the self we have now and the self we had as far back into infancy as we can remember. Third, the self is the source of our agency; i.e. it initiates and is responsible for our actions. When we initiate an action, we believe that it is this same self, the one with unity and continuity, the self which defines our identity, which decides to undertake the action: nothing happens in our brain or body until our self has made a decision - the self is the first link in the causal chain leading to action. It is, therefore, the self which exercises the free will, which we experience ourselves as having.

The fourth characteristic is self-awareness. This is perhaps the most complex of the self's five characteristics and can be interpreted in several ways. Firstly, at the most basic level, an unaware self would be a contradiction in terms. Though, 'awareness' is a very elastic term: single-celled organisms might be said to be 'aware' of phenomena in their environment, such as toxins, temperature, etc., so do they have a ‘self’? As we shall see, they might be conceded to possess the most basic of biological ‘selves’, in which case, all living organisms can claim to be in possession of a ‘biological self’. At the other end of the biological scale, it’s argued that humans can (perhaps frequently) be aware but not conscious: an extreme example would be Petite Mal epilepsy, where, during an attack, a patient remains aware while being entirely unconscious. More everyday examples would be skilled but routine and well-trained patterns of behaviour, such as driving, high-performance sport, etc. These can be competently carried out without being conscious. As with the biological self above, this challenges the Cartesian claim of an indissoluble link between the self and consciousness. Fifth, and finally, we experience our own particular self to be anchored in our own particular body: in other words, we have one self and one body and they are inseparably linked together for the entire duration of our life. (There are, of course, phenomena which seem to contradict this conclusion, such as ‘out-of-body experiences’, but these are unusual enough to provoke controversy as to whether they are ‘real’ and, even for those who claim to have experienced them, they’re regarded as rare and peculiar experiences.)

Consequently, we can never experience another person’s self as we experience our own and we regard someone who claims that their body is inhabited by several distinct selves to be in a strange and probably pathological state. Kenan Malik argues that the idea of self seems so ‘natural’ that we can scarcely bring ourselves to question it: “We imagine we have selves in the same way as we have arms or legs or hearts or livers.” Our thoughts and feelings are our private property; “… even if someone else has the same thought, his is located in his head, mine in my head.” This notion of ourselves as private property involves the distinction between ‘inside’ and ‘outside’: “Our ideas, thoughts and feelings are within us, while they bear upon objects outside.” This is why we talk about our ‘inner selves’ in distinction from the ‘outside world’ and this division seems natural and inevitable to us: “Where, after all, could our thoughts, or ourselves, be but inside our heads?”[21] As we shall see, Cart-Ton world rejects or denies virtually the entirety of these Folk Psychological notions of the self.

Folk ‘Qualia’

[21] Ibid, p.43

So, Folk Psychology features a very strong and clearly defined self. In modern times the philosophical problem of consciousness has come to be defined as a need to explain two phenomena; one is the self, the other is ‘qualia’. This is a technical philosophical term (first used in the 1920s). So, while qualia are certainly abundantly present and accepted as an enormous part of the subjective content of everyday Folk Psychology, the term is not popularly known and the phenomena are deemed so obvious as not to warrant any ‘folk theory’. But what are qualia? Qualia (singular ‘quale’, pronounced ‘kwah-lay’) can be described as our direct experiences of sensory awareness. Qualia consist of qualitative feelings such as seeing red or being in pain. The term qualia includes emotional states, such as being frightened, being depressed, etc. Its original philosophical meaning referred to experiences of one single, simple quality, for example; green, the sound of middle C, the taste of a lemon, the feel of velvet or the smell of garlic. Part of the idea of qualia is that these experiences are purely mental. In other words, qualia do not have physical qualities, such as having a spatial location or being an identifiable object. Traditionally, qualia are described as simple, single, direct ‘raw feels’. Qualia are then contrasted with complex percepts, such as an armchair, which can be broken down into sub-components such as colour, location, surface texture, etc. These sub-components are then defined as qualia, the minimal atomistic elements of experience that cannot be broken down or analysed further. Qualia, in this view, have no substructure, and thus are sometimes described as ‘homogeneous'. They are difficult to describe in words or to analyse into simpler components.[22]

[22] Rose, David, ‘Consciousness; Philosophical, Psychological and Neural Theories’, 2006, Oxford U.P., p.4-7

The closest we can get to a 'folk theory of qualia' can be found in the traditional empiricist theories of perception: the empiricist-associationist philosophers Locke (1690) and Hume (1739) suggested that perception starts with 'simple states', i.e. what we would now call qualia. They imagined these to be sense 'impressions' or simple 'ideas', which served as building blocks or 'atoms' of awareness. These simple entities become associated together, through life-experience, to form complex ideas or concepts. These more complicated, holistic ideas differ from simple ideas in the lower intensity of the imagery accompanying them. For example, the empiricist-associationist argued that old memories and imaginings are less vivid than immediate sensations. In this traditional conception qualia are atomic or quantal units, the elements of experience - basic, primitive or raw feelings such as seeing red. Locke had what can be called an 'atomic' theory of perceptual qualia: according to him, by existing in the physical world an object causes a person to perceive it as it comes into contact with their eyes. This then gives rise to a simple idea in his or her mind, in other words, a quale of the object. We cannot create such simple ideas, we can only get them from experience. Once the mind has a store of such simple ideas, it can combine them into complex ideas of many kinds. Thus, Locke made an analogy between the way atoms combine into complexes to form physical objects and the way ideas combine. The theory was that complex 'ideas' are built up through association, by combining different basic elements of sensation and experience, that we learn as we develop. This is the empiricist, associationist view in psychology.[23]

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[23] Ibid, p.342-365

Traditionally, qualia are also associated with mind/body dualism. In this worldview, qualia are seen as the most basic form of sensation, coming direct from the body: qualia are the ‘raw feels’ that things in the world ‘imprint’ on our bodies. Qualia, therefore, are not representational. Representations, or perceptions, are constructed in the mind from the sensory raw material, provided by the body in the form of qualia.

However, in addition to this simple, single quality definition, the term ‘qualia’ has come to be used for all sensory experience: not just the simple elements but also the whole complexity of sensory input: of stimulus objects and even the entire subjective context. This has probably come to be the case because philosophers identified qualia as mental states which have this ‘raw feel’ quality. In other words, qualia became associated with the immediate, sensory experience of consciousness. And, as many observers have pointed out, we don’t experience the world around us as constructed from discrete ‘atoms’ of sensation, but rather as a unified and continuously evolving, seamless whole. So, qualia has come to stand for our entire subjective experience, for what it feels like to be conscious on a moment-to-moment basis. A lot of the philosophical debate about qualia revolves around the status of this unity of immediate experience: is the unity an illusion, which is actually built up from a lot of very complex and independent processes, or is the brain somehow able to provide us with access to genuine ‘analogue’ states which have a reality outside of individual consciousness? The philosopher Jason Stanley represents this position, which denies that sensory experience is atomistic, when he says: “We will call the space of all possible conscious experience qualia space”.[24]

The American philosopher of the mind, John Searle has frequently claimed that, “the problem of consciousness ***is*** the problem of qualia.”[25] So, at this point it would be appropriate to say something about the way in which qualia are conceptualised in the theory of consciousness being promoted in this book: our major point of destination will be the ontology developed by the mathematician and philosopher, Alfred North Whitehead. This will be presented in detail in later chapters, but here we can refer to Whitehead’s theory of ‘Prehension’: this refers to an alternative sensory channel via which we can ‘know about’ or ‘feel’ the ‘external’ world, alternative, that is, to the conventional understanding of sensory perception. This alternative channel for knowing the world is a product of Whitehead’s rejection of both materialism and idealism. His ontology posits a radically novel conception of the basic constituents of reality, capable of bridging the gap between the ‘mental’ and the ‘physical’. Part of Whitehead’s conception is a rejection of Cart-Ton world’s bifurcation of nature into primary and secondary qualities: Cart-Tonists assume that primary qualities are those independent of the observer’s mind and secondary qualities are those added by it. This ‘primary/secondary’ view became popular following the success of Newtonian physics. However, it has many philosophical difficulties which were pointed out, from very early on by for example, David Hume. In addition, the rise

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[24] Stanley, R.P., ‘Qualia Space’, 1999, Journal of Consciousness Studies, 6 (1), p.49

[25] Searle, John, ‘The Mystery of Consciousness’, 1997, The New York Review of Books

of quantum physics from the 1900s (as we shall see) has completely discredited it. In Whitehead's organic world-view the observer cannot be separated from the observed. (The term 'Prehension' is derived from the Latin term *pre-hendere*, meaning 'to grasp'.) According to Whitehead's doctrine of 'Prehension', qualia are unquestionably real and important phenomena in our experience: they have an onto-logically independent existence and we 'apprehend' them 'as they are' in a simple and direct way. (See chapter twelve for a thorough discussion of these issues.) Again, as we shall see, Cart-Ton world rejects or denies virtually the en-tirety of these Folk Psychological notions regarding qualia.

The Origins of Folk Psychology

I suggest that Folk Psychology is, in fact, a composite composed of two distinct parts. The first of these is Evolved Psychology: in other words, what we experience via the 'mental organs' and other brain structures we have biologically evolved in order to relate to and interact with other individuals in our highly social species. The other half of Folk Psychology consists of what I'm calling here, 'Ethno-Psychology', which is a cultural construction, emerging, following the advent of language, from the memes accumulated by each and every cultural group. Ethno-Psychology stands for the socio-cultural, historical-traditional conceptual framework within which communit-ies and cultures, societies and civilisations deliberate and theorise about consciousness. (Much of the confusion and difficulty of extracting Folk Psychology from contempo-rary consciousness research, is this merger of a cultural product with a set of instinctual predispositions and atti-tudes.)

As the name implies, the theory of Evolved Psychology assumes that it emerged to fulfil a set of biological functions within our species. These benefits can be summarised as follows: firstly, the deeply rooted conviction that our behaviour, and the behaviour of others, is driven by conscious, mental states, such as; fear, anger, desire, etc., provides a context within which we can; a) reflect on and comprehend our own behaviour, and, b) try to predict and respond to the behaviour of others. A byproduct of this, as Nicholas Humphrey has suggested[26], is that we can project our understanding of Folk Psychology onto other people and thus have a sense of, and apparent insight into, the mental and emotional lives of others. This provides an 'everyday' solution to the philosophical problem of 'Other Minds'. The relatively newly discovered phenomenon of 'Mirror Neurones' (see chapter six) could be a major part of the neurophysiological equipment by which this is achieved. Evolved Psychology is the common-sensical, 'everyday' theory of mind and consciousness which we all employ in our ruminations about ourselves and others and in our daily social interactions. It's characterised by what Daniel Dennett calls the 'intentional stance', meaning the assumption that human beings are conscious agents whose behaviour is governed by internally generated mental states, such as beliefs, fears and desires. These assumptions, of course, enormously simplify social interaction and the thought patterns associated with them. The origin of the 'hard-wired' parts of Folk Psychology can very simply be ascribed (as with all biological evolution) to the processes of natural selection.

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[26] Humphrey, Nicholas, 'Soul Dust', 2011, Princeton U.P., p.122

Cart-Ton World: Based in Cartesianism!

Ethno-Psychology, on the other hand, is a cultural product. 'Our' Ethno-Psychology since the emergence of the modern, Western world is Descartes' Interactive Dualism, which went virtually unchallenged until around 100 years ago. Gilbert Ryle[27] suggested in the late 1940s that Cartesianism was the 'Official Doctrine' of Western Society. (John Maynard Keynes probably meant much the same thing when he said that the common sense of the 'man in the street' was based on the work of a philosopher 300 years earlier.) Cartesianism, in turn has deeper roots: much of Rene Descartes' thought about the soul and the existence of an 'Ideal World', outside of space and time, can be traced back to Plato, while his conception of matter as 'passive' was deeply influenced by Christian, Creator-God, monotheistic theology. This monotheistic approach literally adopts the 'God's Eye' perspective, which Thomas Nagel (1989) characterised as the 'View from Nowhere'. Specifically, these notions led to the Cart-Tonist vision of a single Creator-God, who drained all energy and innovation out of matter, leaving it passive and inert, only capable of being affected by external forces.[28]

Descartes interwove these deep, earlier, cultural influences into the common human base of Evolved psychology, in order to articulate what has become the predominant modern, Western doctrine on mind and consciousness. He split

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[27] Ryle, Gilbert, 'Concept of Mind', 1949, Routledge, (2009)

[28] Wallace, B. Alan, 'The Taboo of Subjectivity', 2000, Oxford U.P.

the world into a material half, ‘res extensa’, and a mental or spiritual part, ‘res cogitans’. Res extensa was purely material and mechanical, just like the image of matter emerging from the early-modern science of his time. By splitting this off from the spiritual domain, the material world could safely be left for science to study, while res cogitans was the province of the church. This division therefore, could reduce the conflict between science and religion; allowing science free reign in the material world, while reserving the mental/spiritual world to religion. It’s our Cartesian, Ethno-Psychology that is primarily responsible for the ‘command and control’ model in Folk Psychology: the notion that the conscious human agent receives information as to what is happening in his or her environment and, based on an analysis of this, issues commands to his/her body to react in an appropriate way.

Descartes imagined this taking place in some central area of the brain (which Dennett has contemptuously dubbed the ‘Cartesian Theatre’): a central ‘command room’ into which all information is channelled and out of which all orders to act are issued. Malik comments that by cleaving the world in two that created the great philosophical divide of modern times, between idealist and materialists: “The idealists (who include such different thinkers as Leibniz, Berkeley, Hegel and Heidegger) have argued in effect that matter must be shown to be a form of mind, that reality is something we construct in our heads. The materialists, or mechanists, on the other hand (a tradition which includes Hobbes, Locke, Wittgenstein and Ayer), have believed that mind is a form of matter, that it can be understood in purely physical terms. The two sides have generally been hostile to each other."[29] (However, in parts three and four of this book, I shall argue that the ontology of Alfred North Whitehead can be seen as an effective way of reconciling these hostile camps.)

Following Descartes, thought and knowledge are no longer properties of the world but are rather confined in the head. As Malik comments: "In the Cartesian world, to know reality is to have a correct representation of things - a correct picture within of outer reality. Ideas, therefore, become internalised and exist solely within us." Descartes also transformed the concept of reason: "Reason is no longer defined as existing in the objective order of things, but becomes a method, or procedure, to discover truth." As Descartes himself put it; "I can have no knowledge of what is outside me except by means of ideas I have within me."[30] Malik notes that: "This, of course, is the claim at the heart of the modern scientific method, and, indeed, of all modern epistemology." Descartes' method of starting with the self as the only certainty and then moving out into the objective world also; "… became central to the science of mind over the next three centuries. It led inexorably to a dualist concept of body and mind." To most modern people this seems to be simply common sense. However, I'm going to argue in this book that it is, in fact, a key part of the misleading and deceptive ontology which I've called Cart-Ton world. However, as Malik points out: "A perception, emotion, belief or action may seem natural, not because it is rooted in our biology, but because we live within a particular epistemological framework that fashions our very way of

[29] Malik, Kenan,, 'Man, Beast and Zombie', 2000, WandN, p.320-325

[30] Descartes, Rene, 'Descartes: Philosophical Letters', 1642, p.123

thinking and we cannot imagine it to be otherwise. We should be wary of mistaking an epistemological framework (which shapes how we know things) for an ontological one (which determines how things are)."[31]

There are several major problems with the Cartesian model. The first was recognised by Descartes himself (along with Leibniz and others) and it consists of the problematic nature of the interaction between the mental and physical worlds: how can a conscious decision, for example to raise one's arm, be the cause which initiates the movements of the physical components which composed your arm? In his analysis of the material half of his world, Descartes was a thorough-going mechanist, believing that all physical processes required direct contact between the solid particles, of which he believed matter to be composed. This problem grew progressively more acute as Newtonian physics came to dominate the modern scientific worldview, which promoted the concept of 'physical closure'. In this vision of the world all events are the products of endless causal chains, leaving no 'space' for a 'non-material' phenomenon like consciousness to intervene.

[31] Malik, Kenan,, 'Man, Beast and Zombie', 2000, W&N, p.44/45

Descartes' only attempt at an explanation was to suggest that mental/physical interactions are mediated by the pineal gland (mainly because it's a single organ in the centre of the brain), but not even he was particularly convinced by this. The other great objection to the Cartesian Theatre was the infinite regression of the 'homunculus': this runs as follows; the homunculus (or fully formed 'micro' human being) who sits in the brain controlling everything, must (the argument goes) have an-other, even smaller homunculus in his (or her) brain, and so on in an infinite regress. This did not trouble Descartes for whom the 'homunculus' was a divine soul implanted there by God, enabling the 'buck to stop there'. However, as reli-
gious belief declined within Western scientific culture, this solution to the infinite regression of the homunculus became less and less credible.

This whole section, identifying Cartesianism as one of the major bases for Cart-Tonism, may seem paradoxical in relation to the philosophy of Daniel Dennett: throughout the book I classify him as a Cart-Tonist, and yet there's no denying his anti-Cartesian credentials. Let me avoid this paradox by saying that Dennett's anti-Cartesianism is very narrowly focused on Descartes' dualism. While I too reject dualism, it's the deadening mechanism of the materialist side of Descartes' philosophy to which I object. As we shall see in the next chapter, once the 'other-wordly' half of Cartesianism had been 'lopped off', the extreme mechanism of his materialist vision was left to colour Cart-Tonism. Indeed, 'Cart-Ton world' can be characterised as suffering from 'phantom limb syndrome', in the sense that, as this particular ontological paradigm developed in the modern world, the Res Cogitans 'limb' of Cartesianism was cut off. As in the syndrome, however, this 'limb' continues to exercise a fantom influence, mainly in a negative, 'straw man' capacity. What I'm getting at here is 'Cart-Ton world's' tendency to cast all discussion of mind and consciousness within the categories of 'mental/physical', 'mind/body', etc. which are so familiar (though now anathematised) from 'Cart-Ton world's' intellectual origins. (Dennett stigmatises many of these manifestations as 'crypto-Cartesianism'.)

Conclusions: Consciousness - 'Active' or 'Passive'?

To conclude this consideration of the two components of Folk Psychology, we can look at them in terms of 'active' versus 'passive' conceptions of consciousness. Ming Singer notes that, "…human beings are at once cognitive agents and sentient experiencers."[32] The 'agent' is the active, information gathering version of consciousness, while the 'sentient experiencer' is the part of us which reacts, often in an evaluative way via our emotions, to the environment around us. (This 'active/passive' division within Folk psychology's reflects a distinction made by several conscious-

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[32] Singer, Ming, 'Unbounded Consciousness', 2001, Free Association Books, p.6

ness theorists, such as Ned Block.[33]) Let me suggest that these two aspects of consciousness can be applied to the two components of Folk Psychology, as described above: our Cartesian Ethno-Psychology can very much be identified with Singer's cognitive agent model (what I previously called the 'command and control' model). In Evolved Psychology, on the other hand, concerned as it is with the dynamics of our large social groups and our capacity for empathy, it is the image of humans as sentient experiencers which predominates. It's this evolutionary, 'hard-wired' side which is concerned with a sensitivity to social interaction and (I'm going to argue later) a passive receptivity to qualia. My contention in this book will be that this is the most significant and functionally important side of consciousness. However, Singer also notes that in the 'current intellectual *Zeitgeist*', it is the cognitive agent aspect of consciousness which has come to preoccupy the scientific community (in so far as it is interested in consciousness at all). The active role is sometimes equated with the notion that consciousness plays a direct role in what are described as the 'executive functions' of the brain. Essentially, this is a 'cut-down' and slightly more sophisticated version of folk psychology's command and control model of consciousness. Several theorists attempt to present consciousness in this light. (The 'Global Workspace' proposed by Bernard Baars[34] would be a good example.) The qualia-sensitive side of consciousness, however, is concerned with the idea that qualic experience and our affective response to it plays a vital role (especially in early infancy) in developmental

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[33] Block, Ned, 1995, 'On a Confusion about a Function of Consciousness', Behavioural and Brain Sciences 18 (2): 227-287.

[34] Baars, Bernard, 'In the Theatre of Consciousness', 1997, Imprint Academic

learning and thus contributes significantly to human behavioural flexibility.

In the next chapter we'll look at how developments in science and philosophy over the last 100 to 150 years have eroded and undermined many of the basic assumptions of Folk Psychology. Uncontroversially, I'm going to argue that, in modern culture, a conventional philosophical-scientific consensus (in other words; 'Cart-Ton world') has developed. I suggest that the intellectual origins of Cart-Ton world can be ascribed to two developments in the history of science: 1) what I would describe as a 'failure of ontological nerve' by the founding fathers of quantum mechanics - the empirical findings of quantum mechanics clearly contradicted the ontology of classical physics, but they declined to challenge this ontology by constructing (or calling for the construction of) an alternative ontology; 2) a shift in 'balance' with regard to the philosophy of science, away from 'understanding' and towards prediction, in terms of philosophy, this is very close to the division between rationalism and empiricism. (I take this conceptualisation of science as a balance between these two cultural categories from Stephen Toulmin's 1961 book, 'Foresight and Understanding', while not necessarily agreeing with his explanatory arguments.) This shift was reflected in the development of Logical Positivism and Behaviourism, which in turn diverted the objectives of science towards the collection of empirical data leading to the making of successful predictions and away from theory and understanding, including the formulation of explanatory ontology. I'm going to argue that the above-mentioned development 1 lead to development 2. In other words, the failure to introduce a widely accepted quantum ontology created a vacuum which was filled by the extreme empiricism of Logical Positivism and Behaviourism, which, together with the remnant of the ontology of classical physics, generated Cart-Ton world - the predominant ontology (or paradigm) of contemporary science (see chapter three). I also identify an ontology of 'Ideological Empiricism' (see later chapters) but argue that, given the human unconscious abhorrence of an ontological vacuum, this often, in practice, defaults to Cart-Ton world. One of the main arguments of this book is that a realistic 'explanation' for consciousness not possible within the ontology of Cart-Ton world.

My ambition here is therefore to break this impasse in our understanding of consciousness by casting off the constraining blinkers of Cart-Ton world and turning our vision to an ontology appropriate to the quantum world in which we now consciously live. (I'm going to argue that this is to be found predominantly in the late work of Alfred North Whitehead.) As regards the active/passive bifurcation of consciousness introduced above, I intend to take a nuanced position: I accept many of Cart-Ton world's consciousness-denying conclusions while vigorously rejecting others. Those that I accept are broadly concerned with refuting the comprehensive 'command-and-control' model of consciousness to be found in Cartesianism. However, I decisively part company with Cart-Ton world in regard to their various visions of the ultimate nature of consciousness and its evolutionary purpose: these range from a stark existential denial of consciousness altogether, to various versions of a 'command-and-control' model, all of them based on an assumption that consciousness (or the illusion of it) must be generated directly from information processing. Firstly, I see the function of consciousness as essentially passive: its ‘higher’ forms evolved in order for us to be able to experience ‘affect’ (the phenomenal aspect of emotion) in response to qualic experience. These experiences provide a guide for future behaviour. Secondly, while accepting that information processing is a very important factor in the operations of the brain and in guiding human behaviour (generally carried out in an unconscious way), I intend to argue that consciousness, in fact, arises directly from the qualia (especially affects) experienced by a biologically rooted self. And, in addition, that rather than being generated by information processing, qualia are, in fact, direct manifestations of basic ‘physical’ processes. Evolution exploited the sensitivity of biological tissue to these basic processes in order to generate qualia, which, in turn lead to the development of the self: we have a self because we have conscious feelings. Natural selection’s ‘motive’ for creating both qualia and the self was to bring into being the human capacity for retrospective learning from experience and, hence, the flexibility of behaviour, which is one of the most characteristic features of our species. The rest of this book will be an effort to justify this set of assertions. (These explanations of the nature and function of consciousness will be ‘unpacked’ at much greater length in the remainder of this book.)

Chapter Two: Emerging 'Cart-Ton World' Collides with Folk Psychology

Having looked at the components and content of Folk Psychology in the last chapter, in this we'll look at how the rise of scientific culture has questioned and undermined almost all of the assumptions of this familiar conception of consciousness. Given the devastating effects wrought by 'Cart-Ton world' on our Folk Psychological conception of consciousness, it is apposite to ask what is 'Cart-Ton world' and where did it come from? As regards its origins, two thinkers in particular contributed its predominant features: one was Isaac Newton with his formulation of classical physics and the other was Rene Descartes' philosophy of interactive dualism. Both of these men were, fairly clearly, afflicted with pathological personalities. This, I'm going to argue, is relevant to the peculiar nature of Cart-Ton ontology. (I also seek to set aside any 'ad hominem' objection to this line of argument.) I then move on to look at the roles of Behaviourism and Logical Positivism in deconstructing Folk Psychology. I'll examine Wegner's skeptical theory of free will and Churchland's efforts to completely eliminate Folk Psychology and even the entire conception of consciousness. So, over the last 200 years Folk Psychology has collided with the modern scientific paradigm, which I'm calling 'Cart-Ton world'. This slow but inexorable collision resulted in Folk Psychology being systematically undermined and eroded. For example, the emergence of 'classical physics', with its concepts of 'physical closure', chains of causation, etc., left no space for consciousness to exert causal effects. In psychology, the rise of Behaviourism lead to an emphatic denial of the very existence of mind and consciousness, and in philosophy, Logical Positivism and Identity theory, also diminished the notion of consciousness as a significant and independent phenomenon.

As to the set of notions which comprise Cart-Ton world, these can be briefly summarised as follows: at the core of this worldview is Newton's vision of the ultimate building blocks of reality consisting of 'billiard-ball' atoms, impenetrable, passive particles, activated only by external forces, such as kinetic energy impacts, gravity, momentum, etc. This is an irredeemably materialist, mechanistic and reductive worldview. Descartes' contribution initially provided an 'escape' for mind and consciousness via his notion of 'Res Cogitans', a separate realm exclusively for 'thinking stuff'. However, as scientific culture advanced, and religious belief declined, 'Res Cogitans' was eliminated from Cart-Ton world, leaving only the materialist, mechanistic and reductive ontological assumptions of modern scientific paradigm. These have all now been challenged by advances in physics, especially the advent of quantum mechanics. But, due to what I would describe as a 'failure of ontological nerve', our current scientific culture is still stuck in Cart-Ton world. Consequently, the 'Hard Problem' (i.e. 'why should anything feel like something?') is still with us. I conclude that, despite all these developments, Chalmers 'Hard Problem' of consciousness, i.e. sentience, remains unexplained by Cart-Ton ontology, and it is on ***sentience*** that I shall construct, in this book, my theory of the nature and function of consciousness.

The Classical Trap for the Mind

Despite the fact that (as we saw in the last chapter) Folk Psychology is in daily popular use, modern science and philosophy have, from the Nineteenth Century onwards, been systematically undermining and eroding it. The first onslaught came when Nineteenth Century physicists began to accept the doctrine of the 'physical closure' of the material world. This is a theory about causation in the physical realm which has significant ramifications in the study of metaphysics and the mind. In a strongly stated version, physical causal closure says that 'all physical states have pure physical causes' or that; 'physical effects have only physical causes'. Those who accept physical causal closure tend to think that all entities that exist are physical entities (physicalists), but not necessarily. Physical causal closure can be seen as arising from Newton's conceptions of materialism and causal determinism: all events are conceived as governed by these Newtonian conceptions and embedded in endless causal chains. In other words, there were no gaps or spaces in these endless causal chains for forces which were considered non-physical (such as those from Res Cogitans) to have an effect. (The one exception to this doctrine was the force of gravity, which was reluctantly accepted as mysteriously acting at a distance. Though, as Henry Stapp points out, Newton rejected the idea that gravity could really act at distance without any intervening carrier.) Victor Lowe describes Whitehead's view of Cart-Ton ontology. He says, that the 'classical concept'; "… embodies the prevailing habits of thought. It employs three mutually exclusive classes of entities: points of space, instants of time, and particles of matter. The theory of the motion of matter is superposed on a presupposed independent theory of space and a presupposed independent theory of time. (In fact, the classical concept arose in an age when geometry was the only developed science.) The superposition (according to an analysis first suggested by Russell in The Principles of Mathematics) requires a class of relations of 'occupation of a point at an instant', a new relation being required for each permanent particle. The general laws of dynamics, and all independent physical laws, are then added to the deductive scheme as axioms about the properties of this class of relations."[35] It's important in the context of this book to emphasise that the notion of physical causal closure is an *ontological* theory. Stapp states that Newton's laws were regarded as; "… independent of whether or not anyone was observing the physical universe: they took no special cognisance of any acts of observation performed by human beings, or of any knowledge acquired from such observations, or of the conscious thoughts of human beings. All such things were believed, during the reign of classical physics, to be completely determined, insofar as they had any physical consequences, by the physically described properties and laws that acted wholly mechanically at the microscopic scale."[36]

Via this approach, Nineteenth Century physics adopted a fundamentally reductionist position. Such a position is essentially what's left of Cartesianism dualism when Res Cogitans has been eliminated! When considering the material world, Descartes was an extreme materialist and mechanist. For example, he insisted that physical objects exist purely

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35 Lowe, Victor, 'Understanding Whitehead', 1962, Johns Hopkins U.P., p.159

36 Stapp, Henry, 'Mindful Universe', 2007, New York: Springer, loc: 129

in and of themselves and denied any form of consciousness to animals. So, when Descartes' belief in God and spirit was removed, as happen in Nineteenth-Century scientific culture, fundamentalist materialism was all that was left. Indeed, it can be argued that the peculiar characteristics of Descartes' thought has distinctly 'coloured' the quality of Cart-Ton's vision of the world: Ian McGilchrist points out that Descartes saw the body, the senses and the imagination as likely to lead, not only to error, but into the realm of madness. Descartes referred to the 'madmen' who, trusting their senses, end up imagining "that their heads are made of earthenware, or that they are pumpkins, or made of glass". The irony, as McGilchrist observes, is that such delusions are characteristic symptoms of schizophrenia. But, he continues; "… schizophrenia is not characterised at all by trusting the senses - rather by an unreasonable mistrust of them. It entails in many cases a wholesale inability to rely on the reality of embodied existence in the 'common-sense' world which we share with others, and leads to a dehumanised view of others, who begin to lose their intuitively experienced identity as fellow humans and become seen as devitalised machines. One's own body becomes no longer the vehicle through which reality is experienced, but instead is seen as just another object, sometimes a disturbingly alien object, in the world that is validated by cognition alone." McGilchrist, gives the examples of schizophrenics who see themselves as copying machines, or contemplate cutting their wrists to find out whether they contain engine oil: "'To lose one's reason' is the old expression for madness. But an excess of rationality is the grounds of another kind of madness, that of schizophrenia."[37]

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[37] McGilchrist, Iain, 'The Master and His Emissary' 2009, Yale U.P., loc:8724

McGilchrist (it seems to me) comes very close to diagnosing Descartes as a schizophrenic: in, "… a famous passage from the Meditations on First Philosophy in which Descartes describes looking out of his window and seeing what he knows to be people passing by as seeming to him nonetheless like mere machines." Citing the philosopher David Levin, McGilchrist comments: "What could be a greater symptom of madness than to look out of one's window and see (what might, for all one knows, be) machines, instead of real people?" McGilchrist's point is that this is what the kind rationality which Descartes embraced leads to. Possibly, a philosopher can get away with such scepticism about the existence of other people, but in 'real life', outside the study; "… such a way of talking - such a way of looking at other people - would be judged mad, a subtle symptom of paranoia." In addition, Descartes saw no connection between hunger and the desire to eat: "Even pain was a mystery: 'why', he asks, 'should that curious sensation of pain give rise to a particular distress of mind?' Remarks of this sort seem to me to display a quite extraordinary lack of intuitive understanding. If there is, in fact, one place at which the relationship between the body and subjective experience can be intuitively understood, it is right there, in sensations such as pain and hunger." But then, given his own peculiar type of logic, Descartes was not sure that he had a body at all: "I can make a probable conjecture that the body exists. But this is only a probability; and despite a careful and comprehensive investigation, I do not yet see how the distinct idea of corporeal nature which I find in my imagination can provide any basis for a necessary inference that somebody exists." McGilchrist concludes: "Descartes' rationality led him not only to doubt the existence of others, but to see knowledge of his own body as constituted by the intellect, rather than self-evident through intuition: ‘Even bodies are not strictly perceived by the senses or the faculty of imagination, but by the intellect alone, and this perception derives not from their being touched or seen but from their being understood.’ Thus, by an astonishing inversion, rationality becomes not merely constitutive of reason, but of intuition and the body.”[38]

McGilchrist is using the very prominent historical figure of Descartes to illustrate the theory of the negative consequences which result when the left hemisphere dominates the brain (and, in fact, McGilchrist equates the pathological condition, schizophrenia, with left-brain dominance). McGilchrist refers to Descartes’ particular views on time and reason and concludes that: “Each of these facets of Descartes' predicament recapitulates the phenomenology of schizophrenia. The sense of being a passive observer of life, not an actor in it, is related to the passivity phenomena that are a primary characteristic of the condition.” McGilchrist adds that ‘affective non-engagement’ could be said to be the hallmark of schizophrenia: “The sense that the world is merely a representation (‘play-acting’) is very common, part of the inability to trust one’s senses, enhanced by the feeling of unreality that non-engagement brings in its wake - nothing is what it seems. Such an inability to accept the self-evident nature of sensory experience leads to an emptying out of meaning.” And, again, McGilchrist attributes all these pathological symptoms to left-brain dominance: “I would argue that in all its major predilections — divorce from the body, detachment from human feeling, the

[38] Ibid, loc: 8736-8764

separation of thought from action in the world, concern with clarity and fixity, the triumph of representation over what is present to sensory experience, in its reduction of time to a succession of atomistic moments, and in its tendency to reduce the living to the devitalised and mechanical - the philosophy of Descartes belongs to the world as construed by the left hemisphere."[39] The relevance to this chapter of all this detailed analysis of Descartes' thought is its acute antipathy to the 'naturalistic' notions of Folk Psychology: a distrust of the senses, a denial of causation from inner mental states and a skepticism about the reality of other minds and one's own body - all of these attitudes and beliefs flatly contradict the everyday assumptions of Folk Psychology.

The other major figure I've identified as a synthesiser of Cart-Ton world, Isaac Newton, like Descartes, also suffered from psychological pathologies. When young Newton was a deeply introverted character and even after the huge international success of his maturity, he remained deeply insecure, given to fits of depression and outbursts of violent temper, and implacable in pursuit of anyone by whom he felt threatened, the most famous example being his campaign to destroy the reputation of Gottfried Leibniz, whom he believed (quite unfairly) had stolen the discovery of calculus from him. His psychological problems culminated in what would now be called a nervous breakdown in mid-1693, when, after five sleepless nights, he temporarily lost his grip on reality and became convinced that his friends Locke and Pepys were conspiring against him. Many post-Freudian biographers (and not only fully paid-

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[39] Ibid, loc: 8791-8804

up Freudians) trace the roots of Newton's insecurity and aggressiveness to his earliest years. His father died before he was born. When he was barely three years old, his mother remarried and moved into the home of her new husband Barnabas Smith, leaving the infant Isaac in the care of her own parents until Smith's death some seven years later, when she came back, bringing with her two daughters and a son from her second marriage. The likelihood is that this early experience of loss and betrayal permanently damaged Newton's capacity for trust and close friendship. It has also been suggested - though this is purely conjectural and much disputed - that he was a repressed homosexual, which if true would undoubtedly have placed a man of his background and upbringing under extreme mental strain.[40]

I draw attention to the psychological peculiarities which afflicted Cart-Ton's two founders in order to suggest that their mentality became the characteristic mentality of Cart-Ton world. Consequently, considering their psychological profiles can serve as part of the explanation as to where this particular ontology arose from. Let me, at this point, anticipate the accusations of '***ad hominem***' argumentation which I fear may be coming my way in the wake of this line of reasoning. 'Ad hominem' is defined as; "… a fallacious argumentative strategy whereby genuine discussion of the topic at hand is avoided by instead attacking the character, motive, or other attribute of the person making the argument, or persons associated with the argument, rather than attacking the substance of the argument itself." I shall try to refute the spectre of ad hominem hanging over my com-

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[40] Oxford University's 'Newton Project' website

ments above as follows: Cart-Ton ontology denies phenomenal experience, so, far from 'avoiding the topic at hand', examining the mentality of its founders is highly pertinent. Both Descartes and Newton clearly had problems with phenomenal experience; problems so severe as to qualify (as we have seen) for the label pathological. This pathology is reflected quite clearly (I believe) in Cart-Ton world's aversion for emotion and affect and its exaggerated elevation of cognitive reason and mathematics as the distinctively 'human' attributes. We look more closely at this characteristic of Cart-Ton world in the next and subsequent chapters. Let me also say, in the interests of balance, that in addition to this critique from the phenomenological 'inside', I also do a lot, in this book, of taking Cart-Ton world to task from the conventional 'outside' point of view.

The Ultimate Determinism of Laplace

The most thoroughgoing expression of classical physic's mechanistic and deterministic worldview was articulated by the Eighteenth Century, French mathematician, Pierre Laplace. According to him, the entire universe (including human brains) " … consists of a few kinds of basic objects moving through space in accordance with Newton's laws of motion."[41] Stapp describes the sort of world that these beliefs lead to: "In classical mechanics the state of any system, at some fixed time 't', is defined by giving the location and the velocity of every particle in that system, and by giving also the analogous information about the electromagnetic and gravitational fields. All observers and their acts of observation are conceived to be simply parts or aspects of the continuously evolving fully mechanically pre-

[41] Hodgson, David, 'The Mind Matters', 1991, Clarendon Press, p.32

determined physically described universe. A person's stream of consciousness is considered to be some mysterious, but causally irrelevant or redundant, byproduct or counterpart of his or her classically conceived and described brain activity."[42] In other words, classical physics implied total predictability: if all the initial conditions of any system are known, i.e., the position and motion of its objects at any instant of time, plus all the forces acting on it and all these can be represented as quantities to which purely quantitative mathematical laws can be applied, then the system's position and motion at earlier or later times can be calculated. Within this theoretical framework, Laplace concluded that, given knowledge of the relevant laws, and the state of universe at any one time, then the state of universe at any other time can be calculated. Such vast knowledge and calculations might be beyond the capacity of human beings, but (Laplace was convinced) God could certainly achieve them.[43]

But what about brains and minds? In classical physics there's no place for non-physical causes, so, consequently no place for the effective action of mind upon physically described things. The classical physical world is closed; what happens is wholly determined by physical forces, operating on physical objects, in accordance with quantitative physical laws. According to Hodgson, some people still see this view as obviously true: if non-physical causes, like mind or mental events, could affect physical things - the laws of physics would be violated! Hodgson refers to both

[42] Stapp, Henry, 'Mindful Universe', 2007, New York: Springer, loc: 159

[43] Hodgson, David, 'The Mind Matters', 1991, Clarendon Press, p.32/33

Levin,1979, p.84-86 and Searle, 1984. p.92.[44] Stapp comments on the oppressive concept of physical closure as follows: “There is nothing in the principles of classical physics that requires, or even hints at, the existence of such things as thoughts, ideas, and feelings, and certainly no opening for aspects of nature not determined by the physically describable aspects of nature to ‘intervene’ and thereby influence the future physically described structure. In fact, it is precisely the absence from classical physics of any notion of experiential-type realities, or of any job for them to do, or of any possibility for them to do anything not already done locally by the mechanical elements, that has been the bane of philosophy for three hundred years. Eliminating this scientifically unsupported precept of the causal closure of the physical opens the way to a new phase of science-based philosophy.”[45] But making such a scientific challenge to physical closure was theoretically impossible until the advent of quantum mechanics, starting around 1900.

Deutsch’s Tower of Reductionism

[44] Ibid, p.33

[45] Stapp, Henry, ‘Mindful Universe’, 2007, New York: Springer, loc: 195

In addition to physical closure, the rise of Cart-Ton world also excluded mind and consciousness via a rigid adherence to reductionism: the British physicist, David Deutsch has produced an effective metaphor to illustrate the reductionist ontology which underlies Cart-Ton world. If we imagine the entire enterprise of science as a high-rise building, then physics, as the 'paradigm science' is the foundation for the whole edifice. All the other scientific disciplines are located 'above' the foundations of physics, in order of the 'hard-ness' of their data and predictions. So, chemistry is located immediately above physics, with the 'softer' sciences stacked up, hierarchically, above it. Extremely 'soft' social sciences, such as sociology and political science are located at the very top. Consequently, as the metaphor stipulates, all factual propositions in all areas of science are; a) 'structurally' dependent on the propositions of physics, and b) can (in theory) ultimately be reduced to them. Interestingly, as the metaphor also implies, this 'firm foundation' of physics can hardly be said to include the propositions of quantum mechanics (which, as we shall see in part three, are enormously ambiguous and subject to vigorous controversy). Rather they are the propositions of classical physics, which support a speculative, 'realist' ontology (the ontology of Cart-Ton world) - the very ontology that quantum mechanics has unequivocally rejected.

The American philosopher, Paul Churchland expresses this fundamentally reductive ideology of science in the following quotation. He's attacking the Folk Psychological notion that introspection can reveal the way things 'really' are out in the world; "… as they really are in their innermost nature. This assumption is suspect because we already know that our other forms of observation - sight, hearing, touch, and so on - do no such thing. The red surface of an apple does not look like a matrix of molecules reflecting photons at certain critical wave-lengths, ***but that is what it is***. The sound of a flute does not sound like a sinusoidal compression wave, but that is what it is. The warmth of the summer air does not feel like the mean kinetic energy of millions of tiny molecules, but that is what it is. If one's pains and hopes and beliefs do not introspectively seem like electrochemical states in a neural network, that may be only because our faculty of introspection, like our other senses, ***is not sufficiently penetrating to reveal such hidden details***."[46] In other words, Churchland's commitment

[46] Churchland, Paul, 'Matter and Consciousness', 1988, MIT Press, p.15, my emphases

to the ultimate reality of the 'Objective Material' world completely over-rides and undermines the reality of phenomenal experience. (In response to this, Swinburne, Hodgson and others, have commented that this position is concerned with simply explaining the causes of phenomenal experience, while denying or ignoring the experience itself.) Fellow Cart-Tonist Dennett provides more in the way of explanation for Churchland's assertions: for Dennett 'scientific' facts can only be 'garnered from the outside'. "If something cannot be verified by a third-person observer it does not belong among scientific data. Since the subjective aspects of mental states are, by definition, known only to the person experiencing them, these cannot be scientific facts." Consequently, according to Dennett; "… any such facts as they are about mental events are not among the data of science."[47] This principle can, of course, be traced to Logical Positivism.

This assumption by Dennett doesn't, according to him, prevent mental events from being studied scientifically, but any resulting theory of mind must be constructed from a 'third person point of view': "In other words, subjective experiences - the first-person point of view - has no place in Dennett's science. Since science is objective, it cannot include subjective elements. But since consciousness is subjective, Dennett's stance rules out, in practice if not in principle, a scientific study of consciousness." Importantly for the argument for this book, both Kenan Malik and John Searle question Dennett's conception of the objective/subjective distinction. Malik defines the objective/subjective distinction as follows: "A statement is objective if it can be

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[47] Malik, Kenan,, 'Man, Beast and Zombie', 2000, WandN, p.336/339

known to be true or false independently of the feelings, attitudes and prejudices of people. It is subjective if its truth depends essentially on the attitudes or prejudices of observers." Searle suggests that Dennett is confusing two different notions of the terms 'objective' and 'subjective': "The distinction between the subjective and objective can take place at two different levels. It can be a distinction between how we know about something. Or it can be a distinction between how things are. In philosophical jargon, the distinction between objectivity and subjectivity can be understood both epistemologically (at the level of knowledge) and ontologically (at the level of being)."[48] Searle's analysis is here is highly relevant to the thesis of this book: following Whitehead, I'm claiming that the objective/subjective distinction can be overcome ontologically by ascribing inherent subjectivity to the ultimate building blocks of reality, which also, of course, manifest themselves objectively. Again, following Whitehead, I reject the implication of Searle's analysis that the epistemological and the ontological levels can exist independently of each other, untroubled by contradictions between them. I characterise 'Cart-Ton world' as a combination of Ideological Empiricism, in which ***only*** observations are regarded as real, and the 'billiard-ball' ontology of classical physics, when the psychological imperative of ontology becomes irresistible.

Malik attempts to refute Dennett's deconstruction of consciousness from a Social Constructionist viewpoint. He says: "Subjectivity is an integral part of our world, and aspects of our world are irreducibly mental. But acknowledging the subjective aspect of mental states is not the

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[48] Ibid, p.336/339

same as saying that such states are beyond human understanding. There is no reason why we should not build a rational, scientific accounts of pains, thoughts and feelings without pretending that their subjective qualities do not exist." He goes on to claim that we can't understand consciousness; "… by using the same methods that we use to understand purely objective phenomena: the methods of natural science." And that mental states are not accessible to 'the tools of natural science'.[49] My comment here is that these tools are the tools of a particular contemporary scientific paradigm, and that one of these tools is Cart-Tonist ontology: it is this which blocks consciousness as a legitimate subject of study, rather than the nature of science itself.

So where did this reductive mechanistic model of science leave consciousness? The Artificial Intelligence researcher, Marvin Minsky describes consciousness as a 'suitcase concept' meaning that it's a jumble of (he claimed) more than twenty different meanings. This left the concept of consciousness, within modern scientific culture, in a very anomalous position: there was no consensual scientific definition of consciousness (indeed, many scientists and philosophers were happy to abandon the concept altogether, as representing a non-existent phenomenon). On the other hand, the mass-level population, still under the thrall of Folk Psychology, continued to assume that consciousness was central and indispensable to their life-experience and to ascribe all sorts of powerful causal effects to it. To extend

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[49] Ibid, p.336/339

Minsky's metaphor, the suitcase had floated free from the skyscraper of modern, reductive science. In recent decades, therefore, it can be said that many researchers, safely ensconced in the Cart-Ton world's tower, have been trying to lasso the free-floating suitcase of consciousness onto the solid edifice of reductive science.

Consciousness as Epiphenomenal

From the point of view of reductionist classical physics, all talk about consciousness is 'Epiphenomenalist'. In other words, consciousness is an unimportant byproduct of the operation of the nervous system. Thomas Huxley compared it to the whistle from a steam train; it may be noticeable, but has no causal effects on the operations of the machine. Within an evolutionary context, this Epiphenomenalist argument would require that consciousness is simply a byproduct that makes no contribution to survival and reproduction. Jeffrey Gray provides a modern version of this sort of Epiphenomenalist argument: he imagines a series of genetic mutations which change brain functions and consequently enhance survival. He further supposes that these mutations also lead to some new form of conscious experience. Gray says that; "The increase in survival value requires changes in behaviour (the individual might run faster to escape a predator, mate more successfully, etc.). These changes … can be fully accounted for by the brain processes, and their output in behaviour, to which the new mutations give rise. Therefore, the accompanying conscious experiences do not contribute in their own right to the enhanced survival value: they just come along for the ride."[50]

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[50] Gray, Jeffrey, 'Consciousness: Creeping up on the Hard Problem', 2004, Oxford U.P., p.72

The majority of conventional psychologists are committed to this Epiphenomenalist view. For example, Julien Jaynes identifies many functional areas in which he claims consciousness is simply Epiphenomenal, i.e. it contributes nothing to the actual carrying out of the function. Jaynes goes through a long list of psychological functions, and then, despite popular misconceptions, dismisses the idea that consciousness plays any effective role in them: he starts with memory and reflection and questions how much detail we're actually conscious of in everyday life and concludes that; "What you can consciously recall is a thimbleful of the huge oceans of your actual knowledge."[51]

He goes on to refute the role of consciousness in many other areas, such as; concept formation, learning, thinking, speaking, reasoning and even creativity. He says, for example, that; "When we speak, we are not really conscious either of the search for words, or of putting the words together into phrases, or of putting the phrases into sentences."[52] Speech, in other words, is produced by automatic processes, without any input from consciousness whatsoever. And, in general, Jaynes says; "Our minds work much faster than consciousness can keep up with. We commonly make general assertions based on our past experiences in an automatic way." And he concludes; "How often do we reach sound conclusions and are quite unable to justify them! These are clearly the result of automatic inferences by our nervous

[51] Jaynes, Julian, 'The Origin of Consciousness', 1976, Houghton Mifflin, p.28

[52] Ibid, p.40

systems in which consciousness is not only unnecessary, but, … would probably hinder the process."[53]

Denying Consciousness: Behaviourism and Logical Positivism

An even more brutal assault on consciousness than this Epiphenomenal dismissal of it as a 'byproduct', has been to flatly deny its very existence and to attempt to eliminate the concept from all scientific and philosophical discourse. An example of an early (mid-Nineteenth Century) centre of such thinking is the Berlin Biophysics Club.[54] This was a group of Continental physicians devoted to the empirical study of medicine and included such prominent scientific figures as; Carl Ludwig (1816-1895), Emil du Bois-Reymond (1818-1896), Hermann von Helmholtz (1821-1894) and Ernst von Brücke (1819-1892). They rejected not only Hippocratic ideas about the four humours, but also vitalism in general. As Jaak Panksepp notes: "They rejected the existence of all the spooky forces that had been postulated to govern the functioning of bodies. These eminent scientists maintained that nonphysical forces cannot be subjected to scientific scrutiny, so one cannot know if claims about them are true or even whether they really exist. For these reasons, members of the Berlin Biophysics Club decisively abandoned dualism in science. For them, science had to be rooted in a study of the physical world alone." These physicians focused on physical experiments on the body and from these constructed mechanistic theories, in which facts were more important than theories - theories could always

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[53] Ibid, p.42

[54] Panksepp, Jaak,'The Archaeology of the Mind', 2012, New York, W.W. Norton and Company, p.59

be overturned in the face of contradictory evidence. They contributed to the current evidence-based approach to medicine. However, when applied to psychology, their anti-vitalism prepared the ground for the emergence of Behaviourism around 1900.

The Behaviourist approach was to focus exclusively on the externally observable phenomena of psychology, i.e. behaviour. In practise this was reduced to incoming ‘stimuli’ outgoing ‘responses’. Panksepp comments that Behaviourists; “… speciously equated the making of inferences about mental forces of any kind (from observable behaviours and other scientific data) with the discredited notion of vitalistic forces. Accordingly, they saw no way to study the actual nature of the mind itself in any scientific way. And the mind ceased to exist, at least as far as most of the researchers within twentieth-century scientific psychology were concerned.” Behaviourism emerged, first in psychology and later in philosophy. As the name implies, Behaviourism concentrated exclusively on behaviour and literally denied or ignored the existence of mind and consciousness. Behaviourism, in fact, attempted to eliminate these concepts from all scientific and philosophical discourse. Essentially, Behaviourism created peace in the mind/body wars by banning mind and consciousness from the discussion. Incredibly this prohibition lasted for approximately 50 years, perhaps because of the conjunction of Behaviourist ideas in psychology with the logical positivist movement in the philosophy of science.[55]

[55] Ibid, p.55/56

The rise of Behaviourism was also prompted by the failure, at the end of the Nineteenth Century, of Introspectionist Psychology, which (as the name implies) did recognise a significant role for consciousness. The Introspectionists, on both sides of the Atlantic, got themselves irredeemably bogged down in contradictory concepts and confusions over methodology. Introspectionism's failure very much promoted the rise of Behaviourism, in which the study of mind and consciousness was reduced to objectively observable behaviour or 'predispositions' to behave. For example, animal experiments, such as Pavlov's, were accepted as relevant for human psychology. And even in human experiments, people were treated as animals (apart from their verbal ability). This 'experimental rigour' came to be regarded as the only 'scientific' way in which to study human psychology. Howard Gardener[56] makes an important distinction between 'methodological' and 'ideological' Behaviourists: the former renounced the study of mind and consciousness because they realised that both the ontology and methodology of the prevailing scientific paradigm made such phenomena inaccessible to science. The 'ideologues', however, were actually convinced that mind and consciousness simply didn't exist. Part of this denial was a clear rejection of biological explanations. The Behaviourist's conception of all and any animal is often referred to as the 'empty organism', implying that the causes of all behaviour arise in the environment. This view is starkly illustrated by a famous claim made by the 'father' of Behaviourism, John B. Watson: "Give me a dozen healthy infants, well-formed, and my own specified world to bring them up in and I'll guarantee to take any one at random and train

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[56] Gardner, Howard, 'The Mind's New Science', 1985, New York: Basic Books

him to become any type of specialist I might select - doctor, lawyer, artist, merchant-chief and, yes, even beggar-man and thief, regardless of his talents, penchants, tendencies, abilities, vocations, and race of his ancestors."[57] In the bravado of this boast we can detect one of the origins of what Evolutionary Psychologists later came to call the Standard Social Science Model (SSSM). This was the extreme social-constructionist view that all individual human development is exclusively driven by influences from the environment. SSSM rejects the Folk Psychological notion that inner drives and inherited characteristics can explain individual differences. (This Evolved Psychological side of Folk Psychology, which I identified in chapter one, eventually became established as an academic movement in the 1970s.)

Behaviourism's radical rejection of Folk Psychology was parallel in philosophy by the rise of Logical Positivism. This was developed, in the late 1920s by groups of philosophers, scientists, and mathematicians, working especially in Berlin and Vienna. Logical Positivism attempted to legitimise philosophical discourse by placing it on the same basis as the empirical sciences; namely by insisting on very strict definitions of all concepts and asserting that only statements verifiable through empirical observation are ***cognitively meaningful***. Efforts to convert philosophy to this new scientific philosophy were intended to prevent confusion rooted in unclear language and unverifiable

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[57] Watson, J. B., 'Behaviorism', 1930, Chicago U.P., p.82

claims. The movement reserved its most venomous condemnation for concepts and propositions which could be described as 'metaphysical'. Ludwig Wittgenstein, who in his 'early period' could be described as a spokesperson for Logical Positivism provided, in his 'Tractatus'[58]; "… the 'definitive' statement of support for ruthlessly materialistic challenges to the study of the mind, in his famous assertion that 'When the answer cannot be put into words, neither can the question' (Proposition 6.5) and since mental qualities are impossible to put into clear, operationalised scientif-
ic language, one is left with the following dilemma: 'Even when all possible scientific questions have been answered, the problems of life remain completely untouched. Of course there are then no questions left, and this itself is the answer.' (Wittgenstein, 1981, Proposition 6.52)."[59] Like the Behaviourists, the Logical Positivists stigmatised mind and consciousness as metaphysical concepts and consequently, attempted to eradicate these concepts from scientific and philosophical discourse.

Ryle's 'Category Mistakes' and the Philosophical Zombie

A highly influential exponent of philosophical Behaviourism was the British philosopher, Gilbert Ryle, especially in his 1949 book, 'Concept of Mind'. Ryle regarded all talk about mental states as 'category mistakes'. By a category mistake, Ryle meant a way of talking about something which fundamentally misunderstood the phenomenon in

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[58] Wittgenstein, Ludwig, 'Tractatus', 1922, Kegan Paul, London

[59] Quoted by Panksepp, Jaak,'The Archaeology of the Mind', 2012, New York, WW. Norton and Company, p.55/56

question. Category mistakes might be usefully employed as shortcuts in certain contexts, but are, nonetheless, fundamentally wrong and misleading. As an example of a category mistake, Ryle described a foreigner asking to be shown Oxford University. When all the colleges, research institutes, sports facilities, etc. (which compose this very complex institution) had been pointed out to him, he enquired, “yes, but where is the university”, thus demonstrating his lack of understanding of its real nature. In the same way, Ryle believed, treating mind and consciousness as ‘real things’ was a category mistake which failed to understand their true nature. In line with the dominant, linguistic tradition of British philosophy at the time, Ryle believed that analysing and correcting the way one used language could be used as a ‘therapy’ to avoid making category errors.

A major problem with Ryle’s argument is that (like all Behaviourist theorists) he simply fails to account for that which is most important to most people: the quality of subjective experience. As Kenan Malik asks; “Is all there is to a toothache the disposition to look pale, clutch one’s jaw, take aspirin and visit the dentist? And if subjective experiences are simply such dispositions, in what way can we be said not to be zombies?”[60] Malik is referring here to perhaps the ultimate metaphor for Behaviourism’s consciousness-denying argument; that of the ‘philosophical zombie’. This first appeared as a thought experiment, from philosophers such as Saul Kripke and Thomas Nagel, in discussions of Identity Theory, but it was most famously developed in detail by David Chalmers in ‘The Conscious Mind’ (1996).

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[60] Malik, Kenan,, ‘Man, Beast and Zombie’, 2000, WandN, p.315

Jeffrey Gray explains that, in this context, a ‘zombie’; “… is a philosophical invention intended to cover the possibility that there may exist beings which act just like humankind but do not experience any qualia. It is a stark illustration of our lack of understanding of the functions of consciousness that no-one is at present sure whether zombies could or could not exist in reality. That is to say, we do not have a theory from which it can be deduced what kinds (if any) of information processing or behaviour could or could not be executed in the absence of qualia.”[61] The spokespeople of Cart-Ton world are very happy to accommodate the concept of the philosophical zombie: Daniel Dennett says, regarding them; “They’re not just possible, they’re actual. We’re all zombies. Nobody is conscious …”[62] And Susan Blackmore claims that she personally is a philosophical zombie.[63]

And, indeed, at least one researcher suggests that there may actually be some neurophysiological evidence for this ‘zombie concept’. This idea comes initially from the phenomenon of ‘Blindsight’. In this curious condition, people who have suffered damage to the specifically visual areas of the brain (or the pathways leading to them). They claim to have no conscious experience of seeing, but are nevertheless able, when encouraged to do so, to perform almost as normal in terms of reporting what is in their apparently

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[61] Gray, Jeffrey, ‘Consciousness: Creeping up on the Hard Problem’, 2004, Oxford U.P., p.65

[62] Dennett, Daniel,‘Consciousness Explained’, 1991, Boston, MA: Little Brown, p.406

[63] Blackmore, Susan, ‘The Meme Machine’, 1999, Oxford U.P., p.219-234

'blind' visual field. In other words, the blind-sight sufferer has the function of sight but none of the usually associated qualia, which is the definition of a philosophical zombie in one sense modality. However, similar 'dissociations' have been discovered in all the sensory modalities: Lawrence Weiskrantz is one of the leading researchers into Blindsight and other sensory dissociations, such as 'Deaf-hearing' and amnesiacs who can, when pressed, remember almost everything one might reasonable expect.

Given the existence of all these phenomena, Weiskrantz raises the possibility of a condition which could be called a true zombie: Weiskrantz explains that it would be theoretically possible for one individual to have damage to all their sensory modes, or perhaps to a single awareness module. As he comments, "... one would be left with just a bundle of implicit processors, a true zombie. if you will." (Weiskrantz emphasises that he's never found such a case, having studied tens of thousands of neurological case reports.)[64] My own view on the philosophical zombie comes in two halves: firstly, I agree that the vast majority of our behaviour (arguably all of it!) is automatic, i.e. is carried out entirely without the 'control' of consciousness. However, this is far from the full story and consequently, the zombie model is a grossly inadequate representation of a human being. What's missing (by philosophical definition) is qualia.

Misapplying 'Consciousness': Identity Theory and Functionalism

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[64] Weiskrantz, Lawrence, 'Consciousness Lost and Found', 1997, Oxford U.P., p.44

In the post-war period, Behaviourism was being challenged by the emergence of Identity Theory in philosophy. Rather than simply denying the existence of mental states, as Behaviourism did, Identity Theory stated that mental states ***are*** brain states: they are one and the same thing. This was, clearly, a very radical rejection of Descartes' split world. As Malik points out, a key problem with Ryle's philosophical Behaviourism was that it could not account for the causation of behaviour. Malik suggests that, in an effort to solve this problem, a number of philosophers, including U.T. Place and J.J. Smart, argued that making the assumption that the possession of a mental state was identical to possessing a certain physical state of the brain would remove the problem: "When I think it's going to rain, or when I have a toothache, my brain is in a particular state. That brain state causes the behaviour, or the behavioural disposition. According to this view, mental states neither cause brain state causes the behaviour, or the behavioural disposition. According to this view, mental states neither cause behavioural dispositions, nor are caused by physical processes in the brain; they are merely identical to those processes."[65] As a consequence of this claim, theories of this variety are known as identity theories. Identity theory, therefore, makes the straight forward assumption that every instance of a particular mental state is essentially equivalent to having a particular and corresponding brain state.

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[65] Malik, Kenan,, 'Man, Beast and Zombie', 2000, W&N, p.315

For example, any time that any person has the mental state of wanting an ice cream, then this mental state is identical to one specific neurophysiological state of the brain. It didn’t take long, however, for this claim of identity between mental and brain states to run into severe problems. One of the main arguments against Identity Theory’s insistence that brain states and mental states are the same thing can be described as ‘species chauvinism’: in other words, Identity Theory effectively limits the experience of, for example, pain, emotion or any other form of qualia exclusively to creatures who have a ***human*** brain.

Consequently, the possibility of qualia (in any sense recognisable to us) occurring in any non-human creatures, such as the higher primates on earth or any extraterrestrial species (no matter how intelligent), was, by definition, ruled out. In an effort to counter this sort of criticism, Identity Theorists suggested that although a given mental state is identical to some brain state, these need not necessarily be the same every time or in every person. However, as Malik points out, this concession leads to another problem: “if two
people are in different neurological states, then what is it about those different brain states that makes them the same mental state?”[66] But if your brain state is different from my brain state, then what is it that we have in common that means that we both want an ice cream? We cannot say that what we have in common is our mental state (‘wanting an ice cream’), since the whole object of the materialist exercise is to reduce the mental to the physical.

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[66] Malik, Kenan,, ‘Man, Beast and Zombie’, 2000, W&N, p.315/316

Problems like these led many philosophers to conclude that two different brain states can be said to be identical mental states if they ***perform the same function*** in the organism. Your brain state may be different from my brain state, but the two brain states can be said to have the same mental state - 'wanting an ice cream' - if they both make you and I identically delighted if we get an ice cream and irritable if we don't. "Such 'functional' identity theories have become hugely influential since they were put forward in the late 1960s by a number of philosophers including David Armstrong and David Lewis. The functionalist approach avoids many of the problems associated with Behaviourism. It gives a causal explanation for behaviour (behaviour is caused by the neurophysiological processes in the brain); it avoids the circularity of one mental state having to be explained in terms of another; it accepts the existence of mental states, it does not assume that the same brain process must underlie every instance of the same mental state, but it also shows what different brain states have in common that makes them the same mental state (their common functional role). Moreover, functional theories are easily assimilated to computational theories. Since different physical states can be the same mental state, so a machine and a human brain can exhibit the same mental state, so long as their physical states are functionally identical. This was precisely the argument that Hilary Putnam had already put forward in the late 1950s."[67]

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[67] Malik, Kenan,, 'Man, Beast and Zombie', 2000, WandN, p.315/316

This 'functionalist' doctrine was, consequently, given a significant boost by the development of the computer and the drawing of analogies between it and the brain, which soon followed. The essence of Functionalism is the idea that the mind, although completely dependent on the brain for its generation, is, once generated, a separate entity and with its own independent existence and modes of being. This view was based on the idea that the mind was a product of a set of causal relations between material entities. The material out of which these entities were constructed did not matter: for example, it was now clear that machines could process information using electronic valves or (later) silicon chips. The fact that the brain used organic neurones no longer gave it a monopoly on computation. This position enabled Functionalism to escape from the problem of species chauvinism, which dogged Identity Theory, and also to revive the Folk Psychological notion that the mind is, at least partly, independent of the body. Under the influence of early theories, such as Alan Turing's concept of the Universal Machine, Functionalism conceived of the mind as programs operating on the brain's hardware: different mental states were realised by different programs. Just as Turing had theorised that a computer could run an infinite number of programs, so too can the brain generate an infinite number of mental states.

The Illusion of Free Will?

As we saw in the last chapter, Folk Psychology's 'command and control' model identifies the self as the agency which exercises our free will: free will is thus seen as an essential component of Folk Psychology; but is this an illusion? Daniel Wegner argues that it is, but in a rather complex way. He observes that we all have an acute, conscious experience of willing: “We each have a profound sense that we consciously will much of what we do, and we experience ourselves willing our actions many times a day.” And he quotes William James stating that: “The whole sting and excitement of our voluntary life . . . depends on our sense that in it things are really being decided from one moment to another, and that it is not the dull rattling off of a chain that was forged innumerable ages ago.”[68] Wegner insists that, “… we appreciate the notion of conscious will because we experience it so very acutely. We do things, and when we do them, we experience the action in such a way that it seems to flow seamlessly from our consciousness. We feel that we cause ourselves to behave.”[69]

But Wegner adds that: “Will is not only an experience; it is also a force. Because of this, it is tempting to think that the conscious experience of will is a direct perception of the force of will.”[70] And he adds that: “It is common to talk about conscious will as something that is experienced when we perform an action. Actions feel willed or not, and this feeling of voluntariness or doing a thing ‘on purpose’ is an indication of conscious will.” These feelings around the exercise of will, Wegner suggests, provide a sort of inner ‘umph, which authenticates that an action has been freely willed.[71] In the traditional view of the will, actions are seen as flowing seamlessly from the conscious exertion of an

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[68] James, William, ‘The Principles of Psychology’, 1890, Thoemmes Continuum, p.453

[69] Wegner, Daniel, ‘The Illusion of Conscious Will’, 2002, MIT Press, p.2

[70] Ibid, p.12

[71] Ibid, p.3

innate power: the will can cause actions, but nothing causes the will. In the view of many, this means that no scientific study or explanation of the will is possible. As Wegner comments: “The will in this traditional way of thinking is an explanatory entity of the first order. In other words, it explains lots of things but nothing explains it. As Joseph Buchanan described it in 1812, ‘Volition has commonly been considered by metaphysical writers, as consisting in the exertion of an innate power, or constituent faculty of the mind, denominated will, concerning whose intrinsic nature it is fruitless and unnecessary to inquire’ (p.298). At the extreme, of course, this view of the will makes the scientific study of it entirely out of the question.”[72]

This force of the will is envisaged as taking different forms. Wegner explains that: “Will can come in little dabs to pro
This force of the will is envisaged as taking different forms. Wegner explains that: “Will can come in little dabs to produce individual acts, or it can be a more long-lasting property of a person, a kind of inner strength or resolve. Just as a dish might have hotness or an automobile might have the property of being red, a person seems to have will, a quality of power that causes his or her actions. The force may be with us. Such will can be strong or weak.”[73] As an illustration of this strength or weakness of the will, Wegner uses the example of being able to resist (or not) the temptation to eat junk food: Wegner says: “The feeling that one is purposefully not having a cookie, for instance, can easily be taken as an immediate perception of one’s conscious mind

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[72] Wegner, Daniel, ‘The Illusion of Conscious Will’, 2002, MIT Press, p.12/13

[73] Ibid, p.12

causing this act of self-control. We seem to experience the force within us that keeps the cookie out of our mouths, but the force is not the same thing as the experience."[74] Wegner concludes that our belief in the causal efficacy of the conscious will is an illusion: "We develop a shorthand, a belief in the causal efficacy of our conscious thoughts. We believe in the magic of our own causal agency. The mind creates this continuous illusion; it really doesn't know what causes its own actions. Whatever empirical will there is rumbling along in the engine room - an actual relation between thought and action - might in fact be totally inscrutable to the driver of the machine (the mind). The mind has a self-explanation mechanism that produces a roughly continuous sense that what is in consciousness is the cause of action - the phenomenal will - whereas in fact the mind can't ever know itself well enough to be able to say what the causes of its actions are."[75] This is an example of one of Cart-Ton world's more nuanced dismissals of the notion that there's any from of reality in the concept of free will.

Folk Psychology's 'Activist' Vision Undermined!

An even greater threat to Folk Psychology's 'activist' vision of consciousness can be found in the work of Benjamin Libet. Libet's findings are often cited as support for the position that the conscious self has no causal power to make decisions or take actions: In the 1970s, Libet was involved in research into neural activity and sensation thresholds. This work soon developed into an investigation concerning human consciousness. His most famous experiment indic-

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[74] Ibid, p.12

[75] Ibid, p.28

ated that the unconscious electrical processes in the brain, called readiness potentials, ***precede*** conscious decisions to perform volitional, spontaneous acts. These results, therefore, suggests that unconscious processes in the brain may be the real initiators of volitional acts rather than free will, which essentially has no causal effect. If unconscious brain processes have already taken steps to initiate an action before consciousness is aware of any desire to perform it, the causal role of consciousness in volition is all but eliminated. Susan Blackmore's explanation is that conscious experience takes some time to build up and so is much too slow to be responsible for directing actions.[76] Libet himself concluded that conscious volition is exercised in the form of 'a power of veto'[77] (sometimes called 'free won't': While consciousness plays no part in the ***instigation*** of volitional acts, Libet suggested that it may still have a part to play in suppressing or withholding certain acts instigated by the unconscious. Libet noted that we've all experienced the ability to suppress the acting out of an unconscious urge. Libet's work indicates, however, that consciousness has only a 100-150-milliseconds 'window' within which to exercise this veto over action.

Tor Norretranders, a Danish science writer, makes the following comments on Libet's experimental work: "… if we take Libet's findings seriously, these show quite clearly that the conscious 'I' does not initiate our actions." The 'I' may believe it's actually doing the acting, but this is an illusion:

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[76] Blackmore, Susan, 'The Meme Machine', 1999, Oxford U.P.. p.227

[77] Libet, Benjamin, (1985). Unconscious cerebral initiative and the role of conscious will in voluntary action. *Behavioral and Brain Sciences,* **8**(4), 529–566.

"The I is merely a piece of will-less driftwood, an innocent victim of wind and weather; and, what is more, a piece of driftwood that constantly reassures itself, 'I am keeping my course!'" Trying to insist that the 'I' can account exhaustively and definitively for the entirety of a person, then Libet's delay is going to cause us endless trouble when thinking about free will: "If we want to say that everything decided by a person is decided consciously, or that everything a person does is done consciously, things will go wrong with our idea of free will, simply because the bandwidth of consciousness is far too low for consciousness to control everything a person does." Norretranders also quotes the philosopher, Thomas Nagel's comment that, "Our Brains have Free Will but We Don't!"[78] To illustrate this extreme belittling of the self and conscious will, Jonathan Haidt uses (in his book 'The Righteous Mind') the metaphor of 'the elephant and the rider'; he says, "… that the mind is divided, like a rider on an elephant, and the
Jonathan Haidt uses (in his book 'The Righteous Mind') the metaphor of 'the elephant and the rider'; he says, "… that the mind is divided, like a rider on an elephant, and the
rider's job is to serve the elephant. The rider is our conscious reasoning - the stream of words and images of which we are fully aware. The elephant is the other 99 percent of mental processes - the ones that occur outside of awareness but that actually govern most of our behaviour."[79]

Efforts to Eliminate Consciousness, but the 'Hard Problem' Remains!

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[78] Norretranders, Tor, 'The User Illusion', 1998, Viking Press, New York, p.257/258

[79] Haidt, Jonathan, 'The Righteous Mind', 2012, Penguin, p.19

Given all this deconstruction of its fundamental claims, it's perhaps not surprising that a reductive philosopher, like Paul Churchland insists that Folk Psychology cannot, in any way, be integrated into the emerging worldview of neuroscience. On the contrary, it must be completely eliminated! His basic argument is that Folk Psychology is simply a wrong and inadequate ***theory*** - like demonic-possession in medieval medicine or crystal spheres supporting the stars in medieval cosmology. It has to be abolished before any real scientific progress can be made on mind and consciousness. Looking at it as a theory, Churchland says that Folk Psychology has a stagnant and degenerating research program. He claims that Folk Psychology has made no progress since the Greeks. He also says that Folk Psychology, as a theory, fails, very significantly, to explain a large number of phenomena relevant to mind and consciousness. For example, Folk Psychology fails to explain; mental illness, imagination, differences between individuals in intelligence and the nature of sleep and memory, and even such basic skills as catching a ball and constructing a three-dimensional model of the world from the two-dimensional images which impact on the retina. This reductionist tendency in neuroscience (which is still probably the majority view in the field), lead to the conclusion that the 'theory' and concepts of Folk Psychology will be eliminated and replaced by neuroscience terms. At the extreme (as we saw in the last chapter), Churchland predicts that neuroscience terms will entirely replace folk psychological terms in everyday discourse.

So, despite the successes of 'hard science' in demonstrating (within the confines of its particular ontology) that consciousness had no causal effects, nor any other reason to exist, the 'Hard Problem' has stubbornly refused to go away. This phrase, the 'Hard Problem', was coined by David Chalmers in a 1995 paper, 'Facing up to the Problem of Consciousness'. Essentially it's the problem of explaining sentience: how and why we have qualia or phenomenal experiences. How sensations acquire characteristics such as colours and tastes. Chalmers contrasts these issues with the 'easy problems' of explaining the ability to discriminate, integrate information, report mental states, focus attention, etc. Easy problems are easy because all that is required for their solution is to specify a mechanism that can perform the function. That is, their proposed solutions, regardless of how complex or poorly understood they may be, can be entirely consistent with the modern materialistic conception of natural phenomena (i.e. within Cart-Ton world).

Chalmers insists that the problem of experience is distinct from all these 'easy' issues, and he argues that the problem of experience will persist even when the performance of all the relevant functions is explained.[80] A good illustration of the Hard Problem was devised by John Heil.[81] It goes like this: imagine that you're watching a very spectacular firework display. While you're doing this, imagine also that a third party has complete, transparent access to your brain. This observer would not find any vivid, colourful flashes or

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[80] Chalmers, David, 'Facing up to the Problem of Consciousness', 1995, Journal of Consciousness Studies, 2 (3): 200–219

[81] Heil, John, Editor, 'Philosophy of Mind', 2004, Routledge, p.600

loud bangs and whizzes in the grey and white matter of your brain. In other words, the phenomenal experience you are having when watching the fireworks (or anything else), is simply not available to objective, scientific observation as we understand it today - this is the Hard Problem! And Chalmers insists that the problem has by no means been solved by the current Cart-Tonist scientific-philosophical consensus on consciousness.

Conclusions: Command and Control Wrong, Evolved Psychology Unavoidable

Having looked at Folk Psychology's vision of consciousness, and its deconstruction by Cart-Ton world, we can now try to come to some preliminary conclusions in regard to this traditional version of consciousness. The major theses of this book assert that consciousness has; a) a biological function and b) is an essential feature of a unitary universe. In other words, I'm rejecting dualist and socially constructionist explanations for consciousness. In the context of this approach, we can postulate the following: a) that Evolved Psychology is not responsible for Folk Psychology's 'command and control' vision of consciousness. This is very definitely a product of our Western Ethno-Psychology, namely Cartesianism Interactive Dualism. And b) the 'Hard Problem' has to be taken seriously (i.e. not explained away). This (as the name implies) is the more difficult and arguably the more profound, problem. (I will seek its solution in Whitehead's ontology.)

In defence of the proposition that Evolved Psychology is not responsible for the 'command and control' vision of consciousness, we can start by critiquing Churchland's Eliminativism: his big mistake is to treat Folk Psychology in its entirety as a conventional scientific theory which originated with the Greeks. The true picture is more complex: the evolutionary part is more like a 'built-in' theory which we will ***inevitably*** use to deal with our environment, especially our social environment. Unlike other theories, we can't change this any more than we can change our digestive systems. The Ethno-Psychology part ***is*** culture- and epoch-bound, and therefore, can and does change within historic time. On the other hand, I find it unlikely that our Ethno-Psychology will evolve into the reductive concepts of neuroscience, mainly because it will always have to be integrated with Evolved Psychology.

This 'officially' accepted Ethno-Psychology is ultimately grounded in the cultural worldview of particular societies. In the modern West, it has generally taken the form of Cartesianism, and this has blocked and hampered empirical research into mind and consciousness. To this extent Churchland is right. But, is this the same as saying that

Folk Psychology as a whole is a 'straitjacket' on the efforts of modern science to understand consciousness? From the opposite perspective, could or should contemporary scientists use Folk Psychology as a reliable guide for exploring mind and consciousness? As above, I believe that most of the problems involved in choosing between these alternatives arise from the fusion of Ethno-Psychology, especially Cartesianism, with our evolutionary mental equipment into what has become known as Folk Psychology. Clearly, the evolutionary part of Folk Psychology is part of the subject matter of neuroscience and consciousness studies. (I'm going to argue later that Evolved Psychology is intimately linked with an affect-based, developmental psychology on which the function of consciousness is ultimately based.) Ethno-Psychology, on the other hand, probably ***is*** nothing but a collection of outmoded theories and should, from a scientific point of view, be dispensed with.

Chapter Three: The Contemporary Version of 'Cart-Ton World' - and Some of its Critics

As we saw in the last chapter, from the Nineteenth Century onwards, modern science and philosophy have very seriously subverted Folk Psychology's 'command and control' model of consciousness. What's come to replace it as the 'official doctrine' is what the Australian science writer, David Hodgson calls the 'Consensus'; meaning the standard way of thinking about the problem of consciousness in modern scientific culture. What I call 'Cart-Ton world' underpins this approach. This ontology is deterministic, reductive and physicalist. Very significantly (as we shall see in part three) this consensus is entirely based on classical physics, while studiedly ignoring quantum theory. Hodgson comments that those who take this position regard themselves as having a tough-minded empirical approach which eliminates 'mysterious entities', such as witches, ghosts and spirits: "Contrary views are said to be unscientific and tender-minded."[82] Daniel Dennett can be taken as a prominent and characteristic representative of the conventional, Cart-Tonist position. This doctrine can also be called 'Cognitivism'. (Varela, et al. '91, coined this term, as we shall see later, as a derogative label.). Both Varela's 'Cognitivism' and Hodgson's 'Consensus' can be subsumed under

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[82] Hodgson, David, 'The Mind Matters', 1991, Clarendon Press, p.90

my term ‘Cart-Ton world’. In this chapter we’ll look in detail at the theoretical claims which it asserts.

Contemporary Cart-Ton world ontology has seized on information-processing as the predominant (or even the only) explanatory variable for the generation of consciousness. This latest theoretical framework for understanding the mind gained credence in the 1950s as the outlook of the ‘Cognitive Revolution’ became widespread. Behaviourism, the Cognitivists said, neglected to explain cognition, defined as how people perceive, think, remember, learn, solve problems, and direct their attention to one stimulus rather than another. Behaviourists acknowledged the existence of thinking, but identified it as a behaviour. Cognitivists argued that the way people think impacts their behaviour and therefore cannot be a behaviour in and of itself. Cognitivism has two major components, one methodological, the other theoretical. Methodologically, Cognitivism adopts a positivist approach, claiming that psychology can (in principle) be fully explained by the use of experiment, measurement and the scientific method. Cognitivism is also largely reductionist, believing that individual components of mental function (the ‘cognitive architecture’) can be identified and meaningfully understood. Cognitivism’s theoretical component claims that cognition consists of discrete, internal mental states (representations or symbols) whose manipulation can be described in terms of rules or algorithms.

But where did Cart-Ton world’s Cognitivist Consensus come from? What are its roots in the philosophy of science? In a nutshell, I suggest that the answer to these questions can be summarised by reference to three cultural developments: firstly, scientific reductionism, which can ultimately be traced back to Newton's formulation of classical physics. Secondly, the advent of computer technology. Alan Turing and others laid the theoretical foundations for this in the 1930s and '40s (though widespread, practical implementation of the technology didn't take off till the late Twentieth Century). And, thirdly, the emergence of the doctrine of 'Functionalism', as an uneasy compromise between Behaviourism and the clear implications of computer technology. So, the Cognitive Consensus, rather than being a wholesale refutation of Behaviourism, was more of an enforced expansion which encompassed mental states: Cognitivists typically presuppose a specific form of mental activity, of the kind advanced by the 'Computational Theory of Mind' (see below). This particular theoretical combination tended to reinforce the ancient and still well-respected separation between 'reason' and 'emotion', which runs through the mainstream of Western philosophy (from Plato and Descartes right up to modern philosophers such as Gilbert Ryle and Daniel Dennett). This tradition has a strongly negative bias against 'affect' ('affect' being the conscious, subjective experiences associated with emotion). Cart-Tonist thinkers, of course, accept an evolutionary role for the 'emotions' defined as a set of species-specific, neurophysiological reactions, involving phenomena such as the release of hormones, changes in blood pressure, heart rate, etc. What they don't accept is any evolutionary role for conscious affect. In this chapter we shall look, in detail, at these three cultural developments and finally examine an example of the strongly 'anti-affect' bias of the Cart-Tonist Consensus, from the work of the neurophysiologist, Susan Greenfield.

‘Cognitive Revolution’: Chomsky Vs Skinner and the Decline of Behaviourism

The intellectual movement known as the ‘Cognitive Revolution’ was a great conceptual transition within (primarily) psychology and philosophy which took place gradually, over a number of decades in the mid to late Twentieth Century. This revolution was essentially about rejecting consciousness-denying Behaviourism, which had very rapidly become, from the beginning of the Twentieth Century, the overwhelmingly predominant paradigm in psychology and, to a lesser extent, in the philosophy of mind. Behaviourism represents a very extreme form of empiricism, influenced by logical positivism in the philosophy of science and fundamentalist reductive realism in physics. All these theories radically rejected the notion of mental constructs which are not thoroughly anchored in observable and verifiable entities and processes. This meant that Behaviourism systematically tried to eliminate, for example, all the internal mental states posited by Folk Psychology. Cognitivism reversed this, accepting the reality and causal efficacy of mental states: critics of Behaviourism often refer to its conceptualisation of the ‘empty organism’. Cognitivists, however, were now ready to accept the ‘innerness’ of the mind. Essentially, the theme of the Cognitive Revolution was the return of the mind to scientific discourse following its long banishment by Behaviourism. The independent reality of the mind came to be accepted by analogy with computer software: the mind was conceptualised as the brain’s ‘software’. Consequently, the first phase of the Cognitive Revolution conceived the mind very much in terms of syntax, algorithms and mathematical relations, to the neglect of biology and neurophysiology.

The actual 'death knell' of Behaviourism can be localised to a very specific intellectual controversy between one of the most prominent leaders of Behaviourism in psychology, B.F. Skinner, and an (originally) obscure mathematician who strayed into linguistics, Noam Chomsky. This controversy is often taken as the first eruption of the Cognitive Revolution into academic debate. The disagreement centred around the concept of 'syntax', i.e. the human ability to construct and comprehend meaningful, grammatical sentences. The controversy began when Skinner published, in 1957, a book called 'Verbal Behaviour', in which he expressed an entirely Behaviourist theory of language. In 1959 Noam Chomsky wrote a devastating review of this book in which he suggested that the ease and rapidity with which human infants learn their native language is due to our genetic heritage which so structures our minds that we can effectively learn and use languages. In effect, Chomsky was claiming that, rather than being learned from early experiences, our ability to use syntactical language was due to a 'grammar machine' built into our brains. This 'machine' can manipulate and order internal representations of the world, in the form of physical symbols, into meaningful strings, using the machine's built-in rules. Underneath his specific criticisms and proposals, Chomsky was also breaking at least two of Behaviourism's most profound taboos: firstly, against formulating any kind of abstract theory of the mind, and secondly, Behaviourism's aversion to any form of speculation as to the 'internal' structure of the mind, especially the positing of 'mental entities'.

However, Cognitivism is not a wholesale refutation of Behaviourism, but rather an expansion which accepts that mental states exist. Cognitivists typically presuppose a specific form of mental activity, of the kind advanced by 'Computationalism'. In this theory the human mind or the human brain (or both) are conceived of as an information processing system and thinking is regarded as a form of computing. These essential ideas of cognitivism probably grew out of the clear contradiction between the concepts necessary to develop the computer and the basic principles of Behaviourism. Computer scientists, for example, had no problem designing and building intelligent machines based on goal-setting and goal-following, while Behaviourists denied purpose to human beings. So, Behaviourism began to crumble for two main reasons. Firstly, the rise of computer science and information theory meant that Behaviourism's prohibition against unobservable, 'inner' constructs was challenged to destruction by the practical approach of the system engineers designing and building the new computers. Secondly, and perhaps in response to this challenge, several Behaviourists, most prominently Clark Hull, tried to smuggle mental states into Behaviourism disguised as various forms of internal behaviour or predispositions. These were very elaborate and cumbersome. In addition, this was an affront to the general disapproval of theorising among Behaviourists. But most damning of all was the failure of, for example, Hullian theory when subjected to experimental testing. Given the movement's commitment to extreme ideological empiricism, this was utterly devastating.

At the same time Behaviourism's philosophical 'partner', Logical Positivism was also being eroded: these theorists were adamant that no entities could be included in a scientific theory which were not observable and/or verifiable via experimentation. This was partly the explanation for the Behaviourists' strong aversion to theorising. Ironically, Logical Positivism, along with Behaviourism, accepted physics as the 'paradigm' science but, especially with the advent of quantum mechanics, physicists (in practice) were ignoring the conceptual strictures of Positivism, to which Behaviourists so obsessively (and tortuously) adhered. Also, in the philosophy of mind, Identity Theory was being challenged. The main argument against Identity Theory's insistence that brain states and mental states are the same thing can be described as 'species chauvinism': in other words, Identity Theory effectively limits the experience of; pain, emotion or any other form of qualia exclusively to creatures who have a human brain. Consequently, the possibility of qualia (in any sense recognisable to us) occurring in any non-human creatures, such as the higher primates or any extraterrestrial species (no matter how intelligent), was, by definition, ruled out. Finally, the emergence of quantum physics was provoking serious challenges to the simplistic, reductive notions of causation characteristic of classical physics. In addition, the advent of the computer meant that machines had 'objective' and internal states. This made Behaviourism's denial of these to human beings difficult to sustain. As a consequence, Behaviourism, Identity Theory and Logical Positivism all came to be seen as too reductive.

Mental States and Intentionality

As a result of these trends, from the 1950s on, Behaviourism was challenged and undermined by the 'Cognitive Revolution'. So, following 50 to 70 years of Behaviourist denial, the Cognitive Revolution enabled modern scientific and philosophical culture to accept the existence of 'mental states'. These 'cognitive mental states', however, are but a pale reflection of the vigorous forces which mind and consciousness represent in Folk Psychology. Cognitive mental states are intended to contrast with 'brain states' or 'physical states'. The idea is that you can be in only one, particular conscious, mental state at any one time: that your entire conscious mind is engaged in whatever one thing you are doing. Mental states are often divided into two groups; 'qualia' and 'propositional statements'. This latter group include; thoughts, beliefs and attitudes, including likes and dislikes. These mental states are characterised as 'propositional' because they have a verbal or linguistic format, as opposed to the analogue, imagistic format of qualia: 'believing that Havana is the capital of Cuba' is propositional, while 'seeing red' is qualic. This comparison is a good illustration as to what qualia are; compared to propositional states, qualia are characterised by feeling or sensation rather than thinking or 'computing' and qualia cannot be shared with others via explicit language, whereas propositional states can.[83]

Propositional states refer to something in the world outside you; the capital of Cuba or tomatoes. Even if your mental state is about yourself, it still refers to a communicable meaning. This phenomenon, of mental states referring to meaning, is what philosophers call 'Intentionality'. Another way to express intentionality is to say that mental states point to (literally, 'aim at'), indicate or symbolise something. The problem of intentionality consists of understanding how it is that mental states can have meaning and be about something, in contrast to things like stones. A stone is not about anything: it does not refer to or point to anything

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[83] Rose, David, 'Consciousness; Philosophical, Psychological and Neural Theories', 2006, Oxford U.P., p.4/5

else, in the way that your mental state is about something else. Now consider, if your brain is just full of neurones, glia, and so on, how can those neurones (or their activity) be about anything else? How can an action potential be about the colour of the room or your belief in Catholicism? How is it that activity in certain parts of your brain has meaning? In what way is it different from a stone? This is the problem of intentionality.[84] In modern times, Franz Brentano (1874) revived (from Scholastic Philosophy) the tradition of defining the 'mental' in terms of intentionality. This however, raised problems for the concept of 'qualia' in relation to 'meaning': if all mental states (and only mental states) have intentionality, in other words, have meaning, then do qualia actually qualify as legitimate mental states? It seems fairly obviously true that propositional states have meaning: they can be expressed in language, which guarantees them meaning within a particular language community and beyond that (via translation) potentially universally to all human beings. But what about qualia? Do they have such an obvious connection to 'meaning'?[85] Many philosophers (I'd argue the mainstream consensus of Western analytic philosophy) have tried to eliminate this problem by equating qualia with propositional states. In other words, by simply asserting that propositional states and qualia are the same thing. This philosophical position denies that there really are two kinds of mental state, one based on direct feelings from the body and another based on beliefs, thoughts and propositional attitudes. Instead, they insist that all mental states are propositional, i.e. expressible in language and based on information processing. However,

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[84] Ibid, p.6

[85] Ibid, p.363

the distinction between qualia and propositional states is certainly supported by common sense, and also by at least one heavy-weight philosopher: David Hume claimed that everyone readily perceives a difference between feeling and thinking.[86] Here, Hume can clearly be interpreted as supporting the view that qualia can be said to represent the experience of feeling sensory input, while propositional statements result from processes of logical reasoning, in other words, thinking.

Subjectivity and Cart-Tonist 'Science'

Dennett inherited from Ryle a suspicion of what he considers to be metaphysics and of facts that are objectively unverifiable, but unlike Ryle, Dennett takes seriously mental states and subjective feelings. Malik tries to account for this apparent contradiction. He starts with the Rylean inheritance: "To be a 'materialist' today is to think of the human being as simply an object - an inert organism to be prodded and poked and measured like any other physical being - rather than as a subject, a conscious agent capable to acting upon the world. Viewing humans in this fashion inevitable handicaps our ability to understand them, leaving out as it does the most crucial aspect of humanness - subjectivity. It is a mechanistic, rather than a materialist, view of Man."

Dennett manages to rescue consciousness (at least his minimalist version) by suggesting that it consists essentially of talking to oneself: "the practice asking oneself questions could arise as a natural side effect of asking questions of others." Dennett imagines that initially people literally talked to themselves, probably whispering so as not to be overheard by others. The leap into consciousness occurred

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[86] Hume, David, 'A Treatise of Human Nature',1739, Oxford U.P.

when we learned to do this silently, i.e. internally. Dennett acknowledges that his version of consciousness has advantages and disadvantages: on the one hand it's a slow and laborious process compared with; "… the swift, unconscious cognitive processes upon which it was based, because it has to make use of large tracts of nervous system designed for other purposes. It would also be a linear, or serial, process: one could only say one thing to oneself at the time." On the other hand, it was a major improvement on previous forms of cognition: "One could work things out in one's mind. One could also converse with others about issues not immediately relevant: about the past and the future, for instance, about hopes and desires. This in turn opens up the way for culture. Once human beings began relating in a conscious, rational fashion to fellow beings, then the possibility of social rules, rituals, conventions and institutions became possible. Language created an entirely new world, a symbolic world, both for the individual and the species."

Malik then goes on to make a number of Social Constructionist assumptions about the emergence of consciousness: "It seems logical to assume, for instance, that the emergence of consciousness, which makes explicit certain thought processes, created the capacity to externalise symbol manipulations. Prior to this, symbol manipulation as part of the thought process would have been unconscious. The process of making symbolic thought conscious would have facilitated the development of explicit use of symbols by humans."[87] My own position (as per Whitehead's ontology), as I shall present in detail later, has (I believe) vastly

[87] Malik, Kenan,, 'Man, Beast and Zombie', 2000, WandN, p.320-325

more explanatory power than Malik's Social Constructionism because it not only recognises ***sentience***, but also accounts for it. For example, in the passage immediate above, Malik says that consciousness 'emerges' and symbol thought becomes 'explicit'; but how exactly do these expressions explain the phenomena to which Malik is referring? He criticises Dennett for claiming that human consciousness has; "… no qualitative aspect over and above the physical actions of the neurones." Malik says; "It may be true, as Dennett claims, that there is nothing 'intrinsic' about neural states that constitutes the way things look to us. But this doesn't mean that there is not a way that things look to us that is subjective and private." But how does Malik ***explain*** this subjective and private 'way'. The closest he gets is the following series of statements: "Alone among terrestrial matter, human beings are both subject and object. We are biological, and hence physical, beings, and under the purview of biological and physical laws. But we are also conscious beings with purpose and agency, …" Malik continues that the possession of these traits enable us; "… to understand the kind of creatures we are and to design ways of breaking the constraints of biological and physical laws." He doesn't, however, explain where our 'purpose and agency' come from, but our possession of them means that we are; "… both inside nature and outside it. The peculiar position that human beings occupy in the natural order means that we require special intellectual tools to understand ourselves." Natural science has the necessary tools to understand inert objects (including, according to Malik, animals). Natural science studies; "… objects that exist only as objects." (Note the clear Cart-Tonist assumption here!) "Its tools are inadequate for the full understanding of human beings, who are not simply objects, but subjects too.” Again, the term ‘subject’ appears in Malik’s discourse with no attempt at an explanation of its origins. Malik continues: “Understanding such beings requires not just the tools of natural science but also those of other disciplines: the social sciences, history, philosophy. None of these is less valuable or less rational than physics, biology or chemistry. They are simply more, or less, useful in different circumstances.”[88] These conclusions are a classic reiteration of Cart-Ton world’s ‘fellow traveller’, Ideological Empiricism: all sciences are ‘entitled’ to their own particular paradigm, contradictions between them are irrelevant and a unifying, underlying ontology is surplus to requirements. (I along with Whitehouse, as we shall see, reject all these propositions.)

Panksepp discusses Cart-Tonist Social Constructionist views in relation to his specialist subject of study, namely ‘affect’ (i.e. the subjective experience of emotion). He says that social and personality psychologists; “… have traditionally sided with Social Constructivist visions of mental life …” and he asserts that: “Social Constructivists have traditionally maintained that concepts and language are the hallmarks of the affects, and many still do.” In other words: “If an animal cannot conceptualise, it cannot experience affects.” Panksepp then goes into an elaborate discussion of what constitutes a concept (mainly concluding that it’s a learned category) in contrast to the direct, conscious ***experience*** of affect. He then criticises his fellow emotion researcher, Edmund Rolls for suggesting that rather than being direct experiences, affects too are somehow constructed concepts: “… which is why he believes that only (intelli-

[88] Ibid, p.336-339

gent animals) can experience affects. We suspect this may not make sense evolutionarily, for we know that people experience pain before having the concept of pain. And so forth for all the primary-process emotions…" Panksepp argues that experiencing an affect is equivalent to experiencing a quale, in the sense of being a direct, conscious and unconstructed experience: "We maintain that basic affects are in a category of primary experiences, like seeing a colour, and that language merely labels and represents such experiences. But affective experience itself, like seeing the colour red, does not require any conceptual intelligence. Humans can use words to label their affects, but they do not need words to experience them." Panksepp has an explanation as to why Cart-Tonist researchers and theorists are so convinced that virtually all of human conscious experience is a product of the 'higher realms' of the mind/brain: "There has been a temptation among many theorists (who spend much of their own mental lives in the higher conceptual reaches of BrainMind processing) to put all psychological experiences within those highest realms of mind. This leads to the unjustified assumption that the lower brain functions are strictly unconscious."[89]

The computational theory of the mind

The advent of the computer, and the associated creation of information theory, was one of the triggers for the 'Cognitive Revolution'. The process of designing and manufacturing computers not only broke down Behaviourism's resistance to the 'innerness' of the mind, but also finally challenged the Cartesian concept of the 'immaterial mind', outside of space and time, by asserting that, in reality, mind is

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[89] Panksepp, Jaak,'The Archaeology of the Mind', 2012, New York, W.W. Norton and Company, p.79

based on physical entities and material processes. As above, the main impetus for this revival of the mind was the very practical business of studying information processing with a view to applying it in computational machines. Part of this process was realising that information is, or at least can be, a material entity: the binary code of the digital computer reduced information to the 'on' or 'off' of an electronic switch. This basic on/off unit of data was christened the 'bit'. Thus, for the first time information could be quantified. This materialisation and quantification of the mental processing of information was part of the 'de-Cartesianisation' of the mental, finally making it an acceptable object of modern scientific study. In the Computational theory of the mind the human brain (or brain-mind) is conceived of as an information processing system and thinking is regarded as a form of computing.

One of the earliest manifestations of this 'computer approach' to the mind came, in 1936, from the British mathematician, Alan Turing. Having developed the binary code described above, he claimed that a simple machine could in principle carry out any conceivable calculation. As Kenan Malik says: "Turing showed mathematically that such a machine could execute any kind of programme or plan that could be expressed in binary code (a code that consists purely of zeros and ones). This was the 'universal machine', the abstract ancestor of the modern digital computer." Shortly after Turing's 1936 paper, the neurophysiologist Warren McCullough and the mathematician Walter Pitts suggested that the operations of a neurone could also be modelled according to binary logic: "A neurone can do one of two things - fire or stay silent. Its activity could therefore be modelled as a '0' or a '1'. Suddenly it became plausible to think of the brain in terms of a universal Turing machine - as a computer." The work of Turing, McCullough and Pitts was synthesised by the MIT mathematician Norbert Wiener into the notion of 'cybernetics', the 'science of control and communication in the animal and the machine'. Wiener argued that the medium was irrelevant and all that mattered was the message. Scientists should concentrate on the content of the information that an entity encoded irrespective of "whether this should be transmitted by electrical, mechanical own nervous means": according to Wiener information; "… is a correlation between two things that is produced by a lawful process (as opposed to coming about by sheer chance)." Malik explains that: "A piece of matter that is organised in a specific fashion encodes information. Organised matter can act as a 'symbol': it can 'stand for' a state of affairs elsewhere in the world." However, Wiener argued, what the piece of matter is composed of is irrelevant to the information it embodies: the same information can be encoded by chips in a computer or neurones in a brain. As we shall see, this became the key feature of the doctrine of Functionalism. If the human mind could be thought of as a computer, then perhaps a computer might also be thoughtful and sentient? In order to 'test' this, Turing developed, in 1950, what became known as the 'Turing test', in which a computer would be programmed with a view to making its answers to questions indistinguishable from those of a human being: "… if an observer could not distinguish the responses of a programmed machine from those of a human being, the machine could be thought of as 'conscious'."[90] (As I hope to convince readers of this book, the assumptions behind

[90] Malik, Kenan,, 'Man, Beast and Zombie', 2000, WandN, p.296-300

this procedure are profoundly mistaken. As Searle would say, a computer might be able to ***simulate*** consciousness but can never ***produce*** it. I would in addition say, by way of explaining Searle's assertion, that ***sentience*** is the most important characteristic of consciousness, not the sophisticated information involved in responding to questions.)

In philosophy the computational theory of the mind was first proposed, in its modern form, by the American philosopher, Hilary Putnam in the late 1950s and '60s. He developed the idea of the brain as 'hardware' with the mind as 'software'. Putnam focused on the logical operations themselves (the 'software') as independent of the 'hardware' on which they were implemented and suggested that this distinction between software and hardware could also be applied to the human mind: "This distinction between brain as hardware and mind as software remains key to cognitive science to this day. The invention of the computer, Putnam argued, had helped dissolve the classical mind-body problem: the mind simply comprised the various 'computational states' of the brain. This claim came to be known as the 'functionalist' view of the mind." Putnam's PhD student, the MIT philosopher and cognitive scientist, Jerry Fodor, further developed the theory. He asserted that the mind is a pattern of computation that arises from the brain acting as a computing device. Given that a program is the finite description of an algorithm or effective procedure, it prescribes a sequence of discrete actions. The outputs produced by the program are based only on inputs and the internal states (memory) of the computing machine. For any admissible input, algorithms terminate in a finite number of steps. So the computational theory of mind is the claim that the mind is a pattern of computation of a device (the brain) that derives output representations of the world from input representations and internal memory in a way that is consistent with the theory of computation. Fodor insisted that human information processing required the physical manipulation of symbols, representing the external world, inside the brain.

This violated one of the most sacred of Behaviourism's taboos, namely that there could not be any representation of the world within organisms. To counter this, Fodor coined the slogan, “No computation without representation!” meaning that in order to carry out computations, the human brain must be generating physical representations of the outside world, which are then manipulated according to syntactical rules to produce a biologically useful result. This was one of the ideas which broke down the Behaviourist's resistance against the ‘innerness’ of the mind. This barrier had been erected to protect scientific discourse against Cartesian notions of an immaterial mind, outside of space and time. The Cognitive Revolution collapsed this by asserting that, in reality, the mind consisted of physical entities and material processes. A particular issue for the computational theory of mind concerns ‘meaning’: Natural human language is generally regarded as comprising both syntax and semantics. ‘Syntax’ is a set of rules by which symbols can be legitimately manipulated (such as the grammar of natural languages). Reductionists have no problems with this, since syntax can be achieved ‘mechanically’ within physical symbol systems. ‘Semantics’, however, is concerned with how particular meanings can be ascribed to particular symbols. Consequently, fundamentalist reductionists, such as Stephen Stitch[91], are willing to simply give up the use of the concept ‘meaning’: brain states are simply ‘Functional States’ and are not concerned with subjective meaning.

In this ‘total Computational’ model, computers are capable of intelligence, though probably not consciousness. (But, then from a fundamentalist reductionist point of view, consciousness is, in any case, nothing but an Epiphenomenal illusion.) As an example of Reductionists applying neuroscience findings, we can consider this: the total input-capacity of the human organism for sensory information is; 10 to 100 million bits per second. Whereas the maximum output-capacity from consciousness is only 3 to 50 bits per second.[92] One conclusion from this is that the brain’s ‘Machine Language’ (also called ‘Mentalese’) has a much, much broader bandwidth than natural languages. In other words, it’s much, much faster and more efficient. An apparently serious, suggestion from a Reductive Fundamentalist is to directly couple together the corpus callosum from one human brain to another. The corpus callosum is a very thick ‘communication cable’ of neural fibres connecting the two hemispheres of the brain. The implication of this thought experiment, is that communication between these two individuals would bypass, not just natural language, but also consciousness and maybe even ‘meaning’ in a Folk Psychological sense.

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[91] Stitch, Stephen, ‘From Folk Psychology to Cognitive Science: Case Against Belief’, 1983, Bradford Books

[92] Prof. Karl Kupfmuller, Darmstadt Tech. University, 1950s and 1960s

So, clearly the development of the computer led to new thinking about the human mind/brain. However, on the other hand, our increasing understanding of the human mind/ brain has led to new types of computers: as Malik explains: “The brain is not composed, like most commercial computers, of a single powerful processor that performs one operation at a time, though very fast. Rather, every neurone can be thought of as a ‘microprocessor’, each of which is connected to hundreds, often thousands, of other neurones.” The brain's processing capacity depends on this web of connectivity, while the strength of any particular neuronal connection can vary greatly depending on the activity of the neurone in question: “… the more two neurones signal to each other, the stronger their connections become. And whereas most computers operate serially - one operation at a time - the brain is a parallel processor: many neurones, and circuits, are simultaneously active.” We consequently now believe that thought processes in the brain depend on the patterns of neuronal activity and the strengths of the interneuronal connections, as first suggested by Donald Hebb in his 1949 book, ‘The Organisation of Behaviour’. This growing knowledge about neural structures eventually led, in the 1980s, to the development of a new type of computer architecture which more closely resembled that of the brain. This new type of computer came to be called the ‘neural net’, ‘parallel processing’ or ‘connectionist’ computer. Instead of being designed around a single, very fast and sophisticated central processor, connectionist computers consist of interconnections between a large number of tiny processing elements in parallel, like the synapses that link neurones in the brain. Each neural net contains at least three layers: the input layer, the activity of which was determined by the environment; the output layer, the activity of which expresses the response or ‘behaviour’ of the computer; and a ‘hidden layer’ in between which processes the information provided by the input layer. The hidden layer was analogous to the mental representations in the brain which intervene between stimulus and response. The connections between the elements in the network vary in strength in a haphazard way. A connectionist computer can be taught a task repetitively and, as it ‘learns’, particular connections become stronger, meaning that the computer is not rigidly programmed from the outset, but gradually evolves the set of connections which this particular skill requires. Connectionist computers are particularly good at picking out patterns in data, and can perform tasks which are generally easy for humans, but almost impossible for traditional serial computer, such as recognising faces and picking out objects in a visual field. Consequently, many theorists have suggested that the human brain is much more like a connectionist than a digital computer. This has, as Malik concludes; “… helped reignite the belief that the brain can be understood in purely computational terms.”[93]

Dennett, for example, suggests that the human brain is a ‘parallel processing’ or connectionist computer which generates a digital serial computer. “The parallel computer is where our unconscious mental processing occurs, the output of the serial computers what we call consciousness.” Dennett says: “Conscious human minds are more-or-less serial machines implemented - inefficiently - on the parallel hardware that evolution has provided for us.” The brain works mainly as a parallel processor except that one of its software programmes can turn it (or part of it) into a virtual

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[93] Malik, Kenan,, ‘Man, Beast and Zombie’, 2000, WandN, p.296-300

serial machine. Rowlatt suggests that a key feature of this 'virtual machine' is that it must have is what Dennett calls a 'Joycean' nature: "This Joycean property refers to the 'stream of consciousness' type of monologue used by James Joyce in his novels."[94] Running this serial programme, Malik suggests, makes it seem; "… as if it is performing but one task at a time sequentially. In other words, it appears to create a linear narrative from then parallel chaos surrounding it." According to Dennett this is what consciousness is: "… the transformation of parallel processing changes to a serial narrative thanks to a programme that converts the brain from a parallel processor to a virtual serial machine." Dennett's only explanation as to how such a strange brain architecture developed, is to suggest that consciousness is a product, not so much of natural evolution, as of language and culture.[95]

Searle's Chinese Room

An effective way to access the issues raised by the computational theory of the mind is to look at the most famous critique of it which came from the American philosopher, John Searle. Searle attacked the digital computer as a model for the mind on the grounds that its information processing does not include anything that could be described as 'human understanding'. Searle's main challenge, then, was to the lack of 'intentionality' in computers (as above, 'intentionality' being the philosophical term for the attribution of meaning to information, representations and symbols). To more forcefully make his points, Searle devised a thought experiment, 'The Chinese Room', which has be-

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[94] Rowlatt, Penelope, 'Mind: A Property of Matter', 2017, Ionides Publishing, p.33

[95] Malik, Kenan,, 'Man, Beast and Zombie', 2000, WandN, p.322

come one of the most famous in the history of theories of consciousness. Messages, in the form of sequences of Chinese ideograms are inputted on one side of the room. The operator inside the Chinese room does not speak Chinese in any conventional sense. Instead he has an operating manual (in English) which tells him which Chinese ideograms to respond with according to which ideograms come in. This enables him to put together a response, in the form of a different string of Chinese ideograms, which he outputs on the other side of the room. This response ***is*** meaningful and comprehensible to the genuine Chinese speaker on the other side of the room. As Malik says, in effect the operator in the room is acting like a computer: "… transforming one set of meaningless symbols into another set of meaningless symbols using a set of rules." But suppose the operator gets so familiar with the rules that his answers to the questions are indistinguishable from those of a native Chinese speaker. Then, nobody by just looking at his answers could tell that he doesn't speak a word of Chinese. Significantly, this set up would pass the Turing test! But, of course, Searle argues that this test; "… is not a test of whether a computer programme has a mind, or thinks like a human being, because humanlike performance can be faked by a machine (or a human) blindly following rules."

Searle's point here is that, although the operator is effectively acting as an information processor in Chinese, he still has no ***real*** understanding or knowledge of the Chinese language. And, by analogy, this is his critique of the computational model of the mind; i.e. although computers can ***simulate*** what goes on in the human mind, they have no comPrehension of - or even interest in - the ***meaning*** of the mind's activities, which for human beings is the whole point! The problem here, Searle suggests, is confusing a simulation for the phenomenon itself: as he points out a computer can simulate a hurricane, but the simulation will not blow you down and make you wet Searle concludes that computers don't and can't have any ***understanding*** in a humanly meaningful sense of the word. Jeffrey Gray makes a similar point regarding the conjugation of Latin verbs, namely if you know the stem of a verb and how to conjugate it: "You can do this without any idea of what the verb means, or even if the stem doesn't exist at all. That's syntax without semantics." This is a metaphor for what computers do: they conjugate strings of symbols without any knowledge of the meanings of the strings. This may appear to contradict the common idea that computers are systems for the processing of 'information', but, as Gray points out: "In its everyday sense, 'information' is information about something, it conveys meaning. But I have just asserted that computers cannot on their own compute meaning, the information they process is interpreted by human beings; for the computer itself, it is uninterpreted information."[96]

At the heart of Searle's argument is the distinction between syntax and semantics. Syntax refers to the rules by which

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[96] Gray, Jeffrey, 'Consciousness: Creeping up on the Hard Problem', 2004, Oxford U.P., p.126

symbols may be manipulated, and which tell me whether a string of symbols is well-formed or ill-formed. In English, as in other natural languages, syntax consists of the grammatical rules that tell me how to create valid sentences. Semantics, on the other hand, refers to the meaning of symbols, to what a symbol is about. Syntax, therefore, refers to the structure of a language (or of a system of formal logic), semantics to its content. Syntax is the outside of a sentence, semantics its innards: “A computer programme restructures the outside of a symbolic string without worrying too much about what is on the inside. For humans, however, the ‘inside’ is crucial… To a human, meaning is everything. When we communicate we communicate meaning. Indeed, meaning is the only point of communication.” Yes, it’s perfectly possible to write a set of rules or algorithms that tell a machine the ‘meaning’ of a word, using a ‘semantic network’ to fix its meaning, via definitions of other words and concepts. The problem with this approach, says Malik; “… is that representing a word or a sentence in this fashion does not access its meaning. To believe that is to commit what the psychologist Philip Johnson-Laird has dubbed the ‘symbolic fallacy’.” Johnson-Laird’s point is that semantic networks are as circular as dictionaries: they; “… can tell you that two words are related, or that one sentence is a paraphrase of another, but they perpetrate the ‘symbolic fallacy’.” In other words, they claim that ‘meaning’ is merely a matter of relating one set of verbal symbols to another, which; “… doesn’t tell you what either means. Such algorithms are still engaged with the outside of language, not its inside.”[97]

[97] Malik, Kenan, ‘Man, Beast and Zombie’, 2000, WandN, p.303/304

The Doctrine of Functionalism

The computational theory of mind leads to the doctrine of 'Functionalism': in essence, this asserted that mind, although completely dependent on the brain, is (once generated) a separate entity with its own independent existence and modes of being. One of the major principles of Functionalism states that when considering an entity capable of generating a mind, its material of construction is irrelevant: the mind which is generated is the product of the causal relations between the material components generating it.

For example, machines have proved capable of processing information using electronic valves or (later) silicon chips. The fact that the brain uses organic neurones no longer gives it a monopoly on computation. Under the influence of early computational theories, such as Alan Turing's concept of the 'Universal Machine', Functionalism conceived of the mind as programs operating on the brain's hardware: different mental states were realised by different programs.

early computational theories, such as Alan Turing's concept of the 'Universal Machine', Functionalism conceived of the mind as programs operating on the brain's hardware: different mental states were realised by different programs.
Just as Turing had theorised that a computer could run an infinite number of programs, so too can the brain generate

an infinite number of mental states. This position enabled Functionalism to escape from the problem of species chauvinism, which dogged Identity Theory, and also to revive the Folk Psychological notion that the mind is, at least partly, independent of the body. The long predominance of Behaviourist theory created an effective barrier against 'spiritual' and 'other-worldly' accounts of the mind. This barrier had been erected to protect scientific discourse against Cartesian notions of an immaterial mind, outside of space and time. The Cognitive Revolution, however, eliminated this barrier by asserting that, in reality, the mind consisted of physical entities and material processes.

Functionalism became the dominant philosophical approach to the mind/body problem in the new field of Artificial Intelligence, since it promoted the field's core objective of reproducing human intelligence - and even consciousness - in machines. A number of critics, however, have objected that Functionalism is simply a return to a form of dualism. The main difference being that, in its Functionalist reincarnation, the mind is not a soul in a spiritual realm, but an abstraction in the etherial 'other world' of mathematics and logic, which importantly are also outside of space and time. An example of this is Jerry Fodor's claim that the brain, like a digital computer, must have a 'machine language', expressed in algorithms, thus making its 'running' independent of its 'hardware'. Fodor called this basic language in the brain, 'Mentalese'. These attempts to 'mathematise' the brain, can, I believe, be explained by the enormous cultural prestige of mathematics and logic, which has persisted in the West since its inception in classical Greece. And this tendency was greatly boosted when it turned out that computers could perform much better than human beings at mathematical tasks, such as solving equations and winning at chess.

Cart-Ton's Negative Account of Emotions

This abstract, 'mathematising' of the mind and consciousness is very characteristic of Cart-Ton world. Consistent with this, Cart-Tonists have ignored or denied any role for affect and emotion in relation to mind and consciousness. This reflects a strong tradition in the West, dating back to the ancient Greek philosophers, which views human behaviour as governed by two opposing forces: the emotions versus Reason. As Greenspan and Shanker point out: "In the modern version of this doctrine, introduced by Descartes, emotions constitute the animal side of human behaviour: the innate feelings, moods, and mental states that are involuntary and automatic. Reason resides in a completely separate realm of the mind: the part that is independent from emotions, and that, one hopes, comes to govern them." Behaviourists took Descartes' suspicion of emotion one step further by trying to eliminate the concept entirely from human psychology: Panksepp presents B.F. Skinner's view of emotions: "He disdained emotional concepts in the new science of behaviour from the outset and famously claimed: 'The 'emotions' are excellent examples of the fictional causes to which we commonly attribute behaviour' (Skinner, 1953)."[98] Panksepp also points out how Behaviourists avoided; "… using subjective words like satisfaction and discomfort - words that suggested a motivated mental state accompanied by a feeling tone - the Behaviourists substituted more objective terms, referring to externally observable events: rewards and punishments (or

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[98] Panksepp, Jaak,'The Archaeology of the Mind', 2012, New York, W.W. Norton and Company, p.58

reinforcements when used in the context of learning).” In addition, they refused to attach psychological definitions to the concepts of ‘reward’ and ‘punishment’: “They explicitly chose to ignore the likelihood that affective changes in the brain gave rewarding and punishing events the power to control behaviour. Rather than leaving open the possibility that rewards and punishments worked by generating experiences within the brain, ‘reinforcements’ were defined as in purely operational terms - in terms of the ability of objects in the world to ‘reinforce’ behavioural changes in one direction or another. To this day, we do not know whether ‘reinforcement’ is a specific kind of non-affective brain function, or simply a word used to describe how we train animals by systematically manipulating brain systems that control their feelings.”[99]

Panksepp, however, is clear that both humans and animals reliably work to obtain rewards and avoid punishments. “That humans and animals alike do these things for affective ‘reasons’ is what Behaviourists could not accept as being scientifically workable, and hence credible, and their bias has been passed down to behavioural scientists to this day.” Panksepp notes that references to affective and motivational states (such as hunger and thirst) ‘disappeared’ from the lexicon of most psychological discourse; “… first-person subjective language was literally banned from scientific discourse. This was the case for discussions of animals and humans. But now, thankfully, in our enlightened age, the ban has been lifted. Or has it? In fact, after the Cognitive Revolution of the early 1970s, the Behaviourist bias has largely been retained but more implicitly by most, and it is still the prevailing view among many who study

[99] Ibid, p.58-60

animal behaviour.” Panksepp laments this ‘residue of Behaviourist fundamentalism’ which he claims is still blocking much valuable psychological research, especially in relation to the ‘affective functions’ of the brain/mind.[100]

One of the major assertions of this book is that this Cart-Tonist view of emotion/affect remains predominant in much scientific research to this day: “Recent attempts to develop a scientific theory of emotions have remained tethered to the Cartesian View about the nature and function of emotions. Influential theorists such as Sylvan Tomkins, Carroll Izard and Robert Ekman have developed rigorous methodologies for studying facial expressions of emotions, and cognitive neuroscientists such as Joseph LeDoux and Daniel Schacter have deepened our understanding of the neural processes associated with the primary emotions. But the basic principles underlying these research programs remain those that were enunciated by Descartes. Even Antonio Damasio, a vocal critic Descartes' bifurcation between reason and emotion, has nonetheless remained committed to a Cartesian model of the biological origins and functioning of the primary emotions.” So, what exactly characterises the Cartesian model of emotions? “Not simply that emotions are ‘passive’, for this thought existed long before Descartes, dating back to the Stoics. Not that the feelings associated with emotions are some sort of private mental state, for this idea is prominent in the writings of St. Augustine. Nor that there are basic emotions; this idea can be found in Aristotle. Nor even that the basic emotions are indexed by facial expressions that serve predetermined communicative functions, for this idea can

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[100] Ibid, p.58-60

be found in the Bible. But Descartes introduced a unique slant on all these themes by construing the 'passivity' of emotions as signifying that they constitute a distinct class of involuntary mental states."[101]

Descartes regarded emotions as complex reflexes, triggered by internal and/or external stimuli, and consisting of distinctive bodily processes and sensations, associated with characteristic behaviours and stereotypical facial expressions: "In the modern version of this argument, a 'basic' emotion is defined as a complex process consisting of neural, neuromuscular/expressive, and experiential aspects. To qualify as 'basic', the emotion must be associated with a distinctive facial expression; with certain body movements and postures; with distinctive vocalisations, changes of voice, tone, rhythm, prosody, and stress; and with distinctive sensations and chemical changes in the body." Two highly influential contemporary versions of this argument can be found in the work of Ekman[102] and Izard[103]: "Their theories maintain that all the various elements of emotional responses are coordinated and controlled by neural programs. Emotional responses are treated as a composite form of reflex; namely, a stimulus triggers a neural program that controls a neuromuscular/expressive, autonomic, behavioural, and experiential sequence of events." According to this view, it's complexity that represents the essential dif-

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101 Greenspan, Stanley, and Shanker, Stuart, 'The First Idea', 2004, Da Capo Press, p.43-46

102 Ekman, P., 'Facial expression of Emotion', 1992, Royal Society Publishing

103 Izard, C.E., 'Emotions and Facial Expressions', in 'The Psychology of Facial Expression', ed. Russell, J., and Fernandez-Dols, J., Cambridge U.P., 1997

ference between emotions and reflexes proper; in other words, how many different elements are coordinated, i.e., emotional reactions are unconscious and involuntary (like other 'automatic actions') because they operate at a neural/physiological level that is 'beneath the threshold' of introspection and conscious planning. This Cart-Tonist view retains the key features of the Cartesian theory of emotions.[104]

In the context of an analysis of Cart-Tonist ontology's conception of emotion, we can return here to Jaak Panksepp's critique of the theoretical work of Edmund Rolls (Rolls, of course, being the spokesperson of the Cart-Tonists): Panksepp focuses his criticism on Rolls's assumption that emotional feelings are generated exclusively within higher cortical regions of the brain. Panksepp attempts to map out Rolls's formulation as to how; "… non-affective evaluations of environmental stimuli, as generated by lower brain regions, can be transformed into phenomenal experiences. This supposedly non-affective information, organised by the higher brain stem (the thalamus and hypothalamus), can be sent in two directions. The information sent in one direction will arrive at the basal ganglia - deep forebrain structures that control unfeeling instinctual behaviours such as those involved in eating and adopting a particular posture during elimination, sexual and aggressive stances, and so on."

Panksepp uses the example of a rat finding a piece of cheese: "… the rat's older brain structures would evaluate aspects of the taste and texture of the food. This evaluation

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[104] Greenspan, Stanley, and Shanker, Stuart, 'The First Idea', 2004, Da Capo Press, p.43-46

would be non-affective and the information it generates would be sent to the rat's basal ganglia, which would instruct the rat to continue eating the cheese. The non-experienced information generated by older brain regions can also be sent in another direction, up to the neocortex (actually in this case, an older cortical region called the orbitofrontal cortex, right above the eye sockets)." According to Rolls, however, in order to formulate subjective emotional feelings, a large and complex cortex, such as that in a ***human*** brain is required. Consequently: "In animals with humble neocortical endowments, such as rats … no affects supposedly accompany emotional behaviours. This is because such animals have rather little of the right kind of upper brain to generate symbolic concepts of emotional evaluations - which are presumably necessary to generate affects. For this reason, Rolls concludes that 'unintelligent' species have no emotional experiences - hence the animals we routinely study in the laboratory, certainly rats and mice, are not affective creatures."

Contrast this with a human tasting a spoonful of cheesecake made by a gourmet chef; "… various structures in the older brain regions (including the orbitofrontal cortex) would evaluate non-affective information about the taste and texture of the cake. This information would be sent to your basal ganglia, which would instruct you to eat more cake. In addition, your old cortex would send the information to your neocortex, which would be able to symbolise and therefore speak about the delightful affective experience of eating this elegant confection. Thus, for Rolls, the ability to verbalise or at least conceptualise evaluations is a necessary condition for the affective experience. In his view, only human beings, along with a small number of other intelligent species, have affective experiences."

In Panksepp's Post-Cart-Tonist approach, however; "… it is more likely that deeper structures program (or teach) the old cortical structures how to generate evaluations. … In other words, the mere fact that newer cortical structures can generate evaluations does not eliminate the possibility of fundamental participation by deeper regions of the brain in generating the primary, raw feelings upon which secondary evaluations are based." Panksepp adds that his; "… affective neuroscience perspective envisions that ancient emotional circuits are concentrated in primitive regions of the brain, but with abundant linkages to higher brain regions. Emotional systems are defined in terms of the properties of these circuits."[105]

The Consequences of Seeing Emotion via Cart-Tonist Ontology

In order to illustrate the consequences of the Cart-Tonist view of emotion, we can present here via the views of the very distinguished academic researcher, Susan Greenfield. She specialises in the physiology of the brain. She was Professor of Synaptic Pharmacology at Lincoln College, Oxford and, until 2010, she was director of the Royal Institution. She's researched Parkinson's and Alzheimer's. Here, however, we're going to look at her theory of the self, especially in relation to emotion. Greenfield says she finds it, "... impossible to distinguish mind from the concept of self. After all, if mind is the personalisation of the brain, then what more, or what less, could Self actually be!" Green-

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[105] Panksepp, Jaak,'The Archaeology of the Mind', 2012, New York, W.W. Norton and Company, p.71-73

field, therefore, claims that self and mind are synonymous. However, the other aspect of her self-theory is that the; “emotions are an abrogation of the self. The idea is that the young child is swamped with emotions that are gradually diluted by a growing retaliatory sense of Self and, most important, with a concomitant sense of inner control. Emotions involve relinquishing that control. I think this increasingly interactive and ever-changing dialogue between Self and outside world is important because it highlights the basic issues of how we see ourselves and, indeed, how we chose to live our lives.” Given Greenfield’s emphasis here on the self ‘retaliating’ against emotion and the extreme importance of controlling the emotions, she clearly doesn’t see the emotions as forming the foundation of the self and providing it with ‘tools for living’ (as Panksepp does, which we’ll look at later.)[106]

Greenfield gives several examples as to where the self is swamped and overwhelmed by emotion: “The emotional behaviour of children, the ecstasy of ravers, the mercurial extreme terror and rage of schizophrenics could all be described as instances when The self is forgotten in favour of a - literally - sensational experience.” As we’ll see later, I think that this represents an overly simplistic model of the emotions, i.e. that they function as simple, passive reactions to opportunities for sensation from the environment. Greenfield’s theory claims that, what she calls, the ‘personalisation’ of the brain is an entirely cognitive process and that emotion actually hampers and works against personalisation: She says; “The more we feel, the less we are, literally, ourselves - the less we are encumbered by previous, idio-

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[106] Greenfield, Susan, ‘The Private Life of the Brain’, 2000, Wiley, p.185-187

syncratic associations that personalise the brain into a mind." This, again, is in stark contrast to Non-Cart-Tonist 'emotional-self' theorists: in direct contradiction to Greenfield, they argue that it is precisely via emotional experience that we personalise the brain into a self.[107]

Greenfield's simplistic view of the emotions as consisting of purely passive interaction with the environment, limited entirely to the present, is essential to her 'anti-emotion' self-theory: She says that we generally seek; "... the attainment of a feeling of pleasure, where one will strive to be in situations that counterbalance the mind and revert the individual to a throbbing, sensual present. In evolutionary terms, we can view emotions as processes where one is highly interactive with the environment. If you are interactive with the environment, then you are focusing on your senses, and the more you are the passive recipient of the senses, the less you are accessing the mind. The more you do this, the more you are letting go of The self." As we shall see later in this book, an alternative theory is that the emotions represent millions of years of evolutionary wisdom, pre-packed in a set of genetically pre-programmed, active responses to the environment. Again, Greenfield equates emotion with a diminution in our sense of both meaningfulness and selfhood: She says; "It could be the case, then, that the more emotional you are, the less the world around you means anything and the more you have literally let yourself go."[108] Whereas the 'emotion theorists' assert the exact opposite, that emotions are our principle means of evaluating the world and thus assigning meaning

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[107] Ibid, p.139/140

[108] Ibid, p.50

to it, Greenfield says that; drugs, childhood, schizophrenia and even dreams, too, can lead to, ".. a failure to generate and access the large neuronal assemblies that give rise to the adult human mind."[109] In other words, they wipe out the self.

And again Greenfield emphasises that her model of the self is an entirely cognitive construct, built on neural networks, which have already been effectively simulated in artificial intelligence systems: "These dynamic connections between neurones enable reason and thought, those cognitive phenomena that have already been successfully modelled in artificial systems, and which normally develop with age along with the growth of neuronal connections."[110] Let me conclude this presentation of Greenfield's negative account of emotion by commenting that none of the views she articulates above can be directly ascribed to findings from research in neurophysiology. Rather these are the personal views of an individual (with a particular life-history) on the self, the emotions and the relationships between them. The fact that she happens to be a distinguished scientist is actually irrelevant. Though, as so often in science, they end up in a popular book on the brain, where her professional distinction lends them a spurious authority.

Conclusions: Consciousness = Qualia and The Self

[109] Ibid, p.140

[110] Ibid, p.140

In this book I reject the Cart-Tonist ontology as outlined in this chapter; one of my main reasons being precisely because the Cart-Ton world ignores quantum theory. In part three, I'll appeal to several physicists and philosophers who argue that Cart-Ton world's adherence to the ontology of classic physics is no longer a sustainable scientific-philosophical position. They instead urge direct confrontation with the bizarre phenomena of the quantum world, especially those which flatly contradict the assumptions of classical physics. For example, the fact that quantum mechanics espouses indeterminism rather than determinism, holism rather than reductionism and that (in some versions) it posits the notion of some mysterious reality underlying everyday appearances. Plus, of course and most importantly for our purposes, the fact that quantum mechanics promotes the idea that consciousness may play an important role in physical processes.

Many philosophers have suggested that the problem of consciousness can be reduced to two 'subcomponents'; a) 'qualia', i.e. the way things feel to us, and b) the self, i.e. the subject which has our experiences and the agent who (apparently) carries out our actions. As we saw in chapter one, Folk Psychology had detailed accounts of both these phenomena which were accepted (albeit without much scrutiny) as adequate for centuries. As we have seen, the current Cart-Tonist, scientific-philosophical consensus on consciousness claims to have dismissed these Folk Psychological explanations and replaced them with, generally, reductive and even Eliminativist accounts. In this book, I will, in turn, attempt to dismiss and replace Cart-Tonist views of the self and qualia. In the next chapter, we'll look at Cart-Ton world's view of qualia.

Let me, however, emphasise that in my efforts to achieve this I shall not appeal to religious, spiritual and/or 'New Age' concepts and world views. Rather, my ambition is to limit my supporting references to prominent researchers, who, though they may be positioned at the limits of the mainstream (path-finders and progressives?), are certainly well-accepted as serious researchers within the global scientific-philosophical research community. For example, I shall be referring to the philosopher, Alfred North Whitehead, the physicists, John von Neumann and Henry Stapp, the neurophysiologist, Jaak Panksepp and the psychologists, Nicholas Humphrey, Jeffrey Gray, and Stanley Greenspan and Stuart Shanker. Although I shall be speculating on the ontology of quantum mechanics and in other research areas relating to consciousness, my guiding principle will be not to posit anything which is contradicted by empirical findings. Given that theories can never be directly tested, but only individual hypotheses extracted from them, this strategy can (I would submit) be accepted as a legitimate step in the scientific process.

Chapter Four: The 'Cart-Ton' View of Qualia - Denial and Dismissal

Cart-Ton world has always had (and will always have) a problem with qualia. This is because qualia (as we experience them on a daily basis) have no place in, and are indeed ruled out by Cart-Ton world's ontology. This ontology essentially consists of Descartes' Res Extensa, but (decisively) with Descartes' Res Cogitans ***removed***! Descartes defined qualia as 'mental' (meaning, in his terminology, non-material) and as existing outside of space and time. He located them in his realm of 'thinking substance', Res Cogitans. When classical physics embraced physical closure and, consequently, rejected substance dualism, this realm of 'thinking substance' was banished from the ontology of modern science, leaving nothing but the mechanistic, materialist and reductive metaphysics of Res Extensa. Worse, this development coincided with a turn towards extreme empiricism in philosophical and scientific culture, making the construction of ontologies unfashionable. This resulted in the Res Extensa 'rump' of Cartesian ontology being all that was left to guide speculation, within philosophical and scientific culture, as to the ultimate nature of reality. Denials to the contrary, such speculation (even if subconscious) is probably indispensable to human thought and the need for it became acute following the bizarre and incomprehensible findings of quantum mechanics. Cart-Ton world, however, has resolutely turned its back on all such efforts at ontological innovation, thus perpetuating its problem with qualia - the most important manifestation of consciousness.

Cart-Ton world's response to this dilemma was to claim that rather than being subjective phenomena, qualia are somehow ***constructed*** out of the movements of passive-objective matter, by, for example, neural circuitry or simply mechanical information processing. As 'constructions' qualia are seen, not as unitary and immediate, as we generally feel them to be in everyday life, but as having components, which need to be assembled before a quale is ready for perception.

As we shall see, a typical Cart-Tonist argument for this component nature of qualia is to appeal to connoisseurship, in wine for example: what the naive palate initially experiences as a single unified taste can, with experience and training, be 'deconstructed' into numerous component flavours. In addition to theoretically deconstructing qualia, Cart-Ton world has formulated two distinct accounts to explain away the stubborn popular belief that we do, in fact, experience subjective qualia during our waking hours. The first can be labelled the 'denial and delusion' account. The American philosopher, Daniel Dennett, is its principle spokesperson: he explains away the phenomena we call qualia by appealing to a whole range of psychological and neurological processes. For example, he suggests that rather than being 'in our heads or our minds', qualia are actually and always 'stored' in the external world. The second Cart-Tonist, qualia-denying account is the Functionalist equation of qualia with functions. As the British psychologist, Jeffrey Gray, explains below, this results in the 'meaning' of seeing red or green being reduced to the question as to whether a person can respond to a traffic light in a functionally correct way. If the answer is 'yes' then we know that they can see red and green; to ask anything further is, for Functionalists, a pointless activity. We, who are the victims of Folk Psychological delusions about qualia, may never be convinced by these arguments, but for decades they have enabled Cart-Tonists to slumber peacefully through the dilemma of qualia.

Breaking the 'Spell' of Qualia

Daniel Dennett denies that qualia exist. He attempts to reduce everything in the mind to beliefs and dispositions, in the Behaviourist sense. He argues that when you report that you are experiencing red, this is, in fact, only a belief, produced by the same processes that produce all your other mental states: in other words, qualia are the same as propositional states and all mental states consist of nothing but information. For Dennett, your belief that you're having a sensation, such as seeing red, emerges from 'micro-mental' processes, such as; recognition, discrimination, identification and categorisation. These micro processes are simply acts of mechanistic, logical reasoning, carried out in various different parts of the brain, in just the same way as would a computer running through its algorithms. If this can be called thinking, then parts of the brain can 'think', but parts of the brain cannot perceive: according to Dennett, only a whole and complete person can perceive anything.

To reveal these realities, Dennett claims to be able to break the 'spell' and dissipate the 'magic' of qualia. Qualia, he says, have two important features in common: "On the one hand, they are our most intimate acquaintances; there is nothing we could know any better than the items of our personal phenomenologies - or so it seems. On the other hand, they are defiantly inaccessible to materialistic science; nothing could be less like an electron, or a molecule, or a neurone, than the way the sunset looks to me now - or so it seems." Dennett adds that philosophers have found qualia puzzling in two ways: firstly, the special intimacy of qualia: how and why do we have privileged access to directly apprehend these items? The second puzzle concerns qualia's unusual intrinsic qualities: How could anything composed of material particles provide so much pleasure and entertainment, or matter so much to us the way that for example pain does?[111] The problem with philosophers (and everyone else who's thought about it) says Dennett, is that they start with their strongest and clearest intuitions about their own minds. But, according to Dennett, these intuitions form a; "… mutually self-supporting closed circle of doctrines"[112], which imprisons the imagination. These previous philosophers have lacked the 'whole alternative vision' necessary to reveal the paradoxes inherent in this closed circle of ideas. Trusting too much to their still-strong intuitions, they have been dragged back into the paradoxical prison. This is why the literature on qualia gets more and more convoluted, instead of resolving itself in agreement.

Dennett's Anti-Qualia Tools

Dennett, however, claims to have just such an alternative vision; his 'Multiple Drafts' model. Using this model, he claims, the problems of qualia can be dissolved. In his Multiple Drafts model, there are a variety of sensory inputs from a given event and also a variety of interpretations of these inputs. The sensory inputs arrive in the brain and are

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[111] Dennett, Daniel,'Consciousness Explained', 1991, Boston, MA: Little Brown, p.65

[112] Ibid, p.370

interpreted at different times, so a given event can give rise to a succession of discriminations, like the multiple drafts of a story that's being written and rewritten. As soon as each discrimination has been made, it's available to influence behaviour; it doesn't have to wait to 'enter' consciousness. As in several other theories, the Multiple Drafts model considers that conscious experience takes time to occur. So percepts, or qualia, do not instantaneously arise in the mind in their full richness. What's unique to Dennett's theory is his denial of any clear and unambiguous boundary separating conscious experiences from all other processing. According to him, consciousness is to be found in the actions and flows of information from place to place, rather than some singular view containing our experience. There is no central experiencer who confers a durable stamp of approval on any particular draft.

Dennett claims that different parts of the neural processing system assert more or less control at different times. To reach consciousness, a process must have enough influence to affect what the mouth will say and what the body will do. There's no 'disembodied self' deciding which inputs are 'edited' into our current drafts. This is instead decided by the self-organising functioning of the network, and at the same level as the circuitry that conveys information bottom-up. The conscious self, Dennett claims, exists only as an abstraction visible at the level of the 'intentional stance'. Consciousness exists, but not independently of behaviour and behavioural dispositions, which can be studied via what Dennett calls 'Heterophenomenology'. Heterophenomenology (which means literally the phenomenology of another, not oneself) is Dennett's attempt to describe an explicitly third-person, scientific approach to the study of consciousness and other mental phenomena. It consists of applying the scientific method with an anthropological bent, combining the subject's self-reports with all other available evidence to determine their mental state. The goal is to discover how the subject sees the world, without taking the accuracy of the subject's view for granted. Heterophenomenology is an alternative to traditional Cartesian phenomenology, which Dennett calls 'lone-wolf Autophenomenology' to emphasise the fact that it accepts the subject's self-reports as being authoritative. In contrast, Heterophenomenology considers subjects' reports as authoritative only as to how things seem to them. Heterophenomenology requires the researcher to listen to the subjects and take what they say seriously, but to also look at all other evidence, including the subject's bodily responses and environment, the findings of any neurological or psychological studies, the researcher's memories of their own experiences, and any other scientific data that might help to interpret what the subject has reported. Dennett notes that; "Heterophenomenology is nothing new; it is nothing other than the method that has been used by psycho-physicists, cognitive psychologists, clinical neuropsychologists, and just about everybody who has ever purported to study human consciousness in a serious, scientific way."[113] The key role of Heterophenomenology in Dennett's philosophy of consciousness is that it defines all that can or needs to be known about the mind. For any phenomenological question 'why do I experience X?' There is a corresponding heterophenomenological question; 'why does the subject say "I experience X?"'

[113] Ibid, p.22

Armed with Heterophenomenology and the Multiple Drafts model, Dennett is now ready to tackle the problem of qualia. He proposes to use 'qualia' as the name for all the; "… things in the beholder (or properties of the beholder) that have been supposed to provide a safe home for the colours and the rest of the properties that have been banished from the 'external' world by the triumphs of physics." He reiterates that he denies the existence of qualia, but, on the other hand, as he emphatically states; "I agree wholeheartedly that there seem to be qualia."[114] He quotes Marvin Minsky: "We have the sense of actuality when every question asked of our visual systems is answered so swiftly that it seems as though those answers were already there."[115] But, Dennett cautions; "… the absence of representation is not the same as the representation of absence. And the representation of presence is not the same as the presence of representation. But this is hard to believe. Our conviction that we are somehow directly acquainted with special properties or features in our experience is one of the most powerful intuitions confronting anyone trying to develop a good theory of consciousness."[116]

Dennett fixes on colour as a good example to begin his deconstruction of qualia. (Traditionally, whenever philosophers discuss the concept of qualia seeing a colour is generally chosen as an illustration. As we shall see later, this has definite drawbacks, since such visual perception is passive and purely 'mental' in the sense that it doesn't affect the body's sensory systems in any other way.) Dennett says that

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[114] Ibid, p.372

[115] Ibid, p.257

[116] Ibid, p.359

modern science - so goes the standard story - has removed the colour from the physical world, replacing it with colourless electromagnetic radiation of various wavelengths, bouncing off surfaces that variably reflect and absorb that radiation. It may look as if the colour is out there, but it isn't. Dennett quotes an 'excellent introductory book on the brain' by Ornstein and Thompson: "'Colour' as such does not exist in the world; it exists only in the eye and brain of the beholder. Objects reflect many different wave-lengths of light, but these light waves themselves have no colour."[117] But, if there is; "… no inner figment that could be coloured in some special, subjective, in-the-mind, phenomenal sense, colours seem to disappear altogether. Something has to be the colours we know and love, the colours we mix and match. Where oh where can they be?"[118]

One attempt to answer this question was provided in the seventeenth century, by the philosopher John Locke (and before him, by the scientist Robert Boyle): they called properties as such colours, aromas, tastes, and sounds 'secondary qualities'. These were distinguished from 'primary qualities': size, shape, motion, number, and solidity. Secondary qualities were regarded as not in themselves 'things-in-the-mind', but were rather the result of the power of things in the world (thanks to their particular primary qualities) to produce or provoke certain things in the minds of normal observers. Locke's conception of secondary qualities has become part of the standard layperson's interpreta-

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[117] Ornstein, Robert E. and Thompson, Richard F., 'The Amazing Brain', 1984, Houghton Mifflin Harcourt, p.55

[118] Dennett, Daniel,'Consciousness Explained', 1991, Boston, MA: Little Brown, p.370/371

tion of science, though it is far from unambiguous: “The secondary quality red, for instance, was for Locke the dispositional property or power of certain surfaces of physical objects, thanks to their microscopic textural features, to produce in us the idea of red whenever light was reflected off those surfaces into our eyes. The power in the external object is clear enough, it seems, but what kind of a thing is an idea of red? ls it, like a beautiful gown of blue, coloured - in some sense? Or is it, like a beautiful discussion of purple, just about a colour, without itself being coloured at all? …, but how could an idea be just about a colour (e.g. the colour red) if nothing anywhere is red?”[119] So what are colours?

Colours are Properties of Objects

Thomas Nagel, writes that; “The subjective features of conscious mental processes - as opposed to their physical causes and effects - cannot be captured by the purified form of thought suitable for dealing with the physical world that underlies the appearances.”[120] So, from this point of view, there seem to be qualia, but because science claims to have shown us that the colours can’t be out there, they must be ‘in the mind’. However, as Dennett says, this reasoning is confused: “What science has actually shown us is just that the light-reflecting properties of objects cause creatures to go into various discriminative states, scattered about in their brains, and underlying a host of innate dispositions and learned habits of varying complexity.” These discriminative states in brains, Dennett insists, do actually have ‘primary’ properties: brain states (as we know) are, after all,

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[119] Ibid, p.371

[120] Nagel, Thomas, ‘View from Nowhere’, 1986, Oxford U.P., p.15

physical, mechanical phenomena, and it is they (according to Dennett) which produce 'secondary' properties, which (again according to Dennett) are merely 'dispositions to behaviour', which we mistakenly call qualia: "In human creatures with language, for instance, these discriminative states often eventually dispose the creatures to express verbal judgments alluding to the 'colour' of various things." Such statements claim that colours are simply the reflective properties of the surfaces of objects. And, Dennett affirms, that is just what they are in fact. But, (he adds) what discriminative states ***don't*** have are; "… special 'intrinsic' properties, the subjective, private, ineffable, properties that constitute the way things look to us (sound to us, smell to us, etc.)." Dennett then sets about removing; "… the motivation for believing in these properties in the first place, by finding alternative explanations for the phenomena that seem to demand them. Then the systematic flaws in the attempted proofs will be readily visible."[121]

We compare, Dennett says, the colours of things in the world by putting them side by side and looking at them, to see what judgment we reach, but we can also compare the colours of things by just recalling or imagining them, 'in our minds'. We are able to make such comparisons 'in our mind's eyes', and when we do, we somehow make something happen in us that retrieves information from memory and permits us to compare, in conscious experience, the colours of the standard objects as we remember them. "When we do make these comparisons 'in our mind's eyes', what happens, according to my view? Something strictly analogous to what would happen in a machine - a

[121] Dennett, Daniel,'Consciousness Explained', 1991, Boston, MA: Little Brown, p.372/373

robot - that could also make such comparisons." Here Dennett claims that there is no qualitative difference between the robot's performance of such a task and our own. "The discriminative states of the robot have content in just the same way, and for just the same reasons, as the discriminative brain states I have put in place of Locke's ideas." Dennett is clear that robots don't have any qualia, so, by analogy, he's claiming that we don't have qualia either, or, at least his argument entails that we don't need qualia to discriminate between colours. Dennett also extends the robot vision analogy to taste and imagines a wine-tasting machine. He concludes that: "The sort of difference that people imagine there to be between any machine and any human experiencer … is one I am firmly denying: There is no such sort of difference. There just seems to be."[122]

Minsky on Qualia

Dennett's dismissal of any 'mental' aspect to qualia is affirmed by another prominent Cart-Ton world spokesperson, Marvin Minsky. Minsky also dismisses qualia as simply reductive phenomena, which can and should be deconstructed to non-subjective processes: he says; "Many philosophers have maintained that our sensations have certain 'basic' qualities that cannot be reduced to anything else. For example, they claim that each colour like red and each flavour like sweet has its own unique 'quality' that cannot be described in terms of other things. Of course, it is not hard to make a physical instrument to measure the amount of red light that comes from the surface of some particular apple, or to measure the weight of the sugar contained in the flesh of any particular peach. However (those philosophers

[122] Ibid, p.373-375

claim), such measurements tell you nothing about the experience of seeing a redness or tasting a sweetness. And then (some philosophers go on to claim), if those 'subjective experiences' cannot be detected by physical instruments, they must exist in a separate mental world, which would mean that we cannot explain how minds work in terms of machinery inside our brains." Minsky, however, claims that there is a serious flaw in that argument. He insists that if you say, 'This apple looks red to me', it must be because some 'physical instrument' in your brain must have recognised the activity involved with that experience and then caused your vocal tract to behave accordingly. He casually adds that; "Our brain scientists have not yet located such circuits inside our brains - but it surely is only a matter of time before we find clusters of brain cells that recognise such combinations of conditions."[123]

We already know, Minsky claims, that our perceptions are not generated simply and directly: he takes the example of a ray of light striking the back of your eye; "… a signal will flow from each retinal cell that this excites - and those signals will then affect other resources inside your brain - and some of those resources will then construct descriptions and reports that influence yet other parts of your brain. At the same time, other streams of information will also affect those descriptions so that, when you try to describe your 'experience', you'll be telling a story based on sixth-hand reports." Minsky concludes that the idea that sensations are 'basic' may have been useful in older times, but today we need to recognise the extent to which our perceptions are affected by wants and expectations: Minsky rightly points

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[123] Minsky, Marvin, 'The Emotion Machine', 2006, New York: Simon and Schuster, p.332

out that; “… more signals flow downward to the brain’s sensory cortex than in the opposite direction, presumably to help us see what we expect to see - by priming us with an appropriate ‘stimulus’.” Once we appreciate the complexity of our perceptual machinery, Minksy argues, we can then understand why we find feelings so hard to describe; “… what would a person need to be able to express their ‘subjective feelings’? Perhaps it is no accident that one meaning of the word express is ‘to squeeze’ - for when you try to ‘express yourself’, your language resources will have to pick and choose among the descriptions your other resources construct - and then attempt to squeeze a few of these through your tiny channels of phrases and gestures. Of course, one can never describe one’s whole state of mind, because one can focus on just a few things at a time, and because one's state is constantly changing - so, usually, you will simply settle for expressing those aspects whose signals seem most urgent at each moment. At one moment you're thinking about your foot; then some other sensation attracts your attention; perhaps you notice a change in some sound, or turn your head toward something in motion - and then you notice that you are noticing these. So you can never be ‘wholly aware of yourself’ because ‘you’ are a river of rivalling interests, always enmeshed in cascades of attempts to describe its ever-changing eddies and tides.”[124] So, again, according to Cart-Ton world, qualia are not subjective, mental phenomena, it’s just that complex physiochemical processes in our brains and nervous systems delude us into experiencing them as such.

[124] Minsky, Marvin, ‘The Emotion Machine’, 2006, New York: Simon & Schuster, p.332/333

Minsky, on the other hand, suggests that 'experience' and perhaps even feelings and sensations are simply the result of a mass of reminiscences and associations: he says; "if I were to ask what the colour red means to you, you might first say that it makes you think of a rose, which then reminds you of being in love - and then you'll find yourself relating this to other kinds of sensations and feelings; red might also remind you of blood, and make you feel some sense of dread or fear. Similarly, green might make one think about pastoral scenes and blue might suggest the sky or the sea. Thus, a seemingly simple stimulus can lead to many other kinds of mental events, such as these other feelings and reminiscences." So, why then do our experiences seem so mysterious to us? Minsky argues that if our higher cognitive levels had access to our lower ones, then we might be able to replace statements like 'I am experiencing the sensation of seeing something red' by more detailed descriptions of the processing that sensations involve, such as: 'My resources have classified certain stimuli, and then made some representations of my situation, and then some of my critics changed certain plans I had made, and altered some ways in which I was perceiving things, and this led to the following sorts of cascades, and so forth.' Minsky claims that: "If we were able to make such descriptions, the mystery of 'subjective experience' should disappear, because then we would have enough ingredients to answer our questions about those processes. In other words, it seems to me, the apparent 'directness of experience' is an illusion that comes because our higher mental levels have such limited access to the systems we use to recognise, represent, and react to our external and internal conditions."

For example, how do you know when you're feeling a pain? Common sense might deny that this question is meaningful, but some leading thinkers would disagree: the philosopher Gilbert Ryle (quoted by Minsky) claimed that: "A walker engaged in a heated dispute may be unconscious of the sensations in his blistered heel, …" Can you be mistaken about feeling pain? Many people would deny this on the grounds that pain is the same thing as feeling pain, but again, Ryle disagrees; he says: "The fact that a person takes heed of his organic sensations does not entail that he is exempt from error about them. He can make mistakes about their causes and he can make mistakes about their locations. Furthermore, he can make mistakes about whether they are real or fancied, as hypochondriacs do." Minsky comments that: "We can make such mistakes because what we 'perceive' does not come directly from physical sensors but from our higher-level processes." He illustrates this by claiming that both pain and sleep can develop slowly without you, at first, knowing what's happening. Indeed, he claims that other people might notice these developments before you do. Minsky concludes; "One might even see this as evidence that people have no special ways to recognise their own mental states, but do this with the same methods they use to recognise how other persons feel."[125]

Malik suggests that such a position may be an ultimate product of Cartesianism's 'phantom limb': "Descartes suggested that all we really know is our own mind, and everything else is a hazy blur. The argument I have presented so far suggests the opposite: if you know only your own mind, then you don't know even your own mind. A

[125] Ibid, p.328-330

Cartesian mind is a black, silent existence because a Cartesian brain cannot be conscious of its own processes."[126] David Rose also criticises the intuitive model in which nerve impulses arrive at a particular time and place to give us an immediate instance of subjective illumination. This ignores the enormously complicated anatomy and physiology of the brain, which take time to generate full awareness. Consequently, he says; "Bottom-up processing produces little awareness on its own or only a basic kind of awareness and the full ramifications of a new input may take a long time to manifest themselves. (When do you understand a sentence? How often have you suddenly got the point of a joke hours after you heard it?)." So, there's a hierarchy in consciousness; qualia are at the 'primitive', basic level, while complex, cognitive constructs are at the top; in other words, experiences/feelings at the bottom and propositional knowledge at the top.[127]

The Concept of the Inverted Spectrum

This 'Cart-Tonist' message is also behind Douglas Hofstadter's elaborate critique of what is possibly the earliest thought experiment in the history of consciousness studies. It's known as the 'inverted spectrum'. It postulates the possibility that two people could share their colour vocabulary and colour discriminations, whereas, in reality, the colours they see (their colour qualia) are systematically different from each other. And, of course, if colour qualia can be inverted, then so can other and maybe all qualia. (Interestingly, many people report thinking up this notion them-

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[126] Malik, Kenan, 'Man, Beast and Zombie', 2000, W&N, p.320-225

[127] Rose, David, 'Consciousness; Philosophical, Psychological and Neural Theories', 2006, Oxford U.P., p.358

selves in childhood.) An early promoter of the inverted spectrum was the Seventeenth Century philosopher, John Locke. He invited us to imagine that we wake up one morning to find that, for some unknown reason, all the colours in the world have been inverted. Furthermore, we discover that no physical changes have occurred in our brains or bodies that would explain this phenomenon. Traditionally, if you find the inverted spectrum plausible, then you have to accept; a) that qualia exist and b) that qualia are non-physical entities.

However, some philosophers find it absurd that an 'armchair argument' can prove something to exist. Also, the detailed argument involves many assumptions about conceivability and possibility, which are open to criticism. The idea that an inverted spectrum would be undetectable is also open to criticism on grounds of scientific principle. There's also some practical evidence against the inverted spectrum: for example, there are more perceptually distinguishable shades between red and blue than there are between green and yellow, which would make red-green inversion behaviourally detectable. Dark yellow is brown (qualitatively different from yellow), whereas dark blue is blue. Similarly, desaturated bluish-red is pink (qualitatively different from saturated bluish-red), whereas desaturated greenish-yellow is similar to saturated greenish-yellow. There are also subjective counter arguments; many cultures associate certain colours with certain sensations or moods, for example, red is a 'warm' colour, whereas blue is 'cool'. The anti-inversion argument is that there's something inherent in the physical basis of these colours that lead to these associations. Finally, identity theorists would argue that it's impossible for a given brain state to produce anything other than a given quale in our universe, again, making the inverted spectrum an impossibility.

Hofstadter's Sonic Spectrum

In his book 'I Am A Strange Loop' (2007), Hofstadter argues that the inverted spectrum argument entails a form of solipsism in which people can have no idea about what goes on in the minds of others. Hofstadter goes on to present several arguments against the inverted spectrum, such as firstly, an inverted 'sonic spectrum', in which low musical notes sound like 'high' ones and vice versa (which he claims is impossible because low sounds can be felt physically as vibrations), secondly, an 'inverted political spectrum', in which one person's concept of liberty is identical to another's concept of imprisonment, and finally Hofstadter pushes the 'inverted argument' to absurdity by asking why complex qualia, such as riding a roller coaster or opening presents aren't randomly reversed, such that everyone would perceive the world in radically different, unknowable ways. Hofstadter starts his onslaught on the inverted spectrum by imagining inverting, not the visual but the Sonic Spectrum: in other words, what if when the high keys on the piano are struck, you hear deep, low notes, and when the low keys are struck, you hear high notes. He then says; "Now this scenario strikes me as much less plausible than the original one involving colours." But why would there be any fundamental difference between an auditory inverted spectrum and a visual one? Hofstadter points out that low notes; "… as they sink ever lower, glide imperceptibly into bodily shakings as opposed to being pitches in a spectrum whereas high notes, as they grow higher, do not do so. This establishes a simple and obvious objective difference between the two ends of the audible spectrum." For this reason, Hofstadter says, it is inconceivable that anyone could have an inverted audible spectrum experience. Put more bluntly, Hofstadter's claim is that it's physically impossible for anyone to experience what you or I would call a very high sound when the lowest piano key is struck: "After all, there are no objective bodily shakings produced by a high note!" Hofstadter then asks: "If the idea of a sonic inverted spectrum is incoherent, then why should the visual inverted spectrum seem any more plausible? The two ends of the visible range of the electromagnetic spectrum are just as physically different from each other as are the two ends of the audible sonic spectrum. One end has light of lower frequencies, which makes certain pigments absorb it, while the other end has light of higher frequencies, which makes other pigments absorb it. Unlike rumbles, though, those cell-borne pigments are just intellectual abstractions to us, and this gives some philosophers the impression that our experiences of redness and blueness are totally disconnected from physics." In this view of colour, Hofstadter points out, colour experiences amount to no more than a form of personal invention: consequently, two different people could simply 'invent' different colour experiences without ever being aware that their personal experiences of colour were different.[128]

Hofstadter says that this hypothetical notion makes our inner experiences of colour and sound like a set of floating pre-existent pure abstractions that are not in any way related to physics; "… these inner experiences are arbitrarily mappable onto outside phenomena. As we grow up, the rainbow colours get mapped onto the spectrum of prefab-

[128] Hofstadter, Douglas, 'I am a Strange Loop', 2007, Basic Books, p.334/335

ricated feelings with which our brains all come equipped 'from the factory', but this mapping is not mediated by-neural wiring; after all, neural wiring is observable from a detached third-person perspective, such as that of a neurosurgeon, so that rules it out."[129] David Rose reinforces Hofstadter's position by claiming that colours themselves have independent, external characteristics which make the inverted spectrum unlikely: he points out that it's well known that red/green and blue/yellow oppose one another. We can also say that pink is in-between red and white, and orange is in-between red and yellow. These fixed colour-relationships always occur in people who have physiologically normal colour vision. He adds; "There is a structure to our colour experiences …Some pairs of colours are more similar than others; for instance, orange is more similar to red than it is to blue. Experimentally one can measure the structure of people's colour space by mapping out how similar the various colours are to one another." From all this, Rose concludes that; "This complete integrated structure means that individual bits of it cannot be isolated - you cannot swap red and green around without causing some disruption to the map or web of relationships between the other colours."[130]

Hofstadter then asks why is it that those who postulate the inverted spectrum always do so only for experiences that lie along a one-dimensional numerical scale? "It seems like a great paucity of imagination to limit oneself to swapping red and blue. If you think it's coherent to say to someone

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[129] Ibid, p.336

[130] Rose, David, 'Consciousness; Philosophical, Psychological and Neural Theories', 2006, Oxford U.P., p.49

else, ‘Maybe your private inner experience of red is the same as my private inner experience of blue’, then why would it not be just as coherent to say, ‘Maybe your private inner experience of looking at a red rose is the same as my private inner experience of looking at a blue violet’?” Hofstadter then introduces some examples of inverted experiences that are not restricted to a one-dimensional numerical scale: he says, “What is sacrosanct about the idea of shuffling colours inside a spectrum? Why not shuffle all sorts of experiences arbitrarily? Maybe your private inner experience of redness is the same as my private inner experience of hearing very low notes on a piano. Or maybe your private inner experience of going to a baseball game is the same as my private inner experience of going to a football game. Then again, maybe your private inner experience of going to a baseball game is the same as my private inner experience of going on a roller-coaster ride. Or maybe it’s the same as my private inner experience of wrapping Christmas presents.” Hofstadter summarises his rejection of all forms of ‘experience inversion’ as follows: “The inverted-spectrum riddle depends on the idea that we are all born with a range of certain ‘pure experiences’ that have no physical basis but that can get attached, as we grow, to certain external stimuli, and thus specific experiences and specific stimuli get married and from then on they are intimately tied together for a lifetime. But these ‘pure experiences’ are supposedly not physical states of the brain. They are, rather, subjective feelings that one simply ‘has’, without there being any physical explanation for them. Your brain state and mine could look as identical as anyone could ever imagine (using ultra-fine-grained brain-scanning devices), but whereas I would be feeling blueness, you would be feeling redness. The inverted-spectrum fairy tale is a feeble mixture of bravado and timidity. While it boldly denies the physical world's relevance to what we feel inside, it meekly limits itself to a one-dimensional spectrum, and to the electromagnetic one, to boot. The sonic spectrum is too tied to objective physical events like shaking and vibrating for us to imagine it as being inverted, and if one tries to carry the idea beyond the realm of one-dimensional spectra, it becomes far too absurd to give any credence to."[131]

Why are there Colours?

Having established (to his satisfaction) that robots can discriminate colours as effectively as humans, Dennett goes on to ask why colours exist. He starts by pointing out that their existence in the real world is not as simple as often assumed; "… the appealing idea that each colour can be associated with a unique wavelength of light, and hence that the property of being red is simply the property of reflecting all the red-wavelength light and absorbing all the other wavelengths. But this has been known for quite some time to be false. Surfaces with different fundamental reflective properties can be seen as the same colour, and the same surface under different conditions of lighting can be seen as different colours. The wavelengths of the light entering the eye are only indirectly related to the colours we see objects to be." There is no simple property of surfaces such that all, and only the surfaces with that property, are red (in Locke's secondary quality sense). This can be seen as negative, since it suggests that our perceptual grip on the world is much worse than we believe - that we are living in a dream world, or are victims of mass delusion: "Our col-

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[131] Hofstadter, Douglas, 'I am a Strange Loop', 2007, Basic Books, p.337/338

our vision does not give us access to simple properties of objects, even though it seems to do so." Why should this be the case? Why do we have this 'delusion' of seeing colours?

Dennett points out that we tend to think of colour-coding as the clever modern invention, but this misses the fact that 'natural' colour vision co-evolved from the outset with colours: for example, the colour vision of insects co-evolved with the colours of the plants they pollinated: "Without the colour-coding of the flowers, the colour vision of the insects would not have evolved, and vice versa." So, although our colour vision system is very complex physically and neurophysiologically, its operations are guided by a very simple function, namely the ability to identify ripe fruit. Dennett argues that it was this evolutionary need that lead to the creation of colour in the world: "Once there were creatures who could distinguish red from green berries, they could also distinguish red rubies from green emeralds, but this was just a coincidental bonus. The fact that there is a difference in colour between rubies and emeralds can thus be considered to be a derived colour phenomenon. Why is the sky blue? Because apples are red and grapes are purple, not the other way around." It's a mistake to believe that colour came first, which Mother Nature used to colour-code things. Rather first there were various reflective properties of surfaces, reactive properties of photo pigments, etc. Mother Nature, then; "… developed out of these raw materials efficient, mutually adjusted 'colour'-coding/'colour'-vision systems, and among the properties that settled out of that design process are the properties we normal human beings call colours. If the blue of cobalt and the blue of a butterfly's wing happened to match (in normal human beings' vision) this is just a coincidence, a negligible side effect of the processes that brought colour vision into existence."[132]

Dennett's idea that colour came into existence via the evolutionary needs of fruit-eating species, entails a thoroughly functionalist account of qualia: he says; "There are reasons why we shun the odours of certain things and seek out others, why we prefer certain colours to others, why some sounds bother us more, or soothe us more. They may not always be our reasons, but rather the reasons of distant ancestors, leaving their fossil traces in the built-in biases that innately shape our quality spaces." Dennett now comes to the decisive point of his anti-qualia argument: a) qualia are complex and hard to describe, but that doesn't make them 'magical' in the sense that many commentators have claimed, and b) qualia are more about function than experience; evolution has used the extremely complex features of natural objects to produce complex, ineffable feelings (otherwise known as qualia) in creatures. These feelings are then employed as discrimination devices, which provide vital information, helping to secure the survival of the creature. So, in conclusion, qualia are nothing but discrimination devices, which (like the rest of our biological heritage) have been designed and developed by evolutionary selection.[133]

Functionalism and Qualia

[132] Dennett, Daniel,'Consciousness Explained', 1991, Boston, MA: Little, Brown, p.376-378

[133] Ibid, p.381-383

As per Dennett's position above, Functionalism's core idea is that mental states (beliefs, desires, being in pain and other qualia) are constituted solely by their functional role: in other words, mental states act as or simply are causal relations between other mental states, sensory inputs, and behavioural outputs. Functionalism focuses on processes at the level between physical operations in the brain and behavioural output. Since mental states are identified only by their functional role, they are said to be potentially realisable in a variety of systems, composed of any sorts of material. So, for example, according to functionalism it should be possible for computers to have mental states, including qualia, as long as the system performs the appropriate functions. While computers are physical devices with electronic substrate that perform computations on inputs to give outputs, so brains are physical devices with neural substrate that perform computations on inputs which produce behaviours. Thus, in Functionalism a mental state can be compared to a valve in engineering; a valve can be made of plastic or metal or whatever material, as long as it performs its intended function of controlling the flow of liquid through a tube by blocking and unblocking its pathway.

So, according to Functionalism, qualia are nothing but the functions (input-mechanism-output) by which they are supported. Functionalism may be willing to take into account the detailed circuitry of the brain that mediates between input and output as part of the full description of a function, but it does so only as circuitry: "The tissue out of which brain circuits are made (neurones, membranes, synapses and so on) and the means by which the circuits operate (passage of impulses along axons, release of neurotransmitter into the synapse, etc.) are regarded within Functionalism as irrelevant. In principle, the functionalist holds, one could mimic the circuitry with any materials to hand, and the result (in terms of either conscious or unconscious processing) would be the same - same functions, same processes: if the relevant brain process attains consciousness, so would the same function no matter what material was used to carry it out." Gray concludes that functionalism makes the two following inferences about qualia: 1) for any discriminable difference between qualia, there must be an equivalent discriminable difference in function, and 2) for any discriminable functional difference, there must be a discriminable difference between qualia. Gray points out that there are, of course, many exceptions to this second, complementary inference: "There are many forms of behaviour which are not accompanied by qualia at all. So, for example, the pupils of one's eyes constrict if illumination increases and dilate if it decreases; but one is not normally aware of either of these changes in pupil size. However, in the case of a behavioural domain which is normally accompanied by qualia, whenever functionalism draws the primary inference, it should also draw the complementary one."[134]

Gray then applies these inferences to seeing red and green; "… if someone claims to have different red and green experiences, then there must be different functions (input-mechanism-output) to support this claim. The complementary inference would be that (within the domain of colour vision), if someone manifests different functions, then there must be different qualia accompanying them. The two inferences together constitute a claim for identity between

[134] Gray, Jeffrey, 'Consciousness: Creeping up on the Hard Problem', 2004, Oxford U.P., p.132

qualia and functions within the domain of colour vision. Functionalism at its strongest generalises this identity claim across all qualia within each domain and all domains of conscious experience.” Gray points out that the crux of the ‘Hard Problem’ of consciousness lies in the phenomena of perception qualia. As an example, he considers the question: “How should one explain the difference between two subjective experiences of colour, say of red and green?” In answering this question, functionalism essentially ignores qualia. Instead it focuses on a; “… repertoire of responses by which the experiencing individual demonstrates, behaviourally, the capacity to discriminate between red and green. This repertoire would include, e.g. pointing to a red (green) colour when requested to do so, using the word ‘red’ (‘green’) appropriately in relation to the colours red and green, stopping (going) at red (green) traffic lights, stating that a lime is green and a tomato, red, and so on.” If such a functional account is fully provided, then; “… according to Functionalism, there is no further answer that can be given to the original question: what is the difference between the subjective experiences (the qualia) of red and green? To continue asking this question in the face of a complete functionalist account would, so the doctrine holds, be a meaningless activity.”[135]

A consequence of this Functionalist account of qualia is that their evolution occurs only parasitically by linkage to functions. Therefore, one would not expect to find qualia which adversely compete with the functions to which they are linked. Gray suggests that there are two different flavours of functionalism: “In one flavour, qualia are reduced

[135] Ibid, p.131-133

to so little beyond the functions with which they are linked as to be virtually eliminated. This is more or less Dan Dennett's position in his book 'Consciousness Explained'. In the other, the separate existence of qualia is explicitly acknowledged, but all empirical data are treated as requiring explanation in terms only of the functions with which they are linked." So, many theorists argue that qualia are epiphenomena: they are caused by functions and their underlying mechanisms, but have no causal effects of their own. In either flavour, qualia are left with no substantive properties of their own. Given this very tight linkage between processes and functions, with qualia as epiphenomena of both, Functionalists, therefore, would not expect to find any qualia which are either irrelevant to, or worse still, might interfere with, one or more behavioural functions. As above Gray explains that a Functionalist account of the ability to discriminate the difference between red and green depends entirely on evidence from outward behaviour: "I shall describe ... function as taking the form 'input-mechanism-output'. If a full functional account is given, then, according to Functionalism there is no further answer." In other words, even asking the question; 'what is the difference between the subjective experiences (the qualia) of red and green?' is, according to Functionalism, pointless: qualia just ***are*** the functions (input-mechanism-output) with which they are associated. Gray summarises this key Functionalist contention as follows: "Firstly, for any discriminable difference between qualia, there must be an equivalent discriminable, difference in function. There is also a 'complementary' inference: second, for any discriminable functional difference, there must be a discriminable difference between qualia."[136] (In chapter seven, we'll see that Gray provides several examples of phenomena in which these Functionalist principles are violated.)

Qualia from the World's Storehouse

So, Functionalism diminishes qualia to nothing but functions. Dennett wants to go a stage further by claiming that much qualic information is stored not in the brain but in the world. He uses the example of seeing a wallpaper composed of hundreds of high-resolution images of Marilyn Monroe: "The hundreds of Marilyn's in the wallpaper seem to be present in your experience, seem to be in your mind, not just on the wall. But since, as we know, your gaze can shift in a fraction of a second to draw information from any part of your visual environment, why should your brain bother importing all those Marilyn's in the first place? Why not just let the world store them, at no cost, until they're needed?" Dennett then compares the brain to a library. As he says, some research libraries are gigantic storehouses, housing millions of books, readily accessible from their shelves. Other libraries contain fewer books, but have quick and effective access to a vast range of 'external' books, buying or borrowing whatever books the library's users demand, for example via an interlibrary loan system. With modern technology, Dennett suggests, access via the loan system could even be quicker than retrieval from the library's stores, such that loanable books could be described as 'virtually present' in the library. Dennett then asks; "… how could we, as users of our own brain-libraries, know which of the items we retrieve were there all along, and which our brains sent out for, in swift information-gather-

136 Ibid, p.132-133

ing forays into the external world?" Introspection by itself, he insists, simply can't tell, though that doesn't stop people from thinking that it can. Dennett calls this the 'Introspective Trap'[137] and Minsky calls it the Immanence Illusion: "Whenever you can answer a question without a noticeable delay, it seems as though that answer was already active in your mind."[138] The interlibrary loan system, however, is an inadequate analogy, given that the human brain doesn't just look for information about whatever external topics happen to interest you; "… it also has literally millions of sentries almost continuously gazing at a portion of the external world, ready to sound the alarm and draw your attention to anything novel and relevant happening in the world."[139]

Dennett's qualia-denial position is part of Cart-Ton world's claim that all brain processes (and consequently mental states) are of one and the same type: rather than talk about perception versus cognition, Dennett prefers to describe what happens in the brain as acts of belief fixation, judgement, interpretation, elaboration, categorisation, decision, recognition, discrimination and identification. What this list of terms has in common is that our inner processes are more akin to thinking than to sensation. Although there are many loci in the brain, their effects in rewriting and editing the various draft beliefs we have about 'what is happening out there' are all of this single type. Dennett has thus tried to compress all relevant processing into a single type (be-

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137 Dennett, Daniel,'Consciousness Explained', 1991, Boston, MA: Little, Brown, p.139/140

138 Minsky, Marvin, 'The Emotion Machine', 2006, New York: Simon & Schuster, p.155

139 Dennett, Daniel,'Consciousness Explained', 1991, Boston, MA: Little, Brown, p.359/360

lief fixation, or the selecting and re-editing of drafts). Although we may accept his point that there is not a second type that happens only in a separate 'mental' realm, we cannot deny that there are numerous kinds of psychological process that happen in perception, memory, reasoning, emotion and so on. According to Rose, Dennett simply describes all these processes as 'judgments' about what just happened in the external world.[140] Dennett, consequently, sees experiences, or what others might call qualia, as complex wholes. He gives a number of examples of how experiences are not unitary, indivisible atoms. For instance, we may come to acquire connoisseurship for particular real-world stimuli, such as wine, coffee or particular musical sounds. What at first seems a blurry, single experience becomes, with practice and training, divisible into sub-parts, like a scene coming into focus revealing the presence of one or more separate figures against a background. Thus one can learn to detect different components in a complex taste - for example, experienced cooks can tell what ingredients there are in a casserole or a sauce. A note or chord on a guitar can be broken down into its fundamental and harmonics. By listening to the different components, musicians learn to analyse further what seems at first to be a single stimulus.[141]

Others have extended this anti-qualia argument of Dennett's further by claiming that there is no necessary end to this process of categorisation and sub-categorisation. Throughout our lives we can go on and on learning to make

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140 Rose, David, 'Consciousness; Philosophical, Psychological and Neural Theories', 2006, Oxford U.P., p.357/358

141 Ibid, p.342

finer and finer distinctions, breaking phenomenal experience into more subtle and precise fragments.There is no point at which one can say, 'these at last are the qualia, and we can go no further.'[142] However, a qualia supporter might argue that this view is based on the old notion of qualia as irreducible atoms of experience. If the broader view, of qualia as simply subjective sensation, then a counter-argument could be framed as follows: when we look, for example at a painting, our experience may well in fact be direct and unitary (as we feel it to be): all these fine distinctions and sub-categorisations are simply post-qualic commentaries on the experience itself. Given the infinite variety of thought and language, these commentaries may simply be endless constructions, while the initial experience retains its authenticity as a unitary whole; a quale. For example, if we substitute colour appreciation for wine connoisseurship, an artist may know which primary colours to mix together to make an infinite number of colours; but when each shade of colour has been produced, it is experienced as a single unitary colour, not as a complex compound of the primary colours composing it in their respective proportions. (Later, in chapter fifteen, we'll look at 'Whit-Tum world's' view of qualia, in which Dennett's denial that qualia have any subjective, mental aspect is turned on its head.)

[142] Ibid, p.343

Chapter Five: Rejecting The Self

Introduction: Cart-Tonist Versions of The Self

Like Behaviourism (which was one of its greatest flowerings) Cart-Ton world recognises no ‘inner self’: for Cart-Tonists the Folk Psychological notion of a masterful inner agent absorbing and digesting all sensory information and issuing authoritative behavioural commands, from the top down, is one of the greatest of our popular illusions about mind and consciousness. Looking at the concept of the self from within the narrow confines of Cart-Tonist ontology they see no possibility of a self arising from the experiential foundations of all existence (a notion we will explore in our presentation of ‘Whit-Tum world’, in parts three and four). For Cart-Tonist, as in the great tradition of Seventeenth Century physical ontology (from which they have not escaped), ‘matter’ is ‘dead’ and passive, reacting only to externally applied forces. Consequently, all Cart-Tonist descriptions of the self must account for the conundrum as to how this ‘dead’ and passive matter can give rise to the Folk Psychological illusion of an inner self. As we shall see, Cart-Tonist accounts of the self range from the most eliminativist of deconstructions to grudging recognition of a notional self as a useful abstraction for certain social and cultural purposes, while not diminishing its ontological status as an illusion. Our purpose in this chapter is to illustrate that all these Cart-Tonist versions of the self are grounded in the outdated ontology of Cart-Ton world and do not follow logically from the empirical findings of modern science, as Cart-Tonist claim.

The Self and The Demise of Dualism

Traditionally, in ancient philosophy and in the great faith traditions, the existence of the self has been explained by claiming that each human being is in possession of a soul, frequently deemed to be immortal. Modern science has generally rejected this view, but, as Susan Blackmore observes, a few established scientists and philosophers have tried to find a self that lurks in the gaps in our understanding. She mentions specifically, the philosopher Karl Popper and the neuroscientist John Eccles.[143] They suggested that the self controls its brain by intervening at the synapses between neurones. But, generally in modern philosophical and scientific communities, dualists are very few and far between. The more conventional rejection of 'spiritual' explanations of the self by the scientific establishment is epitomised by Daniel Dennett's insistence that, the self is not a 'soul pearl', but a socially constructed artefact.[144]

Douglas Hofstadter satirises the thesis that consciousness arises from a spiritual soul, which somehow gets implanted in the physical human body. He asks a number of very pointed questions: for example, does the whole human body, or just the brain or just a part of the brain possess soul-consciousness? What organisational or chemical property of these bodily structures ensure that they get a 'dollop' of soul-consciousness? How does soul-consciousness

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[143] Popper, Karl and Eccles, John, 'The Self and Its Brain', 1977, Springer Verlag

[144] Dennett, Daniel,'Consciousness Explained', 1991, Boston, MA: Little, Brown, p.412-430

know how to do this? What kind of 'glue' is used to attach the soul? Might the 'glue'; "… possibly wear out and the Consciousness accidentally fall off or transfer onto something else? ... If your dollop of Consciousness had been attached to my brain and vice versa, would you be writing this and I reading it?"[145] "If what we call 'I' is a squirt of some un-analysable Capitalised Essence magically doled out to each human being at the moment in which it is conceived, with each portion imbued with a unique savour permanently defining the recipient's identity, then we need look no further for an explanation of what we are (even if it depends on something inexplicable)."[146] These sorts of considerations have lead many researchers to predict the complete demise of the notion of, in Gilbert Ryle's dismissive phrase, 'the ghost in the machine'.

Five Characteristics of The Self

The neurologist, Vilayanur Ramachandran, also concluded that as Neuroscience progresses, the concept of the 'Self' will recede and eventually disappear altogether.[147] As we saw in chapter one on Folk Psychology, Ramachandran also listed the five definable, characteristics of the self that we all experience, what we can call the 'Folk Psychological Self': the first is unity and coherence - our sense of being a single, continuously existing person. Second, is continuity, experiencing the self as an unbroken, uniting thread running through our lives, linking past, present and future, and

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145 Hofstadter, Douglas, 'I am a Strange Loop', 2007, Basic Books, p.328

146 Ibid, p.358

147 Ramachandran, Vilayanur, 'The Emerging Mind', 2003, Profile Books (GB), p.133

convincing us that we have the ***same*** self throughout life. Third, we attribute our sense of agency to the self; it initiates and is responsible for our actions. The fourth characteristic is self-awareness, i.e. being aware that we have a self and feeling that it is consciously in charge of our body and its actions and decisions. Fifth, and finally, we experience our own particular self to be anchored in our own particular body: in other words, we have one self and one body and they are inseparably linked together for the entire duration of our lifetime. We shall now look at how the Cart-Ton world has challenged, undermined and deconstructed all of these characteristics.

De-Constructing the Unity of The Self

Daniel Dennett questions the solidity of the self: he claims that it's 'gappy' like consciousness, which appears to be continuous but, in fact, is not. Dennett suggests that a self could be just as gappy; "… lapsing into nothingness as easily as a candle flame is snuffed, only to be rekindled at some later time, under more auspicious circumstances. Are you the very person whose kindergarten adventures you sketchily recall (sometimes vividly, sometimes dimly)? Are the adventures of that child, whose trajectory through space and time has apparently been continuous with the trajectory of your body, your very own adventures? That child with your name, a child whose scrawled signature on a crayon drawing reminds you of the way you used to sign your name is (was) that child you?"[148] (In a later chapter we'll look at Dennett's theory of the self more critically and question his dismissal of any notion of unity and continuity between the adult and childhood self. What he fails to see is

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148 Dennett, Daniel,'Consciousness Explained', 1991, Boston, MA: Little, Brown, p.423

the ‘deep learning’ of the infantile self, which powerfully links it to the adult self over a whole lifetime.)

David Rose also questions the unity of the self. He does this by focusing on the clinical phenomenon known as ‘anosognosia’, in which various form of self-awareness can be lost: he asks, “What can we learn about the neural representation of the self from such cases? … there are many different aspects of self-awareness that may be lost in any one person. These losses can be restricted to one narrow area of self-knowledge, such as the fact that the subject has a paralysed left arm, poor social skills or aphasia (i.e. the inability to speak). The anosognosic symptoms can also be multiple, vary from person to person and recover to varying extents over different timescales.” Thus, contrary to our assumption that the self is a natural unity, neurology indicates that it is made up from different neural components and that one, or more, of these can malfunction independently of the rest, thus dissolving the self’s unity. What this indicates is a poly-modular basis for the self. Rose classifies anosognosic symptoms into four syndromes, “… each centred on damage to regions of higher, integrative and poly-modal cortices in the four lobes. Self-awareness depends on the integration of thinking and feeling that occurs in those regions, and there is thus no single self-representation in the brain … Multiple mechanisms exist, each of which monitors the activity of a restricted domain of the brain to generate self-awareness of the functioning of that subset of neural mechanisms and that subset alone.” Thus, according to this neurological view, the self has multiple, independently functioning, centres in the brain. In addition to this ‘poly-modular self’, many studies and theories have envisaged many selves - or at least many self-awarenesses -

coexisting within a single individual: for example, Sperry's (1984) analysis of split-brain patients led him to conclude that they have two selves, one in each hemisphere. Also, Marcel's (1993) survey of various kinds of anosognosia and blindsight resulted in him suggesting that multiple self-consciousnesses can occur commonly: "There can … be several independent consciousnesses about the same stimulus at any one time. This multiplicity, however, only applies when paying attention to one's self, or when asked to introspect about one's own sensations or inner states. If attention is directed outwards, such as in performing some complex skill (like driving along a busy street), then consciousness is more unified. There may be a single, self, (though Marcel is vague about what exactly that is), but self-awareness comes via multiple mechanisms."[149]

Perhaps the ultimate de-construction of the self is to be found in Buddhism, and in the Eighteenth Century empirical philosophers, such as David Hume. Both these sources conceptualise the self as nothing but a bundle of feelings, sensations, mental states, etc. According to Rose, they claim; "… that there is no such thing as the self as postulated in the atomist, Platonist-Christian idea of a soul or 'ego'." Rather, you are simply a bundle of various feelings, thoughts, abilities, processes, mental states and so on; just the collection of abilities you have at any particular time. For Hume, the feeling of personal identity was merely an illusion based on the memory's production of a sequence of similar ideas at successive instants in time. For Buddhists, it is the continuity of the pattern of habits, accumulated

[149] Rose, David, 'Consciousness; Philosophical, Psychological and Neural Theories', 2006, Oxford U.P., p.383/384

through ontogeny and phylogeny.[150] Modern theories of binding suggest more mechanistic or real-emergent explanations. They imply that there is no 'self' within the person, although there may be an individual person. But where does this identity come from? "… social constructionists may see the 'self' as existing at a higher, societal level, whereas reductionists prefer to look to lower levels, such as the constituent mental states all having their neural bases in common in the same brain."[151]

Deconstructing the Continuity of The Self

The American psychologist, Robert Ornstein dismisses our sense of self-consistency as an illusion: 'we' are not the same person from moment to moment. 'We' are not the same 'self' at all! He asserts that we can readily see this in everyday life. For example, we don't know whether to trust our first intuitive responses or to follow our more deliberated plans of action. "What we might call intuition or subliminal perception may be the receipt of information by a centre inaccessible to consciousness… We assume that we are more consistent, more unified, than we are." And the reason why we make this assumption is that the 'Self' is nothing but one of many 'simpletons' in our brains, with its own limited role and insight. "The idea most people have that they are consistent in the diverse situations of their lives is an illusion. The consistency in which we believe so much is not 'us' any more than our panic reaction is us; both are just small, secluded, and separate sections of the mind, with no special access to the rest of mental

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[150] Varela, F., Thompson, E. and Rosch, E., 'The Embodied Mind', 1991, MIT Press, p.121 and 176

[151] Rose, David, 'Consciousness; Philosophical, Psychological and Neural Theories', 2006, Oxford U.P., p.385

processes.” In reality, the self, like our other brain simpletons, is isolated, usually uncoordinated and alone, and has restricted knowledge. This explains why; “… although we act wildly differently in special situations, we maintain a constant illusion of our personal unity and stability. But our personal judgment is wrong. We are not consistent, not stable; it is only our little self who believes so.”[152]

Rita Carter also considers the durability of the self in terms of what she calls ‘the fridge light problem’: as implied, this is the problem that when we want to examine consciousness (the fridge light), we have to direct our attention to it (that is, open the door). This can create the illusion that the light is always on, or that consciousness is always in operation: “When we talk about normal experience, then, we are talking about self-consciousness. That is, not consciousness of self, but consciousness with self. Thoughts, feelings and perceptions are things that happen to, or are done by, this self and may have no existence without it. Conversely, it is difficult to imagine what would be left of the self if the stream of experience stopped flowing through it - a self without an inner life is not our idea of a self at all. Yet self and experience are not one and the same. Every night, when we enter the quietest stage of sleep, experience is reduced to little or (perhaps) nothing. Yet our self pops up again in the morning, undiminished. So even if it depends on the flow of experience for its moment by moment existence, it must also have some durable form - enough, anyway, for it to be reborn each morning.”[153]

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[152] Ornstein, Robert ‘The Evolution of Consciousness’, 1991, Prentice Hall, p.152/153

[153] Carter, Rita, ‘Consciousness’, 2002, Weidenfeld Nicolson, p.212

The Oxford philosopher, Derek Parfit, coined the metaphor of The self as a club. As Rose explains; "… over time, some members may leave and other new people may join, but it remains the same club. Thus there is unity over time although the constituents may change as the membership changes. A club is not a physical thing, it is the sum total of the individual members. Likewise, the self is just the sum total of all an individual's various faculties, modules, properties and experiences, and there is no special one internal to that collection that is the 'real' self. Over time a person may learn new skills and forget many things too, but the continuity of self is maintained. The self is a higher-level category - the total set of all one's mental states, rather than a subset or a particular member of them."[154] (As above, in a later chapter we'll look critically at this theory of Parfit's. As with Dennett, he neglects the deep links between the self as adult and the childhood self.) Dennett extended Parfit's metaphor by wondering whether the 'club of the self' has a written constitution, which would explicitly provide for its lapses of existence. But, Dennett concludes, this wouldn't guarantee any real, inherent identity for the self: "We might know all the facts that could conceivably bear on the situation and be able to see that they were inconclusive about the identity of the (new?) club ... selves are not independently existing soul-pearls, but artefacts of the social processes that create us, and, like other such artefacts, subject to sudden shifts in status. The only 'momentum' that accrues to the trajectory of a self, or a club, is the stability imparted to it by the web of beliefs that constitute it, and when those beliefs lapse, it lapses, either permanently

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[154] Rose, David, 'Consciousness; Philosophical, Psychological and Neural Theories', 2006, Oxford U.P., p.385

or temporarily."[155] In other words, Dennett sees the self as sustained by a scaffolding of social and propositional networks, rather than by anything biologically internal to the human organism itself.

Deconstructing the Agency of The Self

Ornstein rejects the Folk Psychological view that the self uses conscious thought and reason to control the body: fortunately for our biological survival; "… the commanding, controlling, mental operating system (which might be called the self) is much more closely linked with emotions and the system of automatic bodyguards …" than with our delusions about a conscious, controlling self: "The pivot of the internal self is emotion. This dominant 'selfish' brain … appraises threats in the environment and organises quick actions." In other words, our automatic bodyguards are continuously and unconsciously monitoring the outside environment and posing implicit questions: "Is it harmful? Should I move toward it or not? Should I stop or change what I am doing? Is it surprising? Should I attack?" Ornstein then links the emotions to the notion of an illusionary self: "To ensure a rapid response to these appraisals, the self is linked with certain automatic response patterns, emotions, which prepare us for action." Much more of our life is determined by these primitive appraisals than our 'conscious, thinking' self would like to believe. "We see ourselves through a selective filter, the conscious self. But, like shining a spotlight in a dark area, everything we see is illuminated by our own spotlight. We can't see where we have no illumination. Thus, we assume that our mind is more stable, more complete than it is." We like to think we

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[155] Dennett, Daniel,'Consciousness Explained', 1991, Boston, MA: Little, Brown, p.423

are rational, and our traditional cultures have supported this notion of a conscious, controlling self, but: “We are blinded to our own nature, by our evolved nature, by the very system that makes it possible for us to survive.”[156] (We shall later return to this link between the self and the emotions, but will question Ornstein’s conclusion that it supports the illusory view of the self.)

The work of Benjamin Libet is often cited as support for the position that the self has no causal power to make decisions. In the 1970s, Libet was involved in research into neural activity and sensation thresholds. This work soon crossed into an investigation into human consciousness. Libet's results suggests that unconscious processes in the brain may be the real initiators of volitional acts, and that free will therefore plays no part in initiating them: if unconscious brain processes have already taken steps to initiate an action before consciousness is aware of any desire to perform it, the causal role of consciousness in volition is all but eliminated. Susan Blackmore’s explanation is that conscious experience takes some time to build up and is much too slow to be responsible for making things happen. She points out that; “… the readiness potential began about 550 milliseconds (just over half a second) before the action, and the decision to act about 200 milliseconds (about one-fifth of a second before the action).” In other words, our decision to act was not really the starting point for our action. This finding clearly threatens our Folk Psychological conception of the self: it’s my brain that’s in charge not my conscious self! Consequently, consciousness does not direct our actions. Blackmore comments that; “Conscious aware-

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[156] Ornstein, Robert ‘The Evolution of Consciousness’, 1991, Prentice Hall, p.152-155

ness comes all right, but not in time. The hand is removed from the flame before we consciously feel the pain. We have whacked the tennis ball back before we can be conscious of it coming towards us. We have avoided the puddle before we were conscious of its existence. Consciousness follows on later. Yet we still feel that 'I' consciously did these things."[157]

Libet himself concluded that conscious volition is exercised in the form of 'a power of veto' (sometimes called 'free won't'): while consciousness plays no part in the instigation of volitional acts, Libet suggested that it may still have a part to play in suppressing or withholding certain acts instigated by the unconscious. Libet noted that we've all experienced the ability to suppress the acting out of an unconscious urge. Libet's work indicates, however, that consciousness has only a 100 to 150-milliseconds 'window' within which to exercise this veto over action. Tor Norretranders suggests that, if we take Libet's findings seriously, we have to accept that the conscious 'I' does not initiate our actions: the 'I' may think it is doing the acting, but this is an illusion. "The 'I' is merely a piece of will-less driftwood, an innocent victim of wind and weather; and, what is more, a piece of driftwood that constantly reassures itself, 'I am keeping my course!'." He adds that imagining a consciously controlling self is, in any case, not a viable idea; "… simply because the bandwidth of consciousness is far too low for consciousness to control everything a person does." Norretranders also quotes the philosopher, Thomas Nagel's comment that: "Our Brains have Free Will but We

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[157] Blackmore, Susan, 'The Meme Machine', 1999, Oxford U.P., p.226/227

Don't!"[158] (We'll take a critical look later at these Cart-Tonist efforts to contain and curtail the Folk Self by portraying it as entirely a social construction, as an alternative, we'll consider theories which posit a biological and even, from Whitehead, an ontological basis for the self. Significantly, such theories also posit emotional affects as an essential component for the self.)

The Cognitive Self

Having looked at the deconstructive effort which Cart-Ton world has directed at the Folk Self, we can now consider the various positive versions of the self which it does accept. David Rose points out that a central theme in modern cognitive psychology is that our knowledge of the outside world is fallible. It's based on mental models of the way the outside world is. By analogy, he says, our self-knowledge arises in the same way. In other words, we construct a mental model of the self: "Through individual growth you build up knowledge about yourself, your self-identity, behaviour patterns, likes and preferences, what you do, how you think and so on. The unity of yourself centres around the single concept or model you thus form of yourself." Rose is keen to point out that this 'self-model' has no special status over your other mental models, and, like them, it can contain errors and mistakes: "This model is no different in kind from the mental models you have of other people and objects in the environment. It is qualitatively similar in the sense that it is just another mental model, and when you think of yourself, you are gaining access to that mental model. Your consciousness or awareness of yourself involves processing information in that mental model of

[158] Norretranders, Tor, 'The User Illusion', 1998, Viking Press, New York, p.257/258

yourself... the model is not necessarily an accurate reflection of yourself: errors, mistakes and illusions about yourself can creep in.” In this cognitive version of the self, the model that represents it is simply another part of your mind; it is composed by the rest of your mind. The self-model has no capacity to survey or comprehend the entire mind, and so, Rose says; “... the knowledge you have of yourself is not directly linked to the main functional states. It is a special functional module, a collection of mental states that you have built up. But each state is the same type as any other representation.” But, the mental states in the self-model are different from ‘ordinary’ representational states: “In sum, there are two stages, so in a sense you have two categories of mental states: mental states that you use when you are navigating the world, seeing red, feeling sad, etc.; and then another level that may represent what you think of yourself, what you are aware of within yourself.”[159]

The American philosopher, David Rosenthal (and others) have elaborated these ideas into a higher-order thought theory of consciousness and the self: According to Rose, they claim that; “... higher- or second-order thoughts are those creating consciousness of the contents of first-order, sensory experience, (‘I think I am seeing red’). This theory is easily extended to account for introspection, which occurs when there are third-order thoughts. These are thoughts or knowledge about second-order states - for example, they may contain the content ‘I know that I think I am seeing red’. Thus, there is a third layer of representation that is about the existence of second-order representations.” This

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[159] Rose, David, ‘Consciousness; Philosophical, Psychological and Neural Theories’, 2006, Oxford U.P., p.382/383

‘third-order’ category of thought provides our experience of having a self. But, as Rose points out, Rosenthal specifically denies an infinite regress of higher orders of thought: “Note that Rosenthal denies that any further, fourth-order and so on, layers exist, so there is no infinite regress of higher and higher thoughts. Although one can state ‘I know I know I know I know I am hearing a piano', this does not describe how the mind actually works. We can at times think we are now conscious of seeing something red or hearing a piano’, but we do not introspect our introspections.”[160]

My major criticism of these two samples of ‘Cart-Ton Speak’ about the self is that they are guilty of the fallacy of Computationalism; i.e., that they are grounded on the assumption that the activities of a man-made computing device can provide an adequate model for the human mind. Many might agree that such an assumption is self-evidently mistaken, as, for example, when the neuroscientist Christian Keyser comments; “… comparing our brains to computers is a fallacy. Both leopards and Ferrari’s are fast, but should we therefore assume that a combustion engine must be hidden somewhere in the leopard? Unfortunately, many cognitive scientists have more or less consciously fallen into a similarly wrong line of thinking.”[161] I, however, feel that it’s important to be more explicit about the nature of the computational fallacy: the most compelling reason for rejecting the notion of a mental analogy between a living creature and a man-made machine is the absence in the lat-

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[160] Ibid, p.383

[161] Keysers, Christian, ‘The Empathic Brain’, 2011, Social Brain Press, p.29/30

er of both, a) subjective sensation, and b) the creatures affective reaction to that sensation. As I shall argue at length in part four, the real function of the self within the human organism is to act as a centre of attentive reception and integration. As such, the self is deeply rooted in three levels of existence: 1) in Whitehead's ontology it's implicitly built into the fundamental building blocks of reality. 2) The self is also a product of both biological evolution, at the base level, and 3) results from individual psychological development, at the level of personnel autobiography.

The Socially Constructed Self

Turning to theories of the socially constructed self, I find these, like cognitive theories, inadequate in that they neglect the significance of recent discoveries in neurobiology. One example is the American psychologist, George Kelly's personal construct theory, which shares quite a lot with cognitive mental-model-of-the-self approaches. As Ming Singer explains, Kelly assumes that the individual actively creates mental representational systems or 'constructs' of the reality they perceive, including constructs of their self and how it fits into their perception. Where the social constructionists may differ from the cognitivists is in the value-judgement elements in these constructs: "These constructs are arranged as bipolar dimensions of description like 'relaxed-intense', or 'good-me/bad-me', the self construct system constitutes all aspects of the self as perceived by the person through his/her entire past experiences interacting with the social environment. According to Kelly, all past experiences concerning the self present themselves as the database from which the self construct system can be constructed. Although the same database allows for many different ways of construction, it is up to the individual to freely select."[162] Though Kelly does not have much to say about what criteria individuals may use to make these selections.

Singer identifies the main distinguishing feature of the social constructionist view of the self as its 'exteriorisation' of the self: it's not embedded in a biological organism, but is instead determined by the external social conditions and forces to which the individual is exposed. As she comments, this has implications for human agency: "Self in Gergen's theory is completely shifted out of the experiencing and sentient person: from the intrinsic mental to the external social realm. This shift carries with it a similar set of implications for human agency as did the early Behaviourism of Watson and Skinner. Against the traditional beliefs about individualism and related notions of human agency (individual self-determination and freedom in choice), Behaviourism saw external reinforcements of behaviour as the sole controlling agent of human functioning in general."[163]

Another version of Social Constructionism is to see the self as simply the sum of an individual's social roles, as Susan Blackmore explains; "If I asked you who you are, you might answer with your name, your job, your relationship to other people (I'm Sally's mum or Daniel's daughter), or your reason for being where you are (I'm the cleaner, Adam invited me). All of these self-descriptions come out of your mastery of language, your interactions with other people,

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[162] Singer, Ming, 'Unbounded Consciousness', 2001, Free Association Books, p.141

[163] Ibid, p.149

and the world of discourse in which you live.” But, as Blackmore goes on to comment, although they may be useful in certain circumstances, they fail to encompass any notion of the inner self, which we commonly experience: “They describe no persistent conscious entity. They are just labels for an ever-changing social creature. They depend on where you are and who you are with. We can find out a lot about how such constructions are created - indeed social psychologists do just that - but we do not find a conscious self this way.”[164]

Blackmore also criticises the narrowly neurological approach by dismissively quoting Francis Crick’s throw-away comment: “You’re nothing but a pack of neurones!”[165] Blackmore says; “There are at least two problems with this. First, you do not feel like a pack of neurones. So what the theory needs, and - does not provide, is an explanation of how a pack of neurones comes to believe that it is actually an independent conscious self. Second, the theory does not say which neurones. It cannot be all neurones because ‘I’ am not consciously aware of most of what goes on in my brain; ‘I’ do not identify with the neurones that control glucose levels in my blood or the fine movements that keep me sitting up straight. On the other hand, if you try to identify ‘self’ neurones you are doomed to trouble. All neurones look much the same under the microscope and all of them are doing something all the time regardless of what ‘I’ am doing.” Blackmore further notes that Crick’s position is extremely reductionist in the sense that it ignores Emer-

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[164] Blackmore, Susan, ’The Meme Machine', 1999, Oxford U.P., p.223

[165] Crick, Francis, ‘The Astonishing Hypothesis’, 1994, Simon & Schuster, p.3

gentism and different 'levels' of explanation: "Crick, not only assumes that you are utterly dependent upon the actions of nerve cells - most neuroscientists assume that - but that you are nothing but the pack of neurones. Other scientists assume that new phenomena may emerge from simpler ones, and cannot be understood by understanding the underlying neurones and their connections. For example, we cannot understand human intentions, motivations, or emotions just by observing the behaviour and connections of neurones, any more than we can understand the activity of a desktop computer by looking at its chips and circuits. On this more common view the intentions depend completely on the neurones (just as the computation depends completely on the chips in the computer) but to understand them we must work at an appropriate level of explanation. But what is the appropriate level of explanation for the self. The behaviour of neurones seems to miss it."[166] While I can agree with Blackmore's critique of Crick's neurological reductionism, her own version of 'Emergentism' (as we have seen) ends up in a very sterile account of meme theory, in which in the self is nothing but the ultimate 'memeplex' and Blackmore backs herself into an ontological cul-de-sac; confessing that she experiences herself only as a philosophical zombie.

Dennett's Narrative Self

Dennett argues that the human self is socially constructed from narratives, which each individual automatically generates about him or her self. He refers to the examples of spiders and beavers who, respectively and automatically, spin webs and build dams in order to realise their biological

166 Blackmore, Susan, 'The Meme Machine', 1999, Oxford U.P., p.221/222

selfhood. But how do humans achieve this? Dennett says that: “Our fundamental tactic of self-protection, self-control, and self-definition is ... telling stories, and more particularly concocting and controlling the story we tell others - and ourselves - about who we are.” Furthermore; “… just as spiders don’t have to think, consciously and deliberately, about how to spin their webs, and just as beavers, unlike professional human engineers do not consciously and deliberately plan the structures they build, we (unlike professional human storytellers) do not consciously and deliberately figure out what narratives to tell and how to tell them. Our tales are spun, but for the most part we don’t spin them; they spin us. Our human consciousness, and our narrative selfhood, is their product, not their source.” This instinctual, human proclivity for producing narrative leads, according to Dennett, to the creation, in each human being of a self - not at any locatable place within the human body, but rather as an abstract point, from which the individual’s story-telling activities can be understood. Dennett explains that; “These strings or streams of narrative issue forth as if from a single source - not just in the obvious physical sense of flowing from just one mouth, or one pencil or pen, …” but also, in a more nuanced way, our ‘self narratives’ are designed to encourage ourselves and others to infer a unified agent whose words they are, about whom they are: in short, to posit a ‘centre of narrative gravity’.”[167]

David Rose explains that, for Dennett, this abstract point; “… is not a specific entity, in the same way that the centre of gravity of a physical object is not a real thing. The latter is a useful shorthand for describing the behaviour of a mass

[167] Dennett, Daniel,‘Consciousness Explained’, 1991, Boston, MA: Little Brown , p.418

such as a planet or a piece of metal - it has certain functional uses, but it is just a convenient fiction to describe and predict the behaviour of the object."[168] In the same way, 'the self' or the 'centre of narrative gravity' is a convenient fiction to summarise a person's behaviour, feelings and thoughts. It is a central character in a person's self-generating narratives that survives through the 'multiple drafts' of which that person's mental life is composed. So, for Dennett, the human self is created and maintained by constantly producing and monitoring a personalised web of inter-related stories, he says: "An advanced agent must build up practices for keeping track of both its bodily and 'mental' circumstances. In human beings, as we have seen, those practices mainly involve incessant bouts of storytelling and story-checking, some of it factual and some of it fictional." Dennett emphasises that, in addition to presenting a self to others, the 'narrative centre of gravity' is just as important to the agent itself because it provides its own, internal representation: "A self, according to my theory, is not any old mathematical 'point' but an abstraction defined by the myriads of attributions and interpretations (including self-attributions and self-interpretations) that have a part in the biography of the living body whose Centre of Narrative Gravity it is. As such, it plays a singularly important role in the ongoing cognitive economy of that living body, because, of all the things in the environment an active body must make mental models of, none is more crucial than the model the agent has of itself." In addition, the narratively constructed self, is also required to take on the role of being 'responsible' in many social, educational and legal contexts: "One of the most important roles of a self in our tra-

[168] Rose, David, 'Consciousness; Philosophical, Psychological and Neural Theories', 2006, Oxford U.P., p.384

ditional conceptual scheme is as the place where the buck stops" In the absence of a narratively constructed self, argues Dennett, the buck will simply be passed round and round forever: "If there is no Oval Office in the brain, housing a Highest Authority to whom all decisions can be appealed, we seem to be threatened with a Kafkaesque bureaucracy of homunculi, who always reply, when challenged: 'Don't blame me, I just work here'. The task of constructing a self that can take responsibility is a major social and educational project."[169] Dennett does flirt briefly with the notion of a biological self as a simple boundary recognition mechanism, distinguishing the organism from the rest of the world. He suggests that such a mechanism is necessary to avoid such survival-threatening activities as eating one's own body. However, when it comes to the more sophisticated characteristics of the human self, Dennett gives up on any attempt to found the self in biology and reverts to his linguistic, socially constructed account of the self as the 'centre of narrative gravity'.

Blackmore's 'Meme Self'

Susan Blackmore imagines a self constructed, not out of stories, but out of 'memes': Richard Dawkins coined the term 'meme' in his 1976 book 'The Selfish Gene'. A 'meme' is an idea, behaviour or style that spreads from person to person within a culture. A meme comprises cultural ideas, symbols or practices, which can be transmitted from one mind to another through writing, speech, gestures, rituals or other imitable phenomena. Supporters of the concept regard memes as cultural analogues to genes in that they self-replicate, mutate and respond to selective pres-

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[169] Dennett, Daniel,'Consciousness Explained', 1991, Boston, MA: Little Brown, p.426-430

sures. In other words, memes constitute a ‘second’, social/cultural replicator in human beings, in addition to the ‘primary, biological replicator, the genes. Memes can consist of any cultural product, such as ideas, tunes, recipes, religious practises, algorithms etc. Proponents theorise that memes may evolve by natural selection in a manner analogous to that of biological evolution. Memes do this through the processes of variation, mutation, competition and inheritance, each of which influences a meme’s reproductive success. Memes spread through the behaviour that they generate in their hosts. Memes that propagate less prolifically may become extinct, while others may survive, spread and (for better or for worse) mutate. Memes that replicate most effectively enjoy more success, and some may replicate effectively even when they prove to be detrimental to the welfare of their hosts.

Blackmore has coined the term ‘memeplexes’ to refer to; “… groups of memes that come together for mutual advantage. The memes inside a memeplex survive better as part of the group than they would on their own. Once they have got together they form a self-organising, self-protecting structure that welcomes and protects other memes that are compatible with the group, and repels memes that are not. In a purely informational sense a memeplex can be imagined as having a kind of boundary or filter that divides it from the outside world.” Blackmore also suggests that memes can gain an advantage by associating themselves with a person’s self-concept. How they achieve this, whether by raising strong emotions, by being especially compatible with memes already in place, or by providing a sense of power or attractiveness, doesn’t matter: if memes can embed themselves in the self of their human host, this will give them a competitive advantage over other memes. These successful memes will more often be passed on. By acquiring the status of a personal belief, a meme gets a big advantage. Ideas that can get inside a self - that is, become my 'ideas' or 'my opinions' are winners. Beliefs, opinions, possessions and personal preferences all bolster the idea that there is a believer or owner behind them. The more you take sides, get involved, argue your case, protect your possessions and have strong opinions, the more you strengthen the false idea that there is not only a person (body and brain) talking, but an inner self with esoteric things called beliefs. The self is a great protector of memes and the more complex the memetic society in which a person lives, the more memes there are fighting to get inside the protection of the self.[170]

Blackmore calls this ultimate memeplex the selfplex: She explains that; "Memetics provides a new way of looking at the self. The self is a vast memeplex - perhaps the most insidious and pervasive memeplex of all. I shall call it the 'selfplex'. The selfplex permeates all our experience and all our thinking so that we are unable to see it clearly for what it is - a bunch of memes. It comes about because our brains provide the ideal machinery on which to construct it, and our society provides the selective environment in which it thrives." Blackmore sees the self as a great protector of memes, but we also, in turn, tenaciously defend the memes that have invaded our brains and this strengthens our illusion of having a self, but, Blackmore insists: "There is no 'I' who 'holds' the opinions. There is a body that says 'I' believe in being nice to people' and a body that is (or is

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[170] Blackmore, Susan, 'The Meme Machine', 1999, Oxford U.P., p.232/233

not) nice to people. There is a brain that can store knowledge of astrology and the tendency to talk about it, but there is not in addition a self who 'has' the belief. There is a biological creature who eats yoghurt every day but there is not in addition a self who loves yoghurt."[171]

Hofstadter's Strange Loops

As a final deconstructionist vision of what the self might be, we can look at Douglas Hofstadter's theory of the 'strange loop'. His is a highly abstract and 'mathematised' view of the self and in the mathematical tradition of Cart-Ton world, Hofstadter defines a 'strange loop' as; "... not a physical circuit but an abstract loop, in which in the series of stages that constitute the cycling-around, there is a shift from one level of abstraction, (or structure) to another." A strange loop feels like; "… an upwards movement in a hierarchy, and yet somehow the successive 'upward' shifts turn out to give rise to a closed cycle. That is, despite one's sense of departing ever further from one's origin, one winds up, to one's shock, exactly where one had started out. In short, a strange loop is a paradoxical level-crossing feedback loop." Hofstadter repeatedly emphasises the abstract, mathematical nature of strange loops. Consequently, given his contention that the human self is, in fact, nothing but a particular strange loop, then; "… we ourselves - not our bodies, but ourselves - are strange loops."[172] As above, Hofstadter also emphasises the conversion, or 'elevation', of 'raw feels' to symbols as crucial to the generation of self and consciousness: "In any strange loop that gives rise to

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[171] Ibid, p.231-233

[172] Hofstadter, Douglas, 'I am a Strange Loop', 2007, Basic Books, p.101-103

human selfhood, ... the level of perception, abstraction, and categorisation are central, indispensable elements. It is the upward leap from raw stimuli to symbols that imbues the loop with 'strangeness'. The overall gestalt 'shape' of one's self - the 'stable whorl', so to speak, of the strange loop constituting one's 'I' - is not picked up by a disinterested, neutral camera, but is perceived in a highly subjective manner through the active processes of categorising, mental replaying, reflecting, comparing, counter-factualising, and judging."[173]

Hofstadter tries to convey the peculiar mathematical nature of strange loops by describing how, in twisting back on itself, it violates the rules of hierarchy, which are deeply embedded in our minds: he states this as follows; "… a loop's strangeness comes purely from the way in which a system can seem to 'engulf itself' through an unexpected twisting-around, rudely violating what we had taken to be an inviolable hierarchical order." The origin of a lot of the ideas behind the concept of the strange loop, Hofstadter attributes to Gödel's Theorem. Here is part of his attempt to explain this, "... if Gödel had concocted a self-affirming formula that cockily asserted of itself, 'This formula is not provable via the rules of (Russell and Whitehead's Principia Mathematica)', ... the strange loopiness resides not in the flip due to the word 'not', but in the unexpected, hierarchy-violating twisting-back involving the word 'this'."[174]

Hofstadter again insists that: "When I refer to 'a strange loop inside a brain', do not I have in mind a physical struc-

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[173] Ibid, p.187

[174] Ibid, p.159/160

ture - some kind of palpable closed curve. Perhaps a circuit made of many neurones strung end-to-end? Could this neural loop be neatly excised in a brain operation and laid out on a table, like a delicate pearl necklace, for all to see? And would the person whose brain had thus been 'de-looped' thereby become an unconscious zombie?" And he concludes that: "Needless to say, that's hardly what I have in mind. The strange loop making up an 'I' is no more a pin-pointable, extractable physical object than an audio feedback loop is a tangible object possessing a mass and a diameter. Such a loop may exist 'inside' an auditorium, but the fact that it is physically localised doesn't mean that one can pick it up and heft it, let alone measure such things as its temperature and thickness! An 'I' loop, like an audio feedback loop, is an abstraction - but an abstraction that seems immensely real, almost physically palpable, to beings like us."[175]

Mixing in Biology

Many reductive theories of the self see it as simply a byproduct of the complex neural circuitry built up by personal experience. Neural reductive theories of the self tend to be 'cognitive-biological' hybrids, such as Susan Greenfield's idea of the self as what she calls the 'personalised brain'. This equates to what most people would call the 'mind', but Greenfield specifically excludes emotional experience from the foundations of the self; her self is built entirely out of cognitive knowledge. Another version of neural reductionism is (as we've seen) Francis Crick's dismissive assertion that; "you're nothing but a pack of neurones!" Also, some biological theories of the self incorpor-

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[175] Ibid, p.180

ate elements of the cognitive approach. For example, Edelman argues that: “Once higher-order consciousness begins to emerge, a self can be constructed from social and affective relationships. This self (entailing the development of a self-conscious agent, a subject) goes far beyond the biologically based individuality of an animal with primary consciousness.” Clearly, for Edelman, the ‘primary consciousness’ of animals is not enough to constitute a self: although rooted in human primary consciousness, the self has to be ‘constructed’ by human higher-order consciousness. And this construction process involves building the self out of specifically human capacities, such as language and culture: “The emergence of the self leads to a refinement of phenomenological experience, tying feelings to thoughts, to culture, and to beliefs. It liberates imagination and opens thought to the vast domains of metaphor. It can even lead to a temporary escape, while still remaining conscious, from the temporal shackles of the remembered present. Three mysteries - that of ongoing awareness; that of the self; and that of the construction of stories, plans, and fictions - can be clarified if not completely dispelled by considering a combined picture of primary and higher-order consciousness.”[176]

In a later passage, Edelman makes his proposed mix of biology and culture explicit: “The notions of primary consciousness and higher-order consciousness allow us to consider a mix. An animal with just primary consciousness that lacks symbolic capabilities has no possibility of developing a notion of a self, of time past, or of time future... unlike humans, … apes do not appear to be compelled toward lan-

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[176] Edelman, Gerald, and Tononi, Giulio, ‘Consciousness’, 2000, New York: Basic Books, p.194

guage in their native environment and do not seem to be able to master syntax." So, animals can't have even a primitive self because they lack language. In the case of human babies, however; "... higher-order consciousness, a self-concept, and a notion of past and future emerge rapidly with language and socialisation... the baby is constructing his or her own 'scenes' via primary consciousness and that these scenes rapidly begin to be accompanied by the refurbishment of concepts through gesture, speech, and language. From the earliest times, the thought that accompanies language and that flowers with its development is likely to be metaphorical and narrative. A child can play house with an imaginary companion and make up entire scenarios in which roles and properties are attributed to all kinds of objects."[177]

What Does The Self Do?

Susan Blackmore asks, a seemingly obvious question about the agency of the self; what does my self do? Surely, she says, it must at least be the centre of my awareness; the centre that receives my impressions as I go through life? But apparently this is not actually the case: "The very natural idea that 'I' hear the sounds, feel the sensations, or see the world may be false. Conscious sensory impressions can be induced by stimulating the brain." However, this only works when the stimulation is continued for a minimum of about half a second. The implication is that consciousness takes some time to build up. This leads to the odd idea that our conscious appreciation of the world lags behind the events it's observing. We never experience this 'lagging' effect, however, because of a process Libet calls 'subjective antedating'. This means that we're constantly telling

[177] Ibid, p.197-199

ourselves a story that puts events in order. That's why we don't notice the lag in time between our stream of perceptions and the real flow of events. To explain this Blackmore turns to the British psychologist Guy Claxton who; "... suggests that what we take for self control is just a more or less successful attempt at prediction. Much of the time our predictions about what we will do next are reasonably accurate and we can get away with saying 'I did this' or 'I intended to do that'. When they go wrong we just bluff." Claxton concluded that consciousness is; "… a mechanism for constructing dubious stories whose purpose is to defend a superfluous and inaccurate sense of self. Our error is to think of the self as separate, persistent, and autonomous." Like Dennett, Claxton believes that the self is really only a story we construct for ourselves: the Folk Psychological 'inner self' who is in charge of our actions and decisions is an illusion.[178]

Blackmore reinforces this by insisting that there's no centre of action where a self might reside: "There is no one place into which all the inputs go, and from which all the instructions get sent out. This is an important point, and deeply disturbing. We feel as though we are a central observer and controller of what goes on, but there is no place for this central controller to live." The current account that neuroscientists are building up of the way the brain works leaves no room for a central self. "There is no single line into a central place, nor a single line out; the whole system is massively parallel. In this description there is no need for a 'you'." Blackmore also questions any obvious separation between the observed and the observer: she refers to the

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178 Blackmore, Susan, 'The Meme Machine', 1999, Oxford U.P., p.227/228

eighteenth-century, Scottish philosopher David Hume. Hume described the self as no more than a bundle of sensations: “Staring determinedly into your own experience does not reveal a solid world observed by a persisting self but simply a stream of ever-changing experience, with no obvious separation between observed and observer.” Blackmore comments that whenever David Hume tried to explore his inner self he always stumbled upon some particular perception, such as heat or cold or pain or pleasure. He could never catch himself without a perception, nor, observe anything but the perception. He concluded that the self was no more than a ‘bundle of sensations’.[179] Blackmore then asks, what does it mean to say that I believe? And she answers that it; “… sounds as though there must be a self in there who has things called beliefs, but from another perspective there is only a person arguing, a brain processing the information, memes being copied or not. We cannot actually find either the beliefs or the self who believes.”[180]

Blackmore concludes that it might be thought possible to believe that there’s still room for a central self as some kind of informational or abstract centre rather than an actual place, and there are, in fact, several theories of this kind, such as Baars’ (1997) global workspace theory: Rowlatt explains this as follows; “… that there is a ‘module’, in a person’s brain and that the material that is selected for inclusion in this module at any point in time is what the per-

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179 Hume, David, ‘A Treatise of Human Nature’,1739, Oxford U.P., p.40

180 Blackmore, Susan, ‘The Meme Machine', 1999, Oxford U.P., p.224-227

son will be ‘conscious of’, or ‘attending to’.”[181] Blackmore comments that: “The workspace is like a theatre with a bright spotlight on the stage; the events in the bright spot are the only ones ‘in consciousness’. But this is only a metaphor and can be a misleading one. If there is any sense to the idea of a spotlight, it is that at any time some information is being attended to - or actively processed - while other information is not.” But she insists that; “… this focus of activity changes continuously with the complex demands of the task we are performing. If there is a spotlight, it is one that switches on and off all over the place and can shine in several places at once; if there is a global workspace it is not located in any particular place. It cannot tell us where ‘I’ am.” She also warns that the theatre metaphor may do more harm than good when theorising about the self and consciousness. Blackmore refers to Dennett (1991) who argues that although most theorists now reject Cartesian dualism, they still secretly believe in what he calls the ‘Cartesian Theatre’: “They still imagine that somewhere inside our heads is a place where ‘it all comes together’; where consciousness happens and we see our mental images projected on a mental screen; where we make our decisions and initiate actions; where we agonise about life, love, and meaning. The Cartesian Theatre does not exist. When sensory information comes into the brain it does not go to an inner screen where a little self is watching it. If it did, the little self would have to have little eyes and another inner screen, and so on.”[182]

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[181] Rowlatt, Penelope, ‘Mind: A Property of Matter’, 2017, Ionides Publishing, p.33

[182] Blackmore, Susan, ‘The Meme Machine’, 1999, Oxford U.P., p.225-227

A Useful Illusion?

Having looked at all these various forms of wholesale deconstruction of our compelling sense of having a personal self, it's fairly reasonable to ask: 'If no persistent conscious self exists, why do people believe that it does?' A popular Cart-Tonist answer is that although an illusion, the self is useful in helping us survive and reproduce: Cart-Tonists imply that having a sense of self benefits the replication of our genes, as Blackmore explains: "Crook (1980) argues that self-consciousness arose from using Machiavellian Intelligence and reciprocal altruism, with its need for balancing the trust and distrust of others. In a rather dualistic version of a similar theory, Humphrey (1986) suggests that consciousness is like an inner eye observing the brain. As primates developed ever more complex social structures, their survival began to depend on more sophisticated ways of predicting and outwitting others' behaviour. In this, he argues, Homo Psychologicus would win out... These and other theories suggest that a complex social life makes it necessary to have a sense of self, to tot up scores in reciprocation, and to develop what psychologists now call a 'theory of mind' - that is, the understanding that other people have intentions, beliefs, and points of view."[183]

So, in the end is the Cart-Ton self simply a 'Benign User Illusion'? Hofstadter comments that; "Ultimately, the 'I' is a hallucination, and yet, paradoxically, it is the most precious thing we own. As Dan Dennett points out ... an 'I' is a little like a bill of paper money - it feels as if it is worth a great deal, but ultimately, it is just a social convention, a kind of illusion that we all tacitly agree without ever having

[183] Ibid, p.229

been asked, and which, despite being illusory, supports our entire economy. And yet the bill is just a piece of paper with no intrinsic worth at all."[184] Similarly, Rodolfo Llinas says that the self, like 'Uncle Sam', is just a useful symbol but not a real person.[185] Hofstadter also claims that: "'I' is an outcome, ***not*** a starting point. You coalesced in an unplanned fashion, coming only slowly into existence, not in a flash. At the beginning, when the brain that would later house your soul was taking form, there was no you. But that brain slowly grew, and its experiences slowly accumulated." Hofstadter makes the point that this 'I' which the brain is creating, has no knowledge of the brain processes involved: "But even though it didn't know anything about its brain, that nascent 'I' faithfully followed its brain around just as a shadow always tags along after a moving object."[186]

The Danish science writer, Tor Norretranders, supports this 'useful-illusion' view of the self, which he calls the 'user illusion': this, he says is; "… one's very own map of oneself and one's possibilities of intervening in the world. As the British biologist Richard Dawkins puts it, 'perhaps consciousness arises when the brain's simulation of the world becomes so complete that it must include a model of itself.' … the user illusion operates with a user by the name of 'I'. The I experiences that it is the I that acts; … senses (and) thinks." But it isn't! By analogy with a computer, Norre-

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[184] Hofstadter, Douglas, 'I am a Strange Loop', 2007, Basic Books, p.315

[185] Llinas, Rodolfo, 'I of the Vortex', 2002, MIT Press, p.128

[186] Hofstadter, Douglas, 'I am a Strange Loop', 2007, Basic Books, p.284

tranders argues that the brain and body contain lots of information that the ‘I’ is not interested in: “The I can't be bothered to know how the heart pumps the blood around Me - not all the time, at any rate. Nor can the I be bothered to know how an association occurs in the Me: … it is not only the I experienced as our personal identity and active subject that is an illusion. Even what we actually experience is a user illusion. The world we see, mark, feel, and experience is an illusion. There are no colours, sounds, or smells out there in the world. They are things we experience. This does not mean that there is no world, for indeed there is: The world just is. It has no properties until it is experienced. At any rate, not properties like colour, smell, and sound.”[187]

Conclusion: Rescuing the ‘Folk Self’ and the Reality of Qualia

So, for Cart-Tonists, the self is a nebulous, illusory entity, at best a useful illusion at worst a primitive delusion which deserves to be eliminated from modern scientific discourse. In the rest of this book I shall endeavour to demonstrate how both the ‘Folk Self’ and our subjective experience of qualia can be rescued from the bleak negation to which Cart-Ton world has sought to assign them. Ultimately this rescue mission will rely for its success on substituting the ontology of ‘Whit-Tum world’, which is compatible with the findings of modern physical science, for the outdated ontology of Cart-Ton world, which is not. In addition to its congruence with modern ‘hard’ science, Whit-Tum ontology is also far more in harmony with our subjective experience of the self and qualia than is the ontology of Cart-Ton

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[187] Norretranders, Tor, ‘The User Illusion’, 1998, Viking Press, New York, p.292

world. While scientific and philosophical progress should by no means depend on popularity, it is perverse to make the outraging of popular opinion a virtue, as many Cart-Tonists appear to do. Our feelings, our sensations and our sense of self are, after all, empirical facts, which Cart-Ton world, with its bogus authority, has ignored and contemptuously dismissed for too long.

Part Two: Undermining Cart-Ton World

Although Cart-Ton world remains the mainstream, and to a large extent the dominant ontological position in scientific consciousness studies, it has been under serious challenge over the last few decades. Here in part two we'll look at a fairly wide variety of theories, from philosophical, psychological and neurophysiological perspectives, which are contributing to the undermining of this mainstream consensus, especially in relation to Cart-Tonist theories of qualia and the self. I start, however, with a chapter in which I challenge a predominant feature of Cart-Tonist ontology: I've dubbed it 'infomania' and it consists of the delusion that consciousness can be entirely explained by information processing.

Chapter Six: ‘Infomania’ and Other Challenges to Cart-Ton World

Although Cart-Ton world remains the mainstream, and to a large extent the dominant ontological position in scientific consciousness studies, it has been under serious challenge over the last few decades. Here in part two we’ll look at a fairly wide variety of theories, from philosophical, psychological and neurophysiological perspectives, which are contributing to the undermining of this mainstream consensus. In this chapter I’ll start by critiquing a specific aspect of Cart-Ton world’s ontology, which I’ve dubbed ‘Infomania’. (This arises specifically from the theoretical formation known as ‘Cognitive Computationalism’, which can in many ways be described as the backbone of the modern Cart-Tonist worldview.) We’ll then move on to look at theories of Embodiment which reject Cart-Ton world’s account of cognition. Finally, in this chapter we’ll consider Karl Popper’s three-world theory, a welcome ***ontological*** challenge to Cart-Ton world. In the remaining two chapters of part two we’ll consider theoretical innovations which challenge specifically Cart-Ton world’s conception of firstly qualia and secondly the self.

In part one we examined how the ontological consensus of Cart-Ton world emerged and surveyed its principle features. In this chapter I’m going to focus on a particular aspect of this consensus position (which I believe is its essential component), namely its overriding emphasis on information-processing. In a (slightly twisted) *homage* to the philosopher-physician, Raymond Tallis, I’m going to call this obsession, ‘Infomania’. I shall argue that what’s missing from the Infomaniac approach is any recognition that analogue, energetic processes might play a significant role in generating mind and consciousness. Daniel Dennett and Steven Pinker are leading spokespeople for Infomania. Pinker describes information processing as the “life blood of the mind.”[188] For Infomaniacs the idea of energetic processes playing a role in mind and consciousness is dismissed as a primitive, ‘Folk Psychological’ position. I want to argue, however, the opposite case, i.e. that the Achilles’ heel of Cart-Tonist theory is its insistent denial of a role for energetic processes (which, I believe, will ultimately be found to be based on quantum processes). This denial (despite its ‘mainstream’ respectability within the contemporary scientific and philosophical communities) impoverishes our conceptions of mind and consciousness and contributes hugely to the enormous disparity between ‘ordinary’ human experience and Cart-Ton theory.

Cart-Tonist ‘Cognitive Computationalism’

Let’s first take a quick look at the ‘Cognitive Computationalist’, ‘information-only’ position, which Dennett and Pinker are defending: Cognitivism is a theoretical framework for understanding the mind that gained credence in the 1950s. It was a response to Behaviourism, which Cognitivists said neglected to explain cognition, defined as how people perceive, think, remember, learn, solve problems, and direct their attention to one stimulus rather than another. Behaviourists acknowledged the existence of thinking, but identified it as a behaviour. Cognitivists argued that the

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[188] Pinker, Stephen, ‘How the Mind Works’, 1999, (address to the American Psychological Association, August 1999) [online] http://www.kurzweilai.net/how-the-mind-works

way people think impacts their behaviour and therefore cannot be a behaviour in and of itself. Cognitivism has two major components, one methodological, the other theoretical. Methodologically, Cognitivism adopts a Positivist approach, claiming that psychology can (in principle) be fully explained by the use of experiment, measurement and the scientific method. Cognitivism is also largely Reductionist, believing that individual components of mental function (the 'cognitive architecture') can be identified and meaningfully understood. The theoretical component claims that cognition consists of discrete, internal mental states (representations or symbols) whose manipulation can be described in terms of rules or algorithms. Cognitivism is not a wholesale refutation of Behaviourism, but rather an expansion that accepts that mental states exist. This was due to the increasing criticism, towards the end of the 1950s, of Behaviourism's simplistic learning models. One of the most notable criticisms was Chomsky's argument that language could not be acquired purely through conditioning, but must be, at least partly, explained by the existence of internal mental states.

Cognitivists typically presuppose a specific form of mental activity, of the kind advanced by Computationalism. In this theory the human mind or the human brain (or both) is conceived of as an information processing system and thinking is regarded as a form of computing. As we saw in chapter three, the theory was proposed, in its modern form, by Hilary Putnam in 1961, and developed by the MIT philosopher and cognitive scientist Jerry Fodor (who was Putnam's PhD student) in the 1960s, 1970s and 1980s. The Computational theory of mind holds that the mind is a computation that arises from the brain acting as a computing machine.

The brain is a computer and the mind is the result of the program that the brain runs. A program is the finite description of an algorithm or effective procedure. The program prescribes a sequence of discrete actions. The outputs produced by the program are based only on inputs and the internal states (memory) of the computing machine. For any admissible input, algorithms terminate in a finite number of steps. So, the computational theory of mind is the claim that the mind is a computation of a machine (the brain) that derives output representations of the world from input representations and internal memory in a way that is consistent with the theory of computation.

Critiques of Computationalism

We can start our critique of Computationalism with some comments by the mirror neurone researcher, Christian Keysers: he suggests that; "… the major hurdle to understanding the human mind is the obsession for rationality of the minds of the scientists that study it. The second hurdle is computers. Together, they have created the vision of a brain that processes all information in a conscious, logical and abstract way - much as ordinary computers do. The discovery of mirror neurones changed this vision." (Mirror neurones fire both when an animal acts and when the animal observes the same action performed by another. Hence, they 'mirror' the behaviour of others, as though the observer were acting him- or herself. Mirror neurones have been discovered in many primate species and Keysers argues that they constitute a neurophysiological basis for human empathy and eusociality.) Keysers (like Panksepp in chapter three) notes that; "… the scientists that build our understanding of the brain become good scientists because they enjoy rational empirical thinking, and as such, they are inclined to believe that rational thinking is a more valuable process than intuition." Consequently, their vision of brain functioning was dominated by the idea that our brain; "… understands the world as a scientist would, by collecting evidence and rationally deriving a theory of the world based on this empirical evidence." This abstract rational vision was further entrenched by what Keysers calls the 'trap of the brain-computer-fallacy': "Brains, like most biological things, are hard to understand because we did not build them. Computers on the other hand are easy to understand, at least for the engineers that make them."

Computer engineers turned to brain science for ideas as to how to make better computers. The fallacy came when brain scientists also looked to computers for clues as to how the human mind might work.[189] The Evolutionary Psychologist, Melvin Konner defines the Artificial Intelligence error as follows: ***"if a machine can do something the brain does, the brain probably does it similarly."*** He points out that no component of a computer has any real resemblance to a neurone. Nor do computers possess anything close to a natural language. Also; "… no amount of elegant machine learning can prove that the brain, a pastiche made by evolution from old, inelegant parts, acquires language the way connectionist networks do. The central questions of language development must be answered by what the developing brain actually does." Konner further criticises laboratory research on the brain; "… the assumption that if the brain can do something in a laboratory, then that must be how it does it in nature. This might be called Skinner's error." He goes on to refer to Skinner's inglorious

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[189] Keysers, Christian, 'The Empathic Brain', 2011, Social Brain Press, p.29/30

efforts to explain language learning in Behaviouristic terms (which we looked at in chapter three).[190]

The psychologists, Greenspan and Shanker, argue that the failures of Artificial Intelligence (AI) can be traced to the fact that it is; "… so firmly entrenched in the mechanist tradition of psychological explanation, …" which completely overlooks; "… the role of emotions in the development of the mind." For example, AI scientists try to explain; "… the development of pattern-recognition skills as a purely cognitive phenomenon: the result of certain strategies by which the brain processes stimuli. According to AI, these strategies are part of the brain's intrinsic architecture. But this argument simply replaced one mystery with another: Where did these built-in strategies come from?" Greenspan and Shanker answer this question partly be natural selection but also, critically by affective development very early in life; "… infants begin to engage in long chains of co-regulated affective interactions, which enables them to recognise the various patterns involved in satisfying their emotional needs. Based on culturally transmitted caregiving practices, they learn what different kinds of gestures and facial expressions signify. They learn that certain kinds of facial expressions, tones of voice, and behaviour are connected with an individual's mood or intentions, or with certain sounds and actions, and so on." These patterns of affective development, they argue, are enormously older and, by implication, more basic than the sort of information processing procedures which are simulated in computers; "… early humans, and even, to some extent, nonhuman primates and early hominids, were developing

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[190] Konner, Melvin, 'The Evolution of Childhood: Relationships, Emotion, Mind', 2010, Belknap Press of Harvard U.P., p.255/256

these pattern-recognition skills - and the sense of self that results long before the explosion of symbolic thinking that is associated with anatomically modern human beings.”[191]

Dennett’s Unconvincing Examples:
1) Black and White Mary

Having considered these general critiques of Cognitive Computationalism, I propose to attack this Cart-Tonist position by examining a number of arguments put forward by Dennett and Pinker in favour of an ‘information-only’ account of mind and consciousness and demonstrate their shortcomings. My first example is Dennett’s response to Frank Jackson’s famous, 1982, thought experiment addressing the problem of colour qualia. This runs as follows: Mary is a brilliant scientist who is, for whatever reason, forced to investigate the world from a black and white room via a black and white television monitor. She specialises in the neurophysiology of colour vision and acquires (for the purposes of the experiment) all the physical information that can possibly be obtained about what goes on when we see colours. She discovers, for example, just which wavelength combinations from the sky stimulate the retina, and exactly how this produces the uttering of the sentence ‘The sky is blue’, via the central nervous system, the contraction of the vocal cords and expulsion of air from the lungs. What will happen when Mary is released from her black and white room or is given a colour television monitor? Will she learn anything new or not? Dennett comments quite extensively on this thought experiment and he believes that the answer to the question is no, she won’t learn anything new.

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[191] Greenspan, Stanley, and Shanker, Stuart, ‘The First Idea’, 2004, Da Capo Press, p.132/133

Dennett insists that the crucial premise in this thought experiment is the phrase; 'She has ***all*** the physical information.' This, he says, is not readily imaginable, so people tend to imagine either that she knows lots and lots or that she knows everything that modern science knows today about the neurophysiology of colour vision. But, as Dennett points out, what we know today is almost nothing, so if this were all she knew, it wouldn't be surprising that Mary should learn something new when she first saw colour. Dennett, however, imagines that Mary would have written down, 'in exquisite detail', exactly what physical impression a yellow, blue or green object, etc., would make on her nervous system before she is shown any coloured objects. Then he imagines that they show her a blue banana. According to Dennett, Mary tells the experimenters: "I already knew exactly what thoughts I would have (because, after all, the 'mere disposition' to think about this or that is not one of your famous qualia, is it?). I was not in the slightest surprised by my experience of blue (what surprised me was that you would try such a second-rate trick on me). I realise it is hard for you to imagine that I could know so much about my reactive dispositions that the way blue affected me came as no surprise. Of course it's hard for you to imagine. It's hard for anyone to imagine the consequences of someone knowing absolutely everything physical about anything!"

Dennett concedes that his way of telling the story doesn't prove that Mary learns nothing new, but, then, he claims, neither does the usual version prove that she does! Rather the usual version is what he calls 'an intuition pump' that works by making you think that it, 'just seems obvious' that she does. The story as an ‘intuition pump’ achieves this by lulling you into imagining something other than what the premises require: Dennett says; “It is of course true that in any realistic, readily imaginable version of the story, Mary would come to learn something, but in any realistic, readily imaginable version she might know a lot, but she would not know ***everything*** physical. Simply imagining that Mary knows a lot, and leaving it at that, is not a good way to figure out the implications of her having ‘***all*** the physical information’ – any more than imagining she is filthy rich would be a good way to figure out the implications of the hypothesis that she owned ***everything***. It may help us imagine the extent of the powers her knowledge gives her if we begin by enumerating a few of the things she obviously knows in advance.”

Dennett then elaborates on the consequences of Mary knowing everything there is to know about colour: “… she knows precisely which effects - described in neurophysiological terms - each particular colour will have on her nervous system. So the only task that remains is for her to figure out a way of identifying those neurophysiological effects ‘from the inside’. You may find you can readily imagine her making a little progress on this - for instance, figuring out tricky ways in which she would be able to tell that some colour, whatever it is, is not yellow, or not red. How? By noting some salient and specific reaction that her brain would have only to yellow or only for red. But if you allow her even a little entry into her colour space in this way, you should conclude that she can leverage her way to complete advanced knowledge, because she doesn’t just know the salient reactions, she knows them all.” And consequently, when she finally does get to experience colour, she learns nothing new about it because she already knows everything there is to know about colour![192]

The spurious sense of 'obviousness' which denies this and claims that she ***must*** learn something new, is (says Dennett) a great obstacle to progress in understanding consciousness. He says it's, "… the most natural thing in the world to think of consciousness as occurring in some sort of Cartesian Theatre, and to suppose that there is nothing really wrong with thinking this way." But, he claims, this obviousness disappears if you look carefully and in detail at the brain's actual activities, and try to imagine an alternative to this simplistic model of consciousness. Dennett compares this with learning how a stage magician performs a conjuring trick, he says: "Once we take a serious look backstage, we discover that we didn't actually see what we thought we saw onstage. The huge gap between phenomenology and physiology shrinks a bit; we see that some of the 'obvious' features of phenomenology are not real at all: There is no filling in with figment; there are no intrinsic qualia; there is no central fount of meaning and action; there is no magic place where the understanding happens. In fact, there is no Cartesian Theatre; "…We still have plenty of amazing phenomena to explain, but a few of the most mind-boggling special effects just don't exist at all, and hence require no explanation."[193] It seems to me (and I suspect most other people, including the philosopher, David Hume) that Dennett is making (perhaps wilfully) a fundamental mistake about certain 'obvious facts' of human experience; namely,

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[192] Dennett, Daniel,'Consciousness Explained', 1991, Boston, MA: Little Brown, p.400/401

[193] Ibid, p.434

the difference between knowing something intellectually and having an immediate, personal experience of it. I'm going to claim, along with Hume, that no matter how much information you have (even if you have ***all*** that it's possible to have), there's an insurmountable difference between knowing something intellectually (i.e. based on information about it) and ***feeling*** something by direct experience of it. In my view Dennett is 'getting away with a lot' in his analysis of this story precisely because our knowledge about colour and our qualic experience of colour are hard to disentangle, and so are easily confused. But what if we choose to reconsider this thought experiment having substituted the experience of extreme pain instead of the experience of seeing colours? At the opposite extreme, we can also consider orgasm: does the philosophical Behaviourist really claim that ***experiencing*** severe pain or orgasm is the equivalent to having a globally comprehensive knowledge of the neurophysiology of these two phenomena? (Anglo-American, Analytic philosophy has a well-known aversion to the extremes of human experience, compared to for example the Existentialist School - a vicar's tea party compared to a bull fight.)

Severe Pain Instead of Colour

So, let's rewrite the 'Mary' thought experiment, though this time substituting for the calm, neutral experience of seeing colour, the extreme experience of receiving a severe electric shock. We could imagine her as a medical student researching every aspect of these pain reactions from a neurophysiological point of view. She might finally understand, in exquisite detail, all of the neural processes which a normal human being would experience while receiving a severe electric shock. But would this knowledge enable her to feel the same pain as the person who is actually receiving the shock? (As with the the 'colour' experiment, let's just assume that it's possible to acquire a ***complete*** knowledge of this for the purposes of this thought experiment.) My point is as follows: would any amount of intellectual knowledge of these processes make Mary howl in pain? Dennett's championing of Mary's knowledge is, of course, part of his philosophical denial of the reality of qualia. He's arguing here from a 'Cart-Tonist' Cognitive point of view. So what can we learn about Cart-Tonist Cognitivism from Dennett's response to this thought experiment? The principal lesson is that Dennett does not make a distinction between knowledge (or information) and experience (or feeling): all operations in the brain and all products of those operations, are conducted in, or take the form of, information processing. In Cognitivism, the term 'information processing' means the manipulation of physical symbols in the brain, by means of algorithmic rules, resulting in the deduction of logical inferences. That's why, according to Cognitivism, Mary learns nothing new about colour – she's already processed all the information and made all the right inferences.

This Cognitivist way of seeing brain function is closely linked to the idea that the brain is very similar to, and amounts to nothing more than, a digital computer. We can now revisit the 'Mary' thought experiment, though this time with the focus on pain as the qualic experience: the 'pre-experience' Mary would have all the digital, propositional information that there is about how a severe electric shock affects the human nervous system. But, until she is wired up and the power is turned on, she wouldn't have had the experience of what such a shock feels like in analogue, energetic terms. Consequently, she ***would*** learn something new from actually experiencing the shock. Incidentally, Dennett has also actually denied the reality of pain: “If you can make yourself study your pains (even quite intense pains) you will find, as it were, no room left to mind them: (they stop hurting). However, studying a pain (e.g., a headache) gets boring pretty fast, and as soon as you stop studying them, they come back and hurt, which, oddly enough, is sometimes less boring than being bored by them and so, to some degree, preferable.”[194] I, and I believe most people who’ve actually experience a severe electric shock, would disagree profoundly with these claims from Dennett.

Let’s now look at this Cart-Tonist denial of any distinction between information and experience from the other end of the spectrum of extreme qualic experience; orgasm. We can start with the venerable anti-Behaviouristic joke: a committed Behaviourist has just finished having sex with his lover. He says to her; ‘it was great for you! How was it for me?’ As you have no doubt grasped, the essence of this joke is that for a Behaviourist the phenomenon of orgasm consists entirely of its outward, visible (and hence observable) manifestations. The further implication is that an orgasm does not include a mental state which can be experienced and reported on by the subject. Of course, there are a lot of ***involuntary*** physiological processes involved in having an orgasm: here’s a ‘googled’ description of them; “Orgasm is the sudden discharge of accumulated sexual excitement during the sexual response cycle, resulting in rhythmic muscular contractions in the pelvic region characterised by sexual pleasure, together with the characteristic patterns of

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[194] (Dennett, 1978) quoted by Minsky, Marvin, ‘The Emotion Machine’, 2006, New York: Simon & Schuster, p.67

change in heart rate, blood pressure, and often respiration rate and depth. Experienced by males and females, orgasms are controlled by the involuntary or autonomic nervous system. They are often associated with other involuntary actions, including muscular spasms in multiple areas of the body, … and, frequently, body movements and vocalisations." (Now that you've read this objective account of the physiology of orgasm, and so have received at least the basic information about orgasm, did it make the earth move - even just a little bit?) In reality, of course, it's the intensely pleasurable ***subjective feeling*** of orgasm which motivates people to engage in sexual behaviour. Some might argue that rejecting the idea that, in addition to information processing, we also have analogue, emotional-energetic experiences, might simply reduce us to the status of zombies. But, it appears that Dennett would not have a problem with this outcome: regarding the possibility of the existence of philosophical zombies, he comments; "They're not just possible, they're actual. We're all zombies. Nobody is conscious … I can't prove that no such sort of consciousness exists. I also cannot prove that gremlins don't exist. The best I can do is show that there is no respectable motivation for believing in it."[195]

Dennett's Unconvincing Examples:
2) Snake-Aversion

In another part of his campaign to discredit qualia as independent phenomena, Dennett suggests two different explanations for the uneasiness most of us feel when we see a snake: firstly, "Snakes evoke in us a particular intrinsic snake-yuckiness quale when we look at them, and our un-

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[195] Dennett, Daniel,'Consciousness Explained', 1991, Boston, MA: Little Brown, p.406

easiness is a reaction to that quale." This is his 'qualic explanation'; in other words, the qualia that the presence of snakes provoke in us cause us to recoil from them. Dennett's second, functional, explanation runs as follows; "We find ourselves less than eager to see snakes because of innate biases built into our nervous systems. These favour the release of adrenaline, bring fight-or-flight routines on line." In other words, what causes our aversion to snakes is the evolutionary process that built this reaction into our nervous systems. The qualia we experience when this aversion reaction is triggered are mere byproducts, or epiphenomena. Dennett's point with these two alternative explanations is that the first, 'qualic' explanation is really no explanation at all: he argues against the idea that an 'intrinsic' property, such as snake-yuckiness, pain or the aroma of coffee, can explain a subject's reactions and dismisses the notion as 'hopeless'.

Such explanations are, Dennett implies, tautologies and he compares them with conception and pregnancy: "Conception is, by definition we might say, the cause of pregnancy. If we had no other way of identifying conception, telling someone she got pregnant because she conceived would be an empty gesture, not an explanation. But once we've figured out the requisite mechanical theory of conception, we can see how conception is the cause of pregnancy, and informativeness is restored. In the same spirit, we might identify qualia, by definition, as the proximal causes of our enjoyment and suffering (roughly put), and then proceed to discharge our obligations to inform by pursuing the second style of explanation." But, Dennett laments, 'qualophiles' (which is what he calls those who believe in qualia) dismiss such explanations. They insist; "… that qualia 'reduced' to mere complexes of mechanically accomplished dispositions to react are not the qualia they are talking about. Their qualia are something different."[196]

As above, Dennett uses a comparison with conception and pregnancy as a way to illustrate that referring to a quale as an explanation for a subject's reaction is empty and meaningless; like telling a woman that she's pregnant because she's conceived without further explanation. It's ironic that Dennett's recommendation for escaping this tautological emptiness is to figure out the requisite mechanical theory of conception. This would then make conception an effective explanation of pregnancy. But why doesn't Dennett apply this procedure to the quale-reaction relation? The probable answer is that Dennett is already convinced that qualia are dualistic illusions and thus cannot form part of an effective 'mechanical', or even biological, theory to explain a behavioural reaction. Other researchers, however, are not burdened by such preconceptions: Jaak Panksepp, for example, believes that qualia can be seen as the 'missing link' between the classic Behaviourist phenomena of stimulus and response. Rather than the causality moving directly from stimulus to response, Panksepp believes that 'affect' (subjective feeling) provides the rewards and punishments necessary to reinforce behavioural patterns.

In Panksepp's description of snake-aversion, therefore, qualia would be part of the mechanism! His account would work as follows: rather than being irrelevant epiphenomena, the qualia of fear and disgust provoked by the sight of the snake, would be part of the mechanism via which the

[196] Ibid, 385/386

primate organism mobilises an appropriate aversive response. In other words, these unpleasant qualic feelings would stimulate the primate to flee, or otherwise, avoid the snake. Thus, for our protection against snakes, evolution has hard-wired a connection between perception of snakes and the negative qualic experiences of fear and disgust. Note that this explanation gives the subjective qualities of qualia a proper causal role which Dennett's version denies. In other words, what we feel subjectively actually has effects on how we behave! (Where our feelings come from is a different question. We shall answer it ontologically in parts three and four of this book.)

Dennett's Unconvincing Examples:
3) Acquired Tastes

Dennett engages in his customary convolutions in his efforts to explain acquired tastes. As we saw above, in his example of snake-aversion, Dennett dismisses qualia as basic, hard-wired alarms and attractions. This position, however, makes it difficult to explain how what was first found aversive later becomes attractive. Here is Dennett's explanation as to why this happens; "… these native alarmists have subsequently been co-opted in a host of more complicated organisations, built from millions of associations, and shaped, in the human case, by thousands of memes. In this way the brute come-and-get-it appeal of sex and food, and the brute run-for-your-life aversion of pain and fear get stirred together in all sorts of piquant combinations. When an organism discovers that it pays to attend to some feature of the world in spite of its built-in aversion to doing that, it must construct some countervailing coalition to keep aversion from winning. The resulting semi-stable tension can then itself become an acquired taste, to be sought out under certain conditions." Again, let me suggest that this is an extremely cumbersome explanation. But is there a simpler and more elegant one?

I believe there is. It consists of accepting the physical reality and causal efficacy of both qualia and emotional affect: I accept Whitehead's view that both can be seen as intrinsic parts of the fabric of reality in his ontology. However, we can begin our refutation of Dennett from the work of the fairly mainstream researcher, Antonio Damasio. His explanation of qualia can, hopefully, lead us to a more elegant theory of acquired tastes. Damasio begins by identifying what he calls 'Qualia 1' and 'Qualia 2'. The first (in my interpretation) refers back to the classical concept of qualia: a 'raw', direct sensory feel in one of the sense modalities. As to 'Qualia 2', Damasio says the following; "… if subjective experiences are accompanied by feelings, how are feeling states engendered in me in the first place?" Damasio is far from clear, but this, I believe, could be interpreted as the emotional response to a simple basic quale. The two components together, 'Qualia 1' and 'Qualia 2' produce what Damasio would call a feeling. The picture of qualic experience which emerges could be described as follows: qualic 'feelings' consist of two components; first a simple, immediate quale, such as seeing red. Second, an emotional evaluation of this quale. Damasio implies that the first, initial quale is closer to basic neurophysiological processes, not necessarily conscious and therefore 'easier' to explain. Damasio asks why these physical, neuro-chemical events should feel like something? The answer, as I interpret Damasio, is that qualia are always accompanied by emotions and feelings. He says; "No set of conscious images of any kind and on any topic ever fails to be accompanied by an obedient choir of emotions and consequent feelings." He uses the example of watching dawn over the Pacific Ocean: "I am not just seeing, I am also emoting to this majestic beauty … This is happening through no deliberation of mine, and I have no power to prevent the feelings, any more than I had any power to initiate them."[197]

As a confirmation of this 'always-togetherness' of qualia and emotion, Damasio identifies a small range of real-life situations, where the expectable emotional response to qualia may be reduced or even fail to materialise: "The most benign would come from the effect of any drug capable of shutting down emotional responsivity — think of a tranquilliser like Valium, an antidepressant like Prozac, or even a B blocker such as propranolol, all of which, given enough dosage, dampen one's ability to respond emotionally and consequently to experience emotional feelings. Emotional feelings also fail to materialise in a common pathological situation, depression, in which aspects of positive feeling are notoriously absent and in which even negative feelings such as sadness may be dampened so severely that the result is an affectively blunted state." So the conclusion is; if you suppress or eliminate emotional responsiveness, you inevitably also suppress or eliminate qualia, thus giving the formula; 'Sensation + Emotion = Quale'. Damasio produces another illustration of the 'always-togetherness' of qualia and emotion; listening to music: "… there are two musical tracks going in my mind, one with the Bach piece that is playing right now and another with the music-like track with which I react to the actual music in the language of emotion and feeling." In other

197 Damasio, Antonio, 'Self Comes to Mind', 2010, London: William Heinemann, p.330/331

words, Damasio is saying that as the auditory qualia of the actual music progresses in the brain, it is immediately accompanied by an emotional response, perhaps to each note or phase or pause.[198]

This two-component conception of qualia now permits me to provide, as promised, my more elegant explanation of changing tastes and acquired tastes: the basic qualia, for example, our immediate experience of the bitter taste of an olive, the discordant sound of a musical phrase, or the aggressive shapes and colours of an abstract painting, would remain the same (presumably determined by our neurophysiology), but our emotional response to them can change, or be 'educated' over time. So, what was once aversive or repellent, can become pleasurable or intriguing, although the basic experience itself has not changed! This seems to me a much more flexible and realistic account of acquired tastes that Dennett's cumbersome one, which (let's remind ourselves) argued that, via culture, inbuilt alarms and attractions can become combined and blended into more sophisticated tastes and aversions: they get; "…co-opted in a host of more complicated organisations, built from millions of associations, and shaped, in the human case, by thousands of memes." But these changes require the construction of some 'countervailing coalition' to keep, for example, aversion from winning: "The resulting semi-stable tension can then itself become an acquired taste, to be sought out under certain conditions." Not a very parsimonious explanation! What makes it so cumbersome is Dennett's studied refusal to accept a causal role for ***affect***, the subjective experience of emotion. Other researchers are not so inhibited: Edmund Rolls, (an emotion researcher)

[198] Ibid, p.330/331

endorses just such a role for subjective emotion by claiming that their evolution enabled genes to specify goals and rewards, rather than directly determining specific behavioural responses; "... the theory that genes set many goals for action does not mean that our behaviour is determined by genes. Modern evolutionary theory has led to the understanding that many traits, particularly behavioural ones, may have some genetic basis but that does not mean they will inevitably appear, because much depends on the environment ... in evolution genes specify rewards and punishers that are goals for action, but do not specify the actions themselves, which are flexible and can be learned."[199] As above, another researcher into the anatomy and physiology of emotion, Jaak Panksepp, supports this position and indeed claims that this causal role of affect is the 'missing link' which can make the functioning of the stimulus-response relationship far more flexible than Behaviourism's passive-mechanical account.

Pinker's Critique of Energetic Processes

Pinker provides a more comprehensive explanatory framework into which Dennett's 'anti-energetic' arguments above can be neatly fitted: he says; "… the Computational theory of mind is a radical challenge to our everyday way of thinking about the mind, because the theory says that the lifeblood of thought is information. That goes against our folk notion that the lifeblood of thought is energy or pressure." As an example of the Folk Psychological approach to behavioural explanation, he asks why did the disgruntled postal worker shoot up the post office? The common explanation tends to assume that 'pressure' had been 'building

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[199] Rolls, Edmund, 'Emotion Explained', 2005, Oxford U.P., p.vii

up' for many years until he finally 'burst': "The metaphor is that thought and emotion are animated by some super-heated fluid or gas under pressure. Now, there is no doubt that this hydraulic metaphor captures something about our experience. But we know that it is not literally how the brain works: there is no container full of fluid and channels through which the fluid flows. And that raises an important scientific question: Why is the brain going to so much trouble to simulate energy and pressure, given that it doesn't literally work that way?" Let's note a couple of features of Pinker's comments above: Pinker's version of energetic processes takes a curiously Nineteenth Century form. Thought and emotion are; "… animated by some super-heated fluid or gas under pressure." One is guided immediately to the steam engine as a model for the mind, or (more generously) to Freud's rather crude, (and un-self-published) hydraulic theories.

But, Pinker assures us, "… we know that it is not literally how the brain works: there is no container full of fluid and channels through which the fluid flows." I think we all know that there isn't some version of a steam engine in the brain. (This strikes me as a strange example of Dennett's ally, Pinker, making use of Dennett's despised 'intuition pump'.) We should perhaps recall that for the last century we have been living in the quantum world, where 'energetic processes' are no longer confined to superheated fluids or gases under pressure. Pinker's second comment worthy of note is; " … there is no doubt that this hydraulic metaphor captures something about our experience." He clearly concedes that this is how emotion feels to us, in our 'folk wisdom'. But he, just as clearly, 'knows' that we are wrong about this. His position on this is an example of Cart-Tonist 'ultra-realism', which the American physicist, Henry Stapp, and many other quantum physicists would dismiss as utterly without foundation in modern science.

Pinker uses the irrationality and involuntariness of romantic love to illustrate the difference between the way emotions feel to us and the 'reality' of the logic and functionality, which actually explains what emotions are 'really' about: even potential mates who appear to be the perfect match on paper, he says, turn out to be unexciting when met in person. And, vice versa, someone can fall deeply in love with a person who, on rational grounds, seems completely inappropriate. Why should this be the case? Pinker explains; "Entering a partnership through totally 'rational' shopping poses a problem. If you have set up house with the best person you have found up to a certain point, then by the law of averages, sooner or later someone even better will come along. At that point a rational agent would be tempted to drop a wife or husband like a hot potato."

Fortunately, however, as Pinker points out, pair-bonding requires sacrifices, such as forgoing opportunities with other potential partners, plus all the time and energy involved in child-rearing, etc. So, rational spouses might fear that their partner would reject them if someone better came along. Consequently, they'd have been foolish to have entered the relationship in the first place: "Thus, we would have the paradoxical situation in which what is in the interest of both parties - that they stick with each other - cannot be effected because neither one can trust the other if the other is acting as a rational, smart shopper."[200]

Pinker suggests that evolution has solved this problem by ensuring that we're hard-wired ***not*** to fall in love for rational reasons. Consequently, we're less likely to fall out of love for rational reasons. A mutual feeling of helplessness makes the exchange of promises between a love-struck couple mutually believable, despite the fact that they both know that it may be rational to break that promise in the future. In other words, Pinker is arguing that our brains make elaborate calculations in order to select the best available mating partner, but this rational process is hidden from us by an overwhelming, and 'irrational', feeling of falling in love with the ultimately selected partner. This 'illusory' feeling protects the family unit by blocking the brain from using similar rational calculations to abandon the originally chosen partner when a more attractive one becomes available.

In a nutshell, my critique of this argument is that it's a very cumbersome way of denying the reality and causal effects of the emotions involved in falling in love. The origins of these emotions may not be consciously available to us. (For example, the quality of our early relationships with our parents do, I believe, have a very significant influence on the people we select as mates.) However, as we shall see later, the work of Panksepp and Whitehead can lead us to the conclusion that the affects we experience while engaged in the process of mate selection (popularly known as 'falling

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[200] Pinker, Stephen, 'How the Mind Works', 1999, (address to the American Psychological Association, August 1999) [online] http://www.kurzweilai.net/how-the-mind-works

in love') are sufficient causes in themselves to drive our behaviour and to enable the bonding necessary for effective child-rearing. In a similar vein, Keysers notes that if he had asked his grandmother how she knew she was in love; "… she would have told me that she just 'felt' it. She knew that the processes through which we understand other people are not logical but intuitive." And, in contrast to Pinker's analysis, Keysers concludes: "Ironically, it might be that our grandmothers' intuitive answer 'because I felt it' captures our nature better than do most rational scientists' vision of the mind as a logical, disembodied information processing computer."[201]

Tallis' Critique of 'Infomania'

Further in our efforts to refute Infomania, we can turn to the physician and philosopher, Raymond Tallis, who is extremely critical of the use of the term 'information' by Cart-Tonists. He says that engineers use the term loosely to describe; "… unconscious devices designed by conscious human beings to help them communicate with other conscious human beings. If we remove this element of human intention, essential to ordinary communication, then 'information states' or 'information-bearing states' can be made to encompass pretty well everything that happens or exists." Tallis quotes the example of the American philosopher, Patricia Churchland arguing that; "… nervous systems are information-processing machines." Tallis asks where this information comes from? If we're only interested in physical processes, then we can only really talk about energy impinging on the nervous system. And, again,

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201 Keysers, Christian, 'The Empathic Brain', 2011, Social Brain Press, p.29/30

Tallis asks, how this energy becomes transformed into consciousness?

He concludes; “Clearly you can’t process something you don’t have: a stomach isn’t a dinner-processing machine unless it gets a dinner from somewhere.” Tallis suggests that the Cart-Tonist, reductive-materialist orthodoxy has a simple answer to this puzzling question: the information is actually present in the energy that impinges on the nervous system! Tallis explains that: “The job of the nervous system is no longer the metaphysical task of turning energy into consciousness or material events into information: it simply has to extract and process it.” He quotes the psychologist, Johnson-Laird who argues that; “… light reflected from surfaces and focused on the retina contains a large amount of information.” Tallis comments that; “This must surely be the easiest solution to the puzzle of how energy is transformed into information: the information is in the energy, although there is still some work to be done.” And Tallis once again quotes Johnson-Laird, who says: “No matter how much information is in the light falling on the retina, there must be mental mechanisms for recovering the identities of things in a scene and those of their properties that vision makes explicit to conscious-ness.”

Tallis clearly regards this as a very sloppy use of language. He insists that: “Once information is uprooted from consciousness - and from an informant or from the experience of being informed and of wanting (or, come to that, refusing) to be informed - then any kind of nonsense is possible. According to the information theorists … the (unconscious) structure of organisms contains or embodies information and the physical energy impinging on the nervous system also contains information. It is possible to go further than this: for the fully paid-up information theorist, information is simply and literally everywhere."[202]

Tallis insists that 'real information' requires a conscious receiver. The use of 'information' in any other sense amounts to a misuse of the term. He suggests that the start of this slippery slope of misusing the term 'information', lies in accepting the idea that information can be 'stored' outside the human body, outside conscious organisms, for example, 'in' books or 'on' disks. This loose way of thinking results in the concept of 'information' being; "… liberated from a consciousness being informed or wanting to inform… it seems to suggest that information can be given and received without the involvement of consciousness. This is, of course, misleading: the information in a book, or on a disk, is only potential information. And, speaking more generally, it is not information but only potential information that can be inscribed outside a conscious individual. It remains merely potential until it is encountered by an individual requiring and able to receive information, able to be informed. In the absence of such a (conscious) organism, it is sloppy and inaccurate to refer to the states of objects as 'information'."

This inaccuracy has had very serious and negative consequences: Tallis laments that; "… the illegitimately, and at times insanely, extended misuse of the term 'information' is absolutely pivotal to establishing the conceptual confusions necessary to the seeming fruitfulness and apparent explanatory power of much modern thought about the mind and

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[202] Tallis, Raymond, 'Aping Mankind: Neuromania, Darwinitis and the Misrepresentation of Humanity', 2011, Routledge, loc: 4457-4508

the brain - and ourselves. This converges in the computational theory of mind. By playing on different meanings of ‘information’, and transferring epithets like a volleyball, it is possible to argue that minds, brains, organisms, various artefacts such as computers and even non-living thermodynamic systems are all information-processing devices. Because they are deemed to be essentially the same in this vitally important respect, they can be used to model each other; homology and analogy can run riot. Once the concept of information is liberated from the idea of a conscious someone being informed and from that of a conscious someone doing the informing, anything is possible.”[203]

These strictures from Tallis are a very necessary rebuke to the ambitions of the computational theory of the mind. Indeed, I would like to establish it as a principle in this book that any function capable of being carried out by a human-made device, such as a computer, cannot be cited in a definition of what is essential for consciousness. At one stroke, this principle thus attempts to refute all theories equating consciousness with computation and the operations of computers: computers may be ‘aware’ of many things but they care about none of them. Nor does their ‘knowledge’ ever evoke an affective response. Again, a computer can be said to ‘know’ things and to have ‘knowledge’ stored within it. Despite this, the conventional classical approach often seeks to equate consciousness with ‘knowing’, in the form of ‘mental states’ comprising propositional statements. A subspecies of this ‘knowledge’ definition is the ‘reportability’ definition, where consciousness is defined as having the ability to report what one is aware of. (There is, of course,

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[203] Ibid, loc: 4555-4565

the excuse that this philosophic tradition started way before we had the salutary example of a machine that could 'know'.) The errors of computationalism arise from looking at mind and consciousness exclusively from the outside. Along with the great folk tradition of humanity, I also believe that there is an 'innerness' to consciousness. This, however, is ignored by Cart-Ton world's ontology - hence the errors. These can only be avoided by grasping the ontological nettle, jettisoning this constrictive ontology and moving on to one more consistent with the findings of modern physics, and this we will attempt to do in parts three and four.

The 'Embodiment' of Mind and Consciousness

The concept of the 'Embodiment' of mind and consciousness can be seen as, at least a partial, 'rebalancing' of Cart-Ton world's cognitive obsession with information as the only legitimate causal explanation for human mental and experiential capacities (as described above). Embodiment encompasses far more than the simple notion that the brain needs a body to sustain it: as Nobel prize laureate in medicine, Gerald Edelman says: "All … activities (of the brain) … depend on signals to the brain from the body and from the brain to the body. The brain's maps and connections are altered not only by what you sense but by how you move. In turn, the brain regulates fundamental biological functions of your body's organs in addition to controlling the motions and actions that guide your senses. These functions include fundamental aspects of sex, breathing, heartbeat, … as well as the responses that accompany emotion."[204] The philosophical implications of the theory of Embodiment

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[204] Edelman, Gerald, 'Second Nature', 2006, Yale U.P., p.24

challenge the traditional Western view that human reason transcends the body: on the contrary, Embodiment claims that the mind is crucially shaped by our bodily experience. The very structure of reason arises from the interaction of our bodies and our brains. This can be clearly seen, for example, in the mass of sensorimotor metaphors, which pepper our languages.[205] The linguists, Lakoff and Johnson (1999), in particular have used the concept of the Embodied mind to try to explain how thought and language are based on sensorimotor metaphors. For example, we talk about 'grasping' an idea, describing relationships as 'warm' or 'cold' and try to 'get on top' of difficulties. What is being subverted here is the Cartesian notion that humans have a 'faculty of reason' which is divinely implanted and exists in a separate ontological realm from the body. For Descartes the emotions and the senses were wholly dependent on the body and consequently were in opposition to, and needed to be kept in check by, reason. This was one of the bases for the traditional Western notion of a conflict between 'reason' and 'emotion'. This prejudice can still be found to be influencing Cart-Ton inspired research projects.

Among the leading spokespeople of Embodiment theory were two Chileans, Francisco Varela and Humberto Maturana. In the 1970s, they developed what came to be known as the 'Santiago Theory of Cognition'. Fritjof Capra summarises it as follows: its central insight; "… is the identification of cognition, the process of knowing, with the process of life. Cognition, according to Maturana and Varela, is the activity involved in the self-generation and self-perpetuation of living networks. In other words, cogni-

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[205] Capra, Fritjof, 'The Hidden Connections', 2002, HarperCollins, p. 53

tion is the very process of life. The organising activity of living systems, at all levels of life, is mental activity. The interactions of a living organism - plant, animal or human - with its environment are cognitive interactions. Thus life and cognition are inseparably connected. Mind - or, more accurately, mental activity - is immanent in matter at all levels of life."[206] (As we shall see later, this last statement is highly congruent with the ontology we're calling 'Whit-Tum world', which I'll describe in detail later.) Varela, et al. ask the question; 'which comes first, the world or the perception?'.

This is, of course, a 'chicken and egg' question: the conventional 'chicken' answer is that the world 'out there' has pre-given properties, which exist prior to any perception generated by our cognitive systems. The less conventional egg position claims that the cognitive system projects its own world, and that the apparent reality of this world is merely a reflection of internal laws of the system. Varela, et al. try to establish a 'middle way' between these two extremes. They point out that; "These two extremes both take representation as their central notion: in the first case representation is used to recover what is outer; in the second case it is used to project what is inner. Our intention is to bypass entirely this logical geography of inner versus outer by studying cognition not as recovery or projection but as embodied action." 'Embodied action', they explain, means two things; "first, that cognition depends upon the kinds of experience that come from having a body with various sensorimotor capacities, and second, that these individual sensorimotor capacities are themselves embedded in a more

[206] Ibid, p.30

encompassing biological, psychological, and cultural context. By using the term action, we mean to emphasise once again that sensory and motor processes/perception and action, are fundamentally inseparable in lived cognition."

According to Varela, et al. perception and action are not merely linked, they actually evolved together. "Since all the movements of the organism are always conditioned by external influences, one can, if one wishes, readily treat behaviour as an effect of the milieu. But in the same way, since all the stimulations which the organism receives have in turn been possible only by its preceding movements which have culminated in exposing the receptor organ to external influences, one could also say that behaviour is the first cause of all the stimulations. … In such an approach, then, perception is not simply embedded within and constrained by the surrounding world; it also contributes to the enactment of this surrounding world."[207]

In questioning the assumption of a 'pre-given world', Varela and Maturana use the metaphor of a secret agent being parachuted into a foreign territory and then having to try and find out everything he can about it. In contrast, their position is that the world is entirely perceiver-codependent; organism and environment co-evolve together, influencing and being influenced by each other. Because organisms are very closely coupled, by evolution, to the environments they live in, such environments can never be foreign to them. In fact, the organism plays a big part in creating its environment: Varela calls this, 'bringing forth a world'. To illustrate this he uses what can be called a 'submarine ana-

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[207] Varela, F., Thompson, E. and Rosch, E., 'The Embodied Mind', 1991, MIT Press, p.172-174

logy': Onshore observers go on board to congratulate a submarine's navigator for his skilful entry to a harbour. But the navigator is puzzled, explaining that he has never left the submarine and knows nothing about anywhere else. His navigational skill is based entirely on responding to the set of indicators, controls and procedures at his disposal and adapting to feedback from them. This is exactly the situation of the organism as an agent in its environment: it simply uses its genetic heritage, plus what it has learned from experience, to respond to the world that it is in, without necessarily representing and modelling the environment around it. (Interestingly, Maturana took the same position regarding the relationship between perception and 'external reality' as the Copenhagen interpretation of quantum mechanics: he insisted that our perceptions of what we observe are all that we can be certain about. It is, therefore, fruitless to speculate over the nature of the 'thing-in-itself' which may or may not cause these observations: an example of a biologist manifesting 'failure of ontological nerve' along with the physicists.)

Once the Embodiment position had become established a large and lively debate emerged regarding its anti-representational stance. A lot of this revolved around an analogy with the Watt governor designed to illuminate how the model of the Embodied mind differs from that offered by the Cart-Tonist, cognitive approach. The Watt governor was a mechanical feedback device invented to regulate the speed of a steam engine. This debate and analogy can, I believe, be integrated with Whitehead's position concerning perception and representation. I will therefore leave the presentation of these developments till chapter thirteen on the Synthesis of 'Whit-Tum world'.

Popper's Three Worlds

Despite their criticisms of Cart-Ton world, all of the positions which we have reviewed above can, more or less, be located within the currently predominant ontological paradigm. The purpose of this chapter (and, indeed, this entire book) is to nudge these criticisms towards a clear and fully conscious ontological challenge to Cart-Ton world. One partial, and early, exception to this came from the great modern philosopher, Karl Popper. In the late 1970s, he proposed an alternative ontology to Cartesian dualism, which, as we saw, is one of the pillars of Cart-Ton world and is based on the division of the universe into two essentially distinct substances: *res cogitans* and *res extensa*. Popper's three-worlds theory is based on the common-sense view that physical and mental states not only exist, but also interact in both directions. Such effective Interactionism would solve the mind-body problem. Popper's version of Interactionism, differed in several important ways from Descartes. Firstly, rather than Descartes' two worlds, Popper proposes three: in addition to the Cartesian dichotomy between the physical and mental worlds, Popper introduced a third domain comprising the cultural products of the human mind. Additionally, in place of Descartes dogmatic certainty, Popper proposes his system as a heuristic aid to understanding (which he insists is one of the main objectives of science). Though he modestly adds that; "… complete understanding, just like complete knowledge, is unlikely ever to be achieved." Popper's World 1 comprises the material universe as revealed to us by modern physics. Popper points out that: "Whether or not biology is reducible to physics, it appears that physical and chemical laws are binding for living things ... Living things are (therefore) material bodies, they are processes, and like some other material bodies, (clouds, for example) they are open systems of molecules: systems that exchange some of their constituent parts with their environment. They belong to the universe of physical entities or states of physical things." He also draws our attention to entities which are generally accepted as part of the physical world, but which conceptually are not material, such as; processes, forces, fields of forces. Popper comments that they, "... interact among one another, and therefore with material bodies. Thus we conjecture them to be real ... even though their reality remains conjectural."[208]

Popper's World 2 consists of mental states. He claims that these states are real since they interact with our bodies. In support of this, Popper argues that the, "...Epiphenomenalist view is unsatisfactory. It admits the existence of a World 2, but denies it any biological function. It therefore cannot explain, in Darwinian terms the evolution of World 2. And it is forced to deny what is plainly a most important fact - the tremendous impact of this evolution ... upon World 1."[209] In this context, Popper emphasises the active, 'hypothesis-testing' nature of sensation and perception; "… the neurophysiology of the eye and that of the brain suggest that the process involved in physical vision is not a passive one, but consists in an active interpretation of coded inputs. It is in many ways like problem solving by way of hypotheses. (... our sense organs themselves may be likened to hypotheses or theories - theories about the structure of our

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[208] Popper, Karl and Eccles, John, 'The Self & Its Brain', 1977, Springer Verlag, p.36/37

[209] Ibid, p.74

environment, and about the kind of information most needed and most useful to us.)" Popper, therefore, regards; "… the view that our perceptions are 'given' to us as a mistake: they are 'made' by us, they are the result of active work." Consequently, Popper claims that our; "… visual perception is more like a process of painting a picture, selectively ... than one of taking random photographs."[210]

Popper's World 3 contains the products of thought, language and culture. This includes abstract objects such as scientific theories, stories, myths, tools, social institutions, feats of engineering and works of art. World 3 differs fundamentally from Plato's ideal realm, in the sense that it is a human not a divine creation and consequently is full of mistakes and misconceptions; for example, false beliefs, unsuccessful scientific theories and ineffective works of art. Plato's ideal realm, of course, contained nothing but perfect forms. World 3 objects, although they exist in World 1, are embodied and given extra meaning by World 3. For example, the intrinsic value of Hamlet as a World 3 object is embodied many times in World 1, the physical world. Popper asserted that World 2 and World 3 can interact because World 3 is partially autonomous. For example, the development of scientific theories in World 3 leads to unintended consequences, in that problems and contradictions may be discovered within World 2. Another example is that the process of learning causes World 3 to change World 2.

To conclude this chapter, let me suggest that, while all of these challenges to Cart-Ton world may move us in the right direction, they are partial and lacking in ontological

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[210] Ibid, p.45-49

substance: the critique I've labelled 'infomania' is almost entirely negative and Embodiment and Popper's Worlds, while suggesting alternative theoretical directions in which to look, fail to provide a substantive, coherent and comprehensive ontological worldview. Many may conclude that no such option is available. I, however, believe that the later, ontological work of Alfred North Whitehead does, in fact, provide such an option, when combined with the work of other theorists concerned with the ontology of quantum mechanics, for example, the French physicist, Bernard d'Espagnat (1989).

Conclusion: Qualia Necessary for Learning

Finally, we can look at the implicit implications of the theory of qualia which I have been invoking in opposition to Infomania. I'll spell this out in great detail later in the book, but here I can simply state my belief that qualia are necessary for learning, especially what I'd call 'deep learning': I use this term to refer to the life-forming experiences which occur predominantly in early infancy, when the human organism is especially sensitive and vulnerable to intense, affective qualic experience. As per the quote from Edmund Rolls earlier in the chapter, this sensitivity provides us with our enormous behavioural flexibility in adapting to the vast range of global and emotional environments in which we are fated to live. In neurophysiological terms, Gerald Edelman has described this process as 'neural Darwinism'. During this process neurones and neural connections compete with each other for survival in infancy when the superabundance of neurones from birth are 'pruned' or 'weeded out' to 'sculpt' the brain into a particular adaptive form, suited to the environment in which the infant is growing up. I'm going to suggest that the emotional 'structuring' which this process brings about is based on and guided by affective qualic experience. In other words, the qualic experiences of early infancy provide the rewards and punishers which structure the infantile brain.

To illustrate this thesis, we can appeal to a thought experiment, this time of my own devising: imagine two female toddlers, two to four years old. Both their fathers have a beard. One father is an exemplary parent; kind, patient, attentive and supportive of his daughter. The other father sexually abuses his daughter. Now imagine those same two girls as young women, engaged in the process of searching for sexual partners. They are at a party when a mutual friend introduces them to an eligible young man, who just happens to have a beard. The first young woman reacts with immediate attraction and interest. She engages the young man in lively conversation and may eventually enter into a relationship with him. The second young woman, faced with the same young man, flinches on seeing his face, makes an excuse and leaves the party without speaking to the bearded young man. The immediate, and contrasting reactions of the two young women can be seen as the result of early 'deep learning': for the first, encountering 'beard qualia' triggered happy memories of a very positive childhood relationship with her father. Whereas for the other, 'beard qualia' provoked traumatic memories of fear and pain. The crucial point here is that it is the affective responses (based on previous emotional life history) to the beard ***qualia*** which caused this difference in behaviour.

A historical anecdote can also be cited as to the reality of qualic effects on behaviour. At the end of the Nineteenth Century, the Swiss neurologist, Édouard Claparède, performed an influential experiment demonstrating how the trauma of a painful event could be retained even if short term memory was lost. His experiment involved a woman who suffered from a form of amnesia. She had all of her old memories as well as her basic reasoning skills, but the recent past was not remembered. Despite the fact that Claparède had been treating her over a prolonged period, when he greeted her, each day, she failed to remember him and treated him as a stranger. As an experiment during one of their meetings, Claparède hid a pin in his hand. As he reached to shake the woman's hand, he pricked her with the pin. The next day, as always, she did not remember him. But when Claparède went to shake her hand, she refused. In terms of my qualic learning theory, the 'take away message' is that the direct, immediate quale of the pinprick was powerful enough to change her behaviour, even though she couldn't remember the experience.

Finally, let me suggest that, while all of the challenges to Cart-Ton world above may move us in the right direction, they are partial and lacking in ontological substance: the critique I've labelled 'infomania' is almost entirely negative, and Embodiment and Popper's Worlds, while suggesting alternative theoretical directions in which to look, fail to provide a substantive, coherent and comprehensive ontological worldview. Many might conclude that no such option is available. I, however, believe that the later, ontological work of Alfred North Whitehead does, in fact, provide such an option, especially when combined with the ontology of quantum mechanics, as provided by the work of physicists such Bernard d'Espagnat and Henry Stapp. We'll look more closely at all this in parts three and four of this book.

Chapter Seven: A More Positive View of Qualia

Having looked at Cart-Ton world's denial and dismissal of qualia in chapter four, in this chapter we'll consider some later developments which have moved somewhat in the direction of 'Whit-Tum world'. Most of this critique and speculation is taken from a major book by the British psychologist, Jeffrey Gray; "'Consciousness: Creeping up on the Hard Problem', 2004. I agree almost entirely with his arguments, with the caveats that; a) he doesn't go far enough in the direction to which we, in this book, are heading and b) (keeping one foot firmly in the Cart-Tonist tradition) he has a blind spot for affect (the subjective experience of emotion). We end the chapter with an 'Embodied theory of colour'. This challenges the Cart-Tonist account of qualia from a different direction; by questioning its realist assumption of a 'pre-given' world.

Themes in the Problem of Qualia

Gray considers three different explanations for qualia; from function, from neurophysiological processes, or from quantum-mechanical processes. "In each case, there would need to exist, in the first place, some kind of a systematic relationship between, on the one hand, qualia (red, green, high C on a violin, the hum of a bee, the smell of a rose, etc.) and, on the other, variation in the chosen process (functional, neurophysiological or quantum-mechanical)." Without such systematic relationships none of these three efforts to explain qualia can claim the status of scientific explanations: "For both function and neurophysiology rather well-established systematic relationships already exist. So, for example, colour sensations are well correlated with, on the one hand, the behaviour of allocating colour names to defined types of surfaces (function) and, on the other, activity in area V4 of the visual system (neurophysiology)." On the other hand, Gray points out that these relationships are just correlations rather than mechanistic explanations and that, while still wildly speculative, quantum theories of qualia, might hold out the promise of actual explanation.[211]

Gray also raises seven questions regarding the nature of qualia: 1) What are they? For example, are they simple and singular, as they are experienced, or are they complex constructs of the brain? 2) How does the brain produce them? 3) Why does the brain produce qualia (given that it can perform so many complex operations, without them)? 4) What do they do? 5) How did they evolve? 6) What survival value do they confer? 7) Is it only brains that can produce them? Gray then says that: "No theory at present comes anywhere near answering all of these questions, nor even any one of them satisfactorily. An answer to Question 7 will almost certainly have to wait upon answers to the others. This is because, in the absence of a general theory of consciousness, there are no behavioural tests by which we can distinguish whether a computer, a robot or a Martian possesses qualia. Questions 1-3 are likely to prove the hardest of all. Questions 4-6 go together: if we knew what qualia permit an organism to do that otherwise it cannot,

[211] Gray, Jeffrey, 'Consciousness: Creeping up on the Hard Problem', 2004, Oxford U.P., p.256

then the survival value of this function is likely to be obvious."[212]

Two of Gray's postulated origins for qualia, above (Functionalism and neurophysiology), are clearly compatible with the ontology of Cart-Ton world. Given that a major purpose of this book is to repudiate this ontology in favour of a more quantum-oriented one, which I've called 'Whit-Tum world', it may be useful for me to simplify Gray's qualia enquiries into three issues and to leap ahead by supplying some preliminary 'Whit-Tum' conclusions. ('Whit-Tum world' being an abbreviation of 'Whitehead-Quantum world'.) So the first 'qualia issue' concerns whether qualia are simple or complex. 'Complex' meaning composed of a large number of subcomponents, assembled via a protracted period of neural processing between initial input at the sensory organs and the appearance of a quale in the mind/brain. 'Simple' meaning that the quale appears directly and immediately, from first neural contact with the sensory input.

Second, where do qualia originate from? Is the whole brain, or possibly the whole organism, necessarily involved in their production, or do they spring, fully formed from the initial contact with the sensory organs? The third issue concerns the relationship between function and qualia: Functionalism equates qualia with their supposed function, Gray and many others question this. Let me now provide my Whit-Tum view on each of these issues: 1) I believe that the sentient part of qualia are simple and direct phenomena and that they enter the organism, fully formed. 2) As per

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[212] Ibid, p.66/67

this answer to issue 1, qualia are necessarily not produced by the entire brain or organism, but must have some form of external, independent existence, prior to entering the organism. 3) As regards function, I do not believe that qualia have any direct causal role in any particular function of the human organism, in the sense of enabling us to perform this function better than we could if we didn't have qualia.

On the other hand, I believe that qualia do have a particular, special 'function', which is to facilitate 'deep personal learning' by evaluating experience: by 'deep personal learning' I mean the developmental processes which produce in each individual the particular characteristics and traits which together form their personality. By 'evaluating experience' I mean our positive, negative or neutral affective reactions to sensations. For these processes to be effective, we need to have a capacity for subjective sensory experience for two reasons: firstly, we need our relevant sensations to have a ***subjective feel*** in order to be conscious of them, and, secondly, we need to be conscious of them in order to have a ***conscious affective response*** to them. (In terms of personal development, many of these initial reactions may over time become ***unconscious***, but I believe that the initial reactions need to be conscious.)

As Panksepp and Damasio claim, these processes are part of human homeostasis. Our positive or negative affective responses act as rewards or punishments, which consciousness can use to learn from experience, which, in turn, equips us with flexible, behavioural alternatives. What this means is that the function of qualia, and thus of consciousness itself, is to enable learning from experience. Without consciousness, for example as 'philosophical zombies', we would only have our unconscious, automatic responses to stimuli from the environment. We wouldn't be able to reflect on the qualic after-effects of our behaviour, in order to either reinforce certain forms of behaviour or seek to change them.

Hard and Easy Problems and Public and Private Qualia

Having leapt ahead and got a peek at where we're going, we can now look at how various researchers have paved the way from Cart-Ton world's denial and dismissal of qualia towards this distant destination. For example, (as a starting point) the American philosopher John Searle frequently asserts that the problem of consciousness ***is*** the problem of qualia. The Australian philosopher, David Chalmers made the same point by referring to the 'Hard Problem' of consciousness. The point they're making is that many of the phenomena associated with consciousness, apart from qualia, can potentially be explained within the current scientific paradigm: they are the 'easy problems'. It's trying to explain the sentience of qualia which is currently defeating science. The British psychologist, Jeffrey Gray lists examples of the 'easy' problems of consciousness. These include; sensory detection, sensorimotor action and the extraction of meaningful (intentional) categories grounded in the activities of such sensorimotor feedback mechanisms.[213]

Gray then insists that the Hard Problem of consciousness concerns only perceptual experience: "The philosophical term 'quale' (plural, 'qualia') is a convenient way of refer-

[213] Ibid, p.66

ring to the elemental components of perceptual experience (the colour red, an itch, the smell of jasmine, and so on)." He goes on to repudiate any 'further philosophical baggage' associated with the concept of qualia. This is congruent with the notion (to which, following Whitehead, I subscribe) of the sentient part of qualia as simple and direct phenomena, as opposed to elaborate constructs. Gray also points out that many writers have disputed the notion that conscious experience can be broken down into any such elemental components, but, he claims, there's considerable empirical evidence to support this view. He emphasises again that; "Mental processes that do not involve qualia do not pose any difficulty in principle for scientific analysis." And concludes: "From a scientific perspective, then, the Hard Problem of consciousness boils down at its simplest to just this; how does the brain create qualia?"[214] As we shall see below, this assumption that the brain 'creates' qualia is; a) characteristic of Cart-Ton world ontology and b) potentially, contrary to Gray's description of qualia as simple and direct.

Gray identifies a prejudice in the general discussion of qualia; namely that qualia are exclusively a phenomenon of perception of the public 'real' world 'out there'. This prejudice has enabled the 'executive-function' approach to consciousness to exclude consideration of qualia because they tend to use examples from more private regions of consciousness, such as; thought, imagination, mental arithmetic, problem solving, etc. These activities do not require direct, ongoing interaction with the public world. However, Gray points out that even the more private regions of con-

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[214] Ibid, p.301/302

sciousness also involve qualia: he gives the example of remembering a novel telephone number. Some people can simply remember it without further awareness, i.e. without qualia. The alternative way is to sub-vocally keep repeating it to yourself, either spontaneously or as a deliberate strategy to remember it. In this way, Gray says, “I hear the telephone number ‘in my head’ in much the same (but not identical) way as if I spoke it aloud. The number comes, so to speak, clothed in phonetic qualia. So the problem of qualia is posed in these private regions of consciousness just as it is in the more public places.”

Gray’s point here is that aII the same questions about qualia (where do they come from, what is their function, how do they affect information processing, etc.?) affect private conscious functioning just as much as public perception. In fact, Gray claims that their functions seem to be more significant in the private spaces: “Suppose, for example, that you are lying on the grass gazing at the sunset. That simple act of perception of the public world starkly poses the Hard Problem: whence the conscious visual appearance of the sunset? But there seems to be little if anything in the way of executive function, no mental operations to be managed. You just sit there and look. Such simple, qualia-dominated moments are harder to find when one is not in direct interaction with the world out there. Purely internal qualia are evanescent or require just that special rehearsal of working memory to prevent them from becoming so. The exceptions to this rule (marching pink elephants, say, after years of excessive alcohol abuse or a dose of LSD) have the smack of the pathological about them.”[215] Again, I agree with Gray’s

[215] Ibid, p.162/163

analysis, but am disappointed by his selection of trivial examples: what's again missing is affect! Surely, our affective responses to our ongoing life-experience is overwhelmingly our largest, and/or most important, category of qualic experience! But Gray, in the tradition of consciousness researchers, hardly refers to it.

Challenging the 'Qualia-Function' Link

As Gray says, Functionalism is the dominant theory in Cognitive Science (and/or in what I would call Cart-Ton world ontology). So, in order to challenge the Cart-Tonist view of qualia (as presented in chapter four), it's necessary to question the Functionalist perspective on qualia. Some forms of Functionalism ***do*** accept the existence of 'inner mental processes', the more liberal versions even accept conscious mental states, which could qualify as qualia. However, Functionalism's concessions to qualia turn out to be only a marginal advance on Behaviourism's absolute denial of their existence. This is because Functionalism (as its name implies) focuses almost exclusively on behavioural functions as the important factors in biological evolution. Natural selection favours those neural mechanisms which most successfully mediate the behaviours required for survival and reproduction.

In Functionalism, therefore, the evolution of qualia occurs only parasitically via their linkage to behavioural functions, which are (according to Cart-Tonism) the really important phenomena from a Darwinian point of view. Again, Functionalism fails to advance much beyond Behaviourism, in failing to take any particular interest in the biological details of brain processes. Functionalists do take into account the detailed circuitry of the brain that mediates between input and output as part of the full description of a function, but they're interested in it only as circuitry! Essentially, Functionalism simply added a 'mental black box' to the middle of Behaviourism's even more basic 'stimulus-response' model.

The tissue out of which brain circuits are made, and the means by which the circuits operate, are regarded within Functionalism as irrelevant. In principle, the Functionalist holds, one could mimic the circuitry with any materials to hand, and the result, in terms of either conscious or unconscious processing, would be the same. Same functions, same processes: if the relevant brain process attains consciousness, so would the same function, no matter what material was used to carry it out. As we saw in part one, Functionalism always associates qualia with functions: Gray summarises this key Functionalist contention as follows: "Firstly, for any discriminable difference between qualia, there must be an equivalent discriminable, difference in function." Secondly, there's also the reverse claim that; "… for any discriminable functional difference, there must be a discriminable difference between qualia." He concludes that, for Functionalists; "... two different qualia cannot be associated with the same function, nor two different functions with the same quale."[216] A consequence of this functionalist account of qualia is that one would not expect to find qualia which adversely compete with the functions to which they are linked.

Gray suggests that there are two different flavours of functionalism: "In one flavour, qualia are reduced to so little

[216] Ibid, p.304

beyond the functions with which they are linked as to be virtually eliminated. This is more or less Dan Dennett's position in his book 'Consciousness Explained'. In the other, the separate existence of qualia is explicitly acknowledged, but all empirical data are treated as requiring explanation in terms only of the functions with which they are linked." This position essentially reduces qualia to epiphenomena: they are caused by functions and their underlying mechanisms, but have no causal effects of their own. "In either flavour, qualia are left with no substantive properties of their own."[217] Gray describes this as trying to reduce qualia to cybernetic processes: by which he means that for Functionalists, qualia are nothing more than their associated functions, where a 'function' consists of nothing more than; a set of inputs from the environment, a set of outputs (in the form of actions) and the neural information processing that takes place between these inputs and outputs. Gray states that, for Functionalists, "... a quale and its associated Function are, when all the details are taken into account, identical." So, Functionalism's grudging acknowledgement of the existence of qualia takes this form of simply equating a quale with the information processing that takes place when a human organism carries out a biological function.[218] So, for Functionalism, there's no question of qualia having an energetic, analogue form, which may, for example, act as a causal force in rewarding or punishing particular forms of behaviour.

Gray, however, has carried out research on word-colour synaesthesia which challenges this Functionalist equation

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[217] Ibid, p.132/133

[218] Ibid, p.304

of qualia with function. Word-colour synaesthetes are individuals who whenever they hear or see a particular word, also have a conscious experience of a particular colour linked (for them) to this word. As Gray comments; "... there is no evidence that the experienced colour plays any functional role in the synaesthete's auditory or visual processing of words." He suggests, in fact, that the experienced colour may actively interfere with such processing. "Thus, there is no relationship between the occurrence of the synaesthete's colour experiences and the linguistic function that triggers them. This conclusion is incompatible with the Functionalist analysis of conscious experience."[219] The phenomenon of word-colour (and number-colour) synaesthesia, therefore, clearly violates the Functionalist principle of 'same functions, same qualia'.

Gray raises another challenge to this Functionalist's equation of qualia with function, this time appealing to the phenomenon of 'Blindsight'. As mentioned in chapter two, this curious condition can occur in people who have suffered damage to the specifically visual areas of their brains (or the pathways leading to them). They claim to have no conscious experience of seeing in the eye (or eyes) affected. Yet, when encouraged to do so, they can make perfectly correct 'guesses' as to the colour and shape of objects shown to their 'blind' eye, and even name them. In other words, the Blindsight sufferer has the function of sight but none of the qualia, which according to Functionalism, should be associated with it. This is, of course, the opposite problem from the word-colour synesthete, who has qualia which have no apparent function at all! Both of these phe-

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[219] Ibid, p.140

nomena, therefore, throw considerable doubt on the Functionalist assertion that qualia can be simply equaled with their associated functions.

Qualia Vs Concepts

Rather than being byproducts of functions, Gray believes qualia to be 'raw feels', meaning that: "They can occur without any high-faulting trappings of intentionality, spatial framework, feature binding or the like. They can similarly occur in the absence of any manipulation by so-called executive processes (attention, working memory, decision making and so on)." Gray notes that many in the scientific and philosophical communities believe that qualia are more complicated than straightforward, qualitative, perceptual 'raw feels'; "… most views hold that qualia necessarily include also further properties like intentionality, or result from special processes like feature binding." Gray himself, however, is skeptical as to the need for these surplus properties and processes, as there is empirical evidence that 'raw feels' can be dissociated from them: "These dissociations become particularly (but not uniquely) obvious when you consider the bodily senses (itches, tingles, feelings of fatigue, drowsiness, and the like), … These lack intentionality just about as generally as conscious percepts of the external world possess it."[220]

He points out that: "A toothache will make its presence felt despite your best efforts to prevent it."[221] This is very close to the position of the neurophysiologist Jaak Panksepp, who makes a clear distinction between qualia and concepts:

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[220] Ibid, p.302

[221] Ibid, p.303

the ability to identify even simple objects, like a chair, has to be learned by a gradual abstracting of information from experience. Qualia, however, come to us directly and ready-formed: As Panksepp explains; "...when you first saw the colour red, you rapidly came to know all that you would ever know directly about this colour. Your visual experience was not abstracted from other experiences, ... Seeing red (or yellow or brown) is not a concept because you are intelligent enough to manipulate symbols in the form of language, you can use words like red, scarlet, crimson, and ruby to differentiate and label nuanced differences in your experiences. But the raw phenomenal experience of seeing red does not require intelligence. So words like chair represent intelligent concepts, while other words like red represent primary experiences that require no intelligence except, of course, if you wished to label the experience."[222]

Panksepp goes on to argue that a concept is an abstraction, usually gleaned from a multiplicity of experiences. He uses the example of a chair: "The first time that you ever saw a chair, you might not have known what it was, because you certainly did not yet have a concept that it was a good place to rest. You had to learn that every individual chair is a constituent member of the broader group - leading you to conceptualise what a chair is." Panksepp, therefore, objects to the position taken by Edmund Rolls who has suggested that emotional evaluations somehow become concepts too and that we only experience these emotions when we put these concepts into words. Panksepp responds by pointing out that: "Only intelligent animals can do this, which is why (Rolls) believes that only they can experience affects. We

[222] Panksepp, Jaak,'The Archaeology of the Mind', 2012, New York, W.W. Norton & Company, p.79

suspect this may not make sense evolutionarily, for we know that people experience pain before having the concept of pain."[223]

So, if the Cart-Ton view is wrong and qualia ***do*** have some kind of non-reducible, subjective essence, does this require a return to Cartesian dualism, where qualia emerge out of an entirely separate 'spiritual' realm? Not necessarily: as we shall see, this version of qualia (the one we all experience on a daily basis) can be reclaimed by shifting from the outmoded ontology of Cart-Ton world to Whitehead's Process Philosophy in which the subjective essence of qualia is an inherent part of the ultimate building blocks of reality. In unconscious anticipation of this, Gray speculates that simple 'energetic' qualia (once generated) become a sort of 'raw material' for the mind: they can be put to service in a great diversity of cognitive processes: he suggests that qualia; "… can be used to construct intentional objects, like roses or faces or voices, or multi-modal scenes, or maps of space; they can be used to communicate complex propositions to others in speech or to yourself in thought; they can (within limits) be attended to or ignored, remembered or forgotten, (here is where executive processes come into their own). But they do not depend upon any of these for their existence. That is why the Hard problem of consciousness can be reduced to the straightforward question: how does the brain create qualia?"[224] Gray here expresses a very clear vision as to how these simple 'energetic' qualia (built into the fabric of the universe, as claimed in Whit-

[223] Ibid, p.79

[224] Gray, Jeffrey, 'Consciousness: Creeping up on the Hard Problem', 2004, Oxford U.P., p.303/304

Tum world) can be utilised by the human brain, but, being trapped in the outmoded ontology of Cart-Ton world, he's still stuck with its traditionally assumed problem; "… how does the brain create qualia?"

Qualia in Other Animals?

Another angle of critique against Cart-Tonism's denial and dismissal of qualia is the question as to whether animals other than humans have qualia. Gray, for example, reports several experiments indicating that various animals, such as cats and monkeys, demonstrate intentionality in their perception: in one experiment a pattern of stimulation on a monkey's retina was constant, yet the monkey sometimes reported a starburst and sometimes a face. Gray explains: "This is just the kind of phenomenon that philosophers include in their concept of intentionality: that is to say, a constant input from the world outside is interpreted as this or as that." Gray comments that any attempts by cognitive neuroscientists to interpret these results without attributing qualia and intentionality would be very far-fetched: "We cannot ask a rat or a mouse if it feels pain, but we can observe its speed of withdrawal from a hot surface. Rodents respond to opiates just as human beings do. They do so because their brains contain the same receptors for opiates, and the same endogenous opiates that act upon these receptors, as does the human brain. We could maintain that, nonetheless, only human beings experience pain, just as one could maintain the Ptolemaic view of the Heavens despite the observations made by Copernicus. But it just isn't parsimonious to do so, especially since observations like these can readily be multiplied many times over."[225]

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[225] Ibid., p.68-70

So Gray concludes, that animals ***do*** have qualia and intentionality. He also speculates that experimenters may be well on the way to finding the neural mechanisms that underlie intentionality and even eventually for qualia (which to me merely indicates his residual Cart-Tonism). In a very similar way, Jaak Panksepp also insists that all mammals (and perhaps other species) ***do*** have subjective emotional qualia. He says that conventional neuroscience implies that; "… affects can only occur either in animals that are intelligent enough to interpret emotional physiology or in animals that have language. This would mean that only human beings and perhaps some other primates are affective creatures. Presumably less intelligent mammals copulate without lust, attack without rage, cower without fear, and nurture without affection."[226] (Of course, within the ontology of 'Whit-Tum world', the question as to whether other species would also utilise the inherent abundance of experience built into the universe would hardly arise.)

Are Qualia Epiphenomenal?

Given that animals may have qualia, Gray then starts looking for explanations as to why evolution should have selected for this. He firstly points out that the existence of animal qualia would rule out a large number of 'false leads'; e.g. psychologist and classical scholar, Julian Jaynes' suggestions that consciousness began with the Greeks[227] or that consciousness requires human language or that its survival value (by way of sexual selection) lies in its contribution to

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[226] Panksepp, Jaak,'The Archaeology of the Mind', 2012, New York, W.W. Norton and Company, p.17

[227] Jaynes, Julian, 'The Origin of Consciousness', 1976, Houghton Mifflin

specifically human intelligence or artistic sensitivity. Any theory, in other words, that requires specifically human abilities. But, as Gray points out, we are still left with the puzzle of finding a function for qualia, one moreover that has sufficient behavioural power to have ensured their Darwinian selection: “We failed to find it in the kind of rapid on-line behaviour needed to avoid a predator (which takes place too fast for consciousness to come into it); and it is unlikely that the female rat, cat or even monkey picks her mate for the quality of his conscious life.” Given all this, Gray is willing to consider the possibility that qualia in fact have no real function - that they are merely epiphenomena. In considering this Epiphenomenal view of qualia, Gray comments that it would make consciousness, as it were, only half involved in causality; “… it is caused but has no further causal effects of its own.” A famous analogy for this (first proposed by Thomas Huxley) is the whistle on a steam locomotive: steam in a steam-powered locomotive plays a causal role in driving the train’s wheels. Excess steam is blown off through the funnel, making a whistling sound. This sound plays no part in powering the train, though it is caused by the same events that do power it. Gray says that, in the same way; “… Epiphenomenalists suppose that conscious experiences are caused by the same brain processes that drive behaviour, but do not themselves add to the causal effects of those processes.” But in relation to the simple analogy of the locomotive’s whistle, Gray points out that the whistle may provoke comments and might even make you whistle too. So the whistle’s melody has ***some*** causal effects, even though it doesn’t contribute to the powering of the train.[228]

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[228] Gray, Jeffrey, ‘Consciousness: Creeping up on the Hard Problem’, 2004, Oxford U.P., p.70/71

The British mathematical physicist, Roger Penrose also explores a similar possible role for consciousness: he accepts that; "… in any reasonably rapid activity consciousness is just a passenger." On the other hand, he speculates; "… that natural selection has produced consciousness just for its role in deliberate thinking." Despite this concession, Penrose's suggested function for consciousness has a distinctly Cart-Tonist tinge to it: in his view we have consciousness in order to carry out the notoriously slow kind of conscious contemplation that is required for mathematical understanding, and he adds: "Perhaps the faculty of consciousness has evolved only for the purpose of such slow and contemplative mental activity, while the more rapid response times are entirely unconscious in action - yet accompanied by a delayed conscious perception of them which plays no active role."[229] My comments on these two speculations as to a function for qualia and consciousness is as follows: Gray's notion that the steam train whistle might provoke people into whistling too, at least contains a reference to our emotional-affective lives, even if a trivial one. Whereas, Penrose, in true Platonic fashion, reserves consciousness for the Divine realm of mathematics, not the earthy evolutionary struggle for survival and reproduction. As I shall argue at greater length in parts three and four, it is in just this messy biological struggle where I see consciousness and especially qualia playing a decisive role: infants need qualia and their associated affects to calibrate their brains in order to adapt to the environment to which fate has assigned them.

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[229] Penrose, Roger, 'Shadows of the Mind', 1994, Oxford Press, p.387

But despite these speculations, Gray insists, the Epiphenomenalist position cannot be lightly dismissed: a major question concerns the role of qualia in brain processes which appear simultaneously to give rise to them while discharging other functions. Gray uses the example of competitive tennis. Modern neuroscience tells us that a professional player will ***consciously*** experience his opponent's serve only ***after*** he has returned it. In other words, the player's return stroke is fully accounted for by the brain's unconscious sensorimotor functions. So, what role does the player's conscious perception of his opponent's serve play in his return stroke? In other words, what function does this qualia have in the player's response? An extreme Epiphenomenalist would answer none! Gray, however, does make a detailed suggestion as to a possible causal role for this type of qualia: he suggests that qualia play a crucial role in what he calls a 'late error detection system'. This, he claims, works as follows: cognitive systems in the brain construct a model of the external world, which is used to guide behaviour. The brain also operates what Gray calls a 'comparator system'.

This compares the outcomes of behavioural acts against the internal, cognitive model of the world. Qualia function as 'markers' of discrepancies between outcomes and the brain's world model. For example, consider a young child putting its hand on the hot plate of a stove at a high temperature. We know from neurophysiology that the child will remove its hand before he or she feels any pain. The pain qualia come later and, therefore play no part in correcting this potentially very damaging behaviour. What the qualia do contribute, however, (according to Gray) is to decisively mark the negative outcome of this behaviour and hence to render its repetition less likely. (In the case of the tennis player, the psychological ‘pain’ of failing to return a shot or the boost from successfully returning it, will mark all the associated muscle memories, etc., making the repetition of that particular stroke less/more likely.)[230] Again, my critique of Gray’s theory is that while it mildly objects to the Epiphenomenalism of Cart-Ton orthodoxy, it ignores ***affect***! Why does Gray’s ‘late error detection system’ require a cognitive model of the world, a cognitive ‘comparator system’ and cognitive ‘markers’ to alter future behaviour when other empirical researchers, such as Panksepp and (to a lesser extent) Damasio, have suggested affect alone could achieve this via an extension of homeostasis. (We’ll look at this is greater detail in part four.) Gray, along with other more committed Cart-Tonists seems to suffer from an ‘affect blindspot’. (As we shall also see later, affect is of central importance in Whitehead’s ontology.)

Gray also points out some of the absurd consequences of an extreme Epiphenomenalist position: he says, for example, that; “… books about the problem of consciousness could not be written if conscious experiences had no causal effects, for their production is one such effect. (Philosophers have speculated that zombies with no conscious experience might nonetheless develop the behavioural capacities that allow them to write such books. I shall, however, ignore this bizarre speculation.) More generally, neither language nor artistic creation, at least as we know them, would be possible without qualia.”[231] Gray pursues this relationship

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[230] Gray, Jeffrey, ‘Consciousness: Creeping up on the Hard Problem’, 2004, Oxford U.P., p.71/72 and p.291

[231] Ibid, p.71

between qualia and language and art by considering how qualia and meaning relate to each other: if qualia and meaning always occur together, how are they related to each other? Gray speculates that this relationship may be as arbitrary in perception as it is in language; "… at the evolutionary level, the relationship between perceptual qualia and functions may possess at least some of the flexibility that holds in ordinary language between qualia (phonetics) and meanings (semantics)." What Gray is saying here is that the meanings of spoken and written words are simply assigned to them by the language community in which they are used. (We can be certain of the arbitrariness of these assignments because different language communities use completely different words for the same things.) Gray's analogy here implies that just as human vocal equipment is capable of producing a certain range of sounds, to which human communities assign meanings, so nature is capable of producing a certain range of qualia, to which evolution has assigned meanings. As Gray says, solving the Hard Problem might then consist in trying to discover the syntactical and semantic apparatus which evolution has put in place between nature's range of qualia and human meanings. So that just as a word goes into a human ear or eye and a particular meaning emerges in the attached human brain, in a similar way, evolution has arranged that particular qualia, in the five sensory modalities, goes into, say, a mammalian organism and a particular meaning emerges for that organism.[232] As we shall see later, Gray's view here, that qualia emerge from nature in a ready-formed range of variations (although he makes no attempt to explain how this comes

[232] Ibid, p.306

about), is very consistent with Whit-Tum world's conception of qualia.

Gray goes on to use different art forms to illustrate these ideas regarding the relationship between qualia and meaning: "Novels in prose depend strongly on meaning; poetry, song and representational painting are pretty well balanced between meaning and qualia; while abstract art and non-vocal music depend almost exclusively on qualia." I believe that what Gray is suggesting here is that some qualia have clear, direct and functional meanings for humans, whereas other qualia don't. This is not to say that these other qualia have no 'meaning' at all; abstract art and non-vocal music are well-known to produce very significant aesthetic feelings and strong emotional reactions in people. We wouldn't have 'non-meaningful' art if we didn't have qualia. What Gray is trying to suggest by his observation on different art forms is that the assertion by Functionalism of a simple, direct and inevitable link between qualia and function is much too limited and narrow: Gray says; "The sheer existence of music-without-meaning, not to mention its powerful aesthetic effects, is further testimony to the independence of qualia from function."[233]

Qualia's Function is a Conceptual, not Empirical Problem!

Gray uses the example of colour perception to question the Cart-Tonist Epiphenomenal position: he describes how trichromatic colour vision evolved in monkeys and how this enabled them, for example, to pick out ripe red fruit from a background of green foliage, thus improving their diet. He

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[233] Ibid, p.307

then comments that; “These developments are all explicable - and perhaps even fully explicable - within our standard understanding of biology, physiology and behaviour. There is no need to add into this explanation any mention of qualia. Yet, given the close evolutionary relationship between the human and other primate species, it is likely that the development of colour vision in monkeys was accompanied by the development of the same qualia of red, green, orange, yellow, etc., by which it is accompanied in us.” Gray then asks what additional survival value did these qualia provide? If none, then they are simply Epiphenomenal. However, Gray continues that finding a function for qualia is not just an empirical problem, it’s also a conceptual one. This is because in modern scientific culture, the dualist notion that consciousness occupies a separate ‘psychic’ realm has virtually disappeared, so now it’s taken for granted that conscious experiences result from brain activity. Therefore, whenever a function is discovered or proposed for consciousness, it’s assumed that there are brain processes causing the accompanying conscious experiences. Gray comments that there seems to be nowhere in this causal chain which could allow for an extra contribution from consciousness: “And, if there were a gap in the chain, no-one has proposed a way in which conscious experience could contribute to its filling in a manner compatible with the way in which the rest of the chain operates. So this is not merely an empirical difficulty, it is also a conceptual one.”

Gray has here, I believe, hit upon the major challenge not only to the puzzle of qualia, but also the effort to explain consciousness as a whole. I would not, however, characterise it as a ‘conceptual’ problem, but rather as an ***ontological*** one: Cart-Ton world doesn't even have a consensual, instrumentalisible ***definition*** of consciousness. Consequently, there's nowhere within the framework of its ontology to even begin to address the problem of consciousness. Gray explains the scientific and philosophical background which has led him to this conclusion: "… there's no room in the standard scientific world-view for a class of entities that stands aside from full causal interaction with other classes. And, in particular, no other significant biological phenomenon stands outside the framework of natural selection. If we require that conscious experiences should fully participate in causal interactions with other biological phenomena (and, in particular, with brain processes and behaviour), we have to abandon the assumption that brain function and behaviour will yield to a full explanation within the framework of existing neuro-scientific and psychological concepts."[234] I believe that what Gray is saying here amounts to the following: if you believe that qualia have a function, then there are only two conceptual choices; a) a return to dualism (which most modern people will find scientifically unacceptable), b) a paradigm shift in our conceptions of brain function in relation to qualia. The purpose of this book is to provide just such a paradigm shift; from Cart-Ton world to Whit-Tum world.

An Embodied Theory of Colour

Part of this paradigm shift will involve rejecting the Cart-Tonist perspective which adopts the ontological position of looking at phenomena from the 'outside' only, while a move to Whit-Tum world would involve integrating an 'inner' together with an 'outer' perspective. These (somewhat

[234] Ibid, p.72/73

cryptic) remarks will be expanded at length later in the book. Meanwhile, we can look at a critique of Cart-Tonist theories of colour vision from Embodiment theories as a practical illustration of these concepts of 'inner' versus 'outer'. Some of the originators of the 'embodied mind' have also used the example of colour vision to illustrate their theory of qualia, but come to very different conclusions from the Cart-Ton theorists (e.g. like those of Dennett, which we looked at in chapter four). In their book, 'The Embodied Mind', Varela, Thompson, and Rosch argue that colours don't exist 'out there' but are 'brought forth' by the particular nature of our visual systems: they say; "… we will not be able to explain colour if we seek to locate it in a world independent of our perceptual capacities. Instead, we must locate colour in the perceived or experiential world that is brought forth from our history of structural coupling."[235] Their point here is that different kinds of organism will 'bring forth' different worlds (and this would include Dennett's colour-perceiving robot). For Varela, Thompson and Rosch; "… facts about neurophysiology determine the nature of an organism's colour experience. Were the neurophysiological facts to differ, so would the experiences of colour." As the American philosopher, Lawrence Shapiro, comments, Varela, et al. conclude that; "… organisms make their worlds: there is no pre-given world that an organism discovers." Shapiro goes on to say that this 'bringing forth of worlds' is in no way recognised by standard cognitive science: "Indeed, work in computational theories of vision takes for granted a world 'independent of our perceptual capacities'. This is a world of edges, shapes, surfaces, shading, and texture. It is the very

[235] Varela, F., Thompson, E. and Rosch, E., 'The Embodied Mind', 1991, MIT Press, p.165

independence of the world from our conception of it that makes possible the construction of algorithms that derive depth information from disparity."[236] Essentially, this Cart-Tonist conceptualisation of colour sees it as entirely comprehensible in terms of reflections from the surfaces of objects.

Varela, et al. first consider, and then dismiss, this idea that colour is simply surface reflectance. They claim that colours have certain properties and bear certain relations to each other: colour varies along the three dimensions of hue, saturation, and brightness; hues are either unique or binary and are organised into opponent pairs, etc. But, they say; "… if colour is just surface reflectance, we should be able to match these features of colour with corresponding features of surface reflectance. But there are no such corresponding features." These properties cannot be found in the structure of light. "For these reasons, the properties that specify what colours are simply have no non-experiential, physical counterparts." Second, they say; " … colour is not simply a perceived attribute of surfaces; it is also a perceived attribute of volumes such as the sky. Furthermore, we experience colours as attributes of afterimages and in dreams, memories, and synesthesia. The unity among these phenomena is not to be found in some non-experiential, physical structure but rather in colour as a form of experience that is constituted through emergent patterns of neuronal activity." They then consider the idea that the function of colour vision is to represent and thereby recover surface reflectance. Firstly, Varela, et.al note that this idea comes not from biological and ecological research into colour vis-

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[236] Shapiro, Lawrence, 'Embodied Cognition', 2011, Routledge, p.203/204

ion, but from the attempt to engineer artificial systems which can detect objects, including their colour. Such systems discount variations in illumination and simply recover the invariant reflectances in a scene. Varela, et. al. concede that this engineering research is important and useful, but insist that; " … it should not be allowed to dictate conclusions about the biological and ecological purposes that natural colour vision serves. Indeed, attention to these biological and ecological purposes reveals that colour vision is concerned as much with properties that change, such as lighting, weather conditions, and time of day, as with properties that remain constant, such as surface reflectance."[237]

Finally, Varela, et al. identify a; "… hidden, but much deeper problem with the objectivist view of colour vision: the objectivist simply assumes that surface reflectances are to be found in some pre-given world that is independent of our perceptual and cognitive capacities. But how are we to specify what counts as a surface? How are we to specify its edges, boundaries, texture, and orientation, if not in relation to some perceiver for whom these distinctions are relevant? The objectivist supposition that surface reflectances are pre-given rests on the assumption that since surface reflectance is a physical property, it can be measured and specified in entirely physical terms. But although the reflectance at any point in a scene can be specified in physical terms, what counts as a surface may in fact involve tacit reference to a type of perceiver." They claim that computational models obscure this because they; "… treat the visual system as if it were simply presented with a certain class of pre-specified objects whose reflectances must then be re-

[237] Varela, F., Thompson, E. & Rosch, E., 'The Embodied Mind', 1991, MIT Press, p.165/166

covered." This, they say, results in a considerable and artificial simplification of our actual perceptual situation: "The visual system is never simply presented with pre-given objects. On the contrary, the determination of what and where an object is, as well as its surface boundaries, texture, and relative orientation (and hence the overall context of colour as a perceived attribute), is a complex process that the visual system must continually achieve. This achievement, … results from a complex cooperative process involving active dialogue among all the visual modalities. Indeed, colour vision is actually involved in the cooperative processes by which the visual scene comes to be segmented into a collection of surfaces." They then quote two researchers (P. Gouras and E. Zenner), who say it's "… impossible to separate the object sensed from its colour because it is the colour contrast itself that forms the object." Thus, colours and surfaces go together: both are to be found in our embodied perceptual capacities.[238]

We have perhaps succeeded in this chapter in throwing doubt on the Cart-Tonist denial and dismissal of qualia as Epiphenomenal. However, we haven't really got very far in terms of establishing what qualia are, where they come from, what their function (if any) is, etc. Once again, we might permit ourselves a leap forward to the 'Whit-Tumist' conclusions in regard to the nature of qualia. Whitehead took from William James the notion that ultimate reality was composed of 'drops of experience'. This clearly implies that sentience and qualia are inherent in reality; they do not require a complex nervous system to 'generate' them. I'm going to suggest that these 'drops of experience'

[238] Ibid, p.166/167

constitute the ‘raw material’ of human consciousness, in the sense that they are the source of the sensations and the affects, for which contemporary science has failed to account. Whitehead’s philosophy also implies that what we feel about things, our intuitions, give us access to a profound level of reality, rather than distracting or misleading us (as Cart-Tonist would have it). Parts three and four of this book will seek to establish how this view of qualia can be seen to be consistent with contemporary science and especially quantum mechanics.

Chapter Eight: Rescuing Part of the 'Folk Self' from Cart-Ton World

Given that Cart-Ton world has fairly comprehensively deconstructed our Folk Psychological conception of the self, where can we turn in order to find a subjectively meaningful account of the self? The ultimate answer I'm offering in this book lies in the ontology of Whit-Tum world, but before we delve into the details of that strange realm, I shall pursue, in this chapter, a two-part strategy for the at least partial restitution of the 'Folk Self': first I shall try to loosen the stranglehold which Cart-Ton's dismissals of the self maintains over those imbued with modern scientific culture. In order to tackle this task, I'll look mainly at biological theories of the self and how these can be related to, and integrated with constructionist, linguistic and cultural approaches to the self.

Let me also remark here on the dense and convoluted language employed by many of the theorists I'm about to cite below, for example Damasio. Over the years I've become all too familiar with such knotty impenetrable thickets of text. In defence of such writers, I can only say, by way of expiation, that in order to reach the professional eminence, which they have all attained, these people will have been subjected to many long hours of 'indoctrination' (as I see it) in the ontology of Cart-Ton world. If they subsequently come to believe in the reality and importance of consciousness, the self and qualia, they are then confronted by an insoluble mental challenge: how to express these new beliefs within an ontological worldview which systematically denies their existence. This results all too often in some pretty turgid and indigestible prose.

Towards a Biological Self?

As we have seen, Cart-Tonist theories tend to be relentlessly 'self-denying': far from being the essential core of our personal identity, the self is for Cart-Tonists an illusion. At best a useful (because convenient) illusion, but essentially Epiphenomenal to the human organism. Clearly, the very idea that the self could have a basis in biology would contradict this Cart-Tonist orthodoxy. Strangely, despite his generally impeccable Cart-Tonist credentials, Dennett appears to have set out down the path of trying to establish a biological foundation for the self. He does this by focusing on the biologically necessary boundary between 'me' and 'not me', however; "This minimal proclivity to distinguish self from other in order to protect oneself is the biological self, and even such a simple self is not a concrete thing but just an abstraction, a principle of organisation." So, as we can see, Dennett very rapidly comes out in his true colours; the biological self is simply an 'abstraction, a principle of organisation'.

In addition, he's keen to point out the ambiguities in the self's biological foundation; "… the boundaries of a biological self are porous and indefinite." Here he's referring to the 'many, many interlopers' within the human body; "… ranging from bacteria and viruses through microscopic mites that live like cliff-dwellers in the ecological niche of our skin and scalp, to larger parasites - horrible tapeworms, for instance. These interlopers are all tiny self-protectors in their own rights." He rightly notes that; "... once something is outside of our bodies it is no longer quite part of us anymore - it becomes alien and suspicious - it has renounced its citizenship and becomes something to be rejected." Dennett then questions where the 'natural' biological boundary of the self should be located: he argues that external equipment, such as shells, internal equipment, and resident bacteria, should be included. He further argues that other individuals of the same species may be required for a viable self, for example beavers and termites require teams of individuals to survive in their ecological niches. While all this may be true, what Dennett is doing here is extending and diluting the notion of biological selfhood. [239]

Damasio agrees with Dennett as to the necessity of a boundary for selfhood, but Damasio's boundary is much more definite: it effectively guarantees 'singular individuality' based in biology: "One key to understanding living organisms, from those that are made up of one cell to those that are made up of billions of cells, is the definition of their boundary, the separation between what is in and what is out. The structure of the organism is inside the boundary and the life of the organism is defined by the maintenance of internal states within the boundary. Singular individuality depends on the boundary."[240] In other words (as we shall see below), Damasio is saying that, while the self is clearly influenced by social relations and the environment, it is nevertheless a biological reality.

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[239] Dennett, Daniel,'Consciousness Explained', 1991, Boston, MA: Little, Brown, p.414/415

[240] Damasio, Antonio, 'The Feeling of What Happens', 2000, Vintage, p.135

How Do Selves Come into Being?

Having seen how seen how vigorously Dennett rejects the 'Cartesian Theatre' as the seat of the self, it may now be a good time to see what degree of reality (if any) Dennett believes that the self can claim. He accepts that people have selves, but then asks do dogs? Do lobsters? He points out that now selves indisputably exist, but there; "… was a time, thousands (or millions, or billions) of years ago, when there were none - at least none on this planet. So there has to be - as a matter of logic - a true story to be told about how there come to be creatures with selves." He goes on to say that this 'as a matter of logic' will have to start with processes involving; "… the activities or behaviours of things that do not yet have selves - or are not yet selves - but which eventually yield, as a new product, beings that are, or have, selves." Dennett takes an evolutionary approach to these questions, and starts with what he calls 'the birth of boundaries', he says; "… the boundary between 'me' and 'the rest of the world', (is) a distinction that even the lowliest amoeba must make, in its blind, unknowing way."[241] (True Cart-Tonist that he is, Dennett could never countenance the view that the self might emerge from the accumulation of sentient beings stretching all the way down to the foundations of reality. For Dennett, and all the Cart-Tonists, such a view - which I shall argue for later - 'defies logic'.)

Dennett often seems to equate the self with the concept of an 'agent' (which for him may also be an illusory, but useful abstraction). At a minimum, he says; "… every agent has to know which thing in the world it is!" And, for sim-

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[241] Dennett, Daniel,'Consciousness Explained', 1991, Boston, MA: Little Brown, p.413/414

pler organisms, "... there is really nothing much to self-knowledge beyond the rudimentary biological wisdom enshrined in such maxims as 'When Hungry, Don't Eat Yourself!' and 'When There's a Pain, It's Yours!'" Dennett emphasises that these basic, biological principles for selfhood are automatic and hardwired, but that, in more advanced creatures, selfhood can be elaborated in more complex and perhaps ambiguous ways: he says; "In every organism, including human beings, acknowledgment of these basic biological design principles is simply 'wired in' - part of the underlying-design of the nervous system, like blinking when something approaches the eye or shivering when cold. A lobster might well eat another lobster's claws, but the prospect of eating one of its own claws is conveniently unthinkable to it. Its options are limited, and when it 'thinks of' moving a claw, its 'thinker' is directly and appropriately wired to the very claw it thinks of moving. With human beings (and chimpanzees and maybe a few other species), on the other hand, there are more options, and hence more sources of confusion."[242] However, as Dennett points out, for complex creatures, like us, even this apparently simple distinction between 'me' and 'not-me' is not so straightforward: again, as above, there are numerous 'interlopers' (in the form of micro-organisms) living within our skins. The fact that they are biologically entirely independent from us, dilutes beyond rescue (according to Dennett) any claim that our physical bodies constitute the basis of ourselves.[243]

A Biological Self - Body Maps and the 'Proto-Self'

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[242] Ibid, p.427

[243] Ibid, p.414

So, Dennett's 'biological' approach to the self started with a very basic, reductive proposition; that all organisms need to be able to recognise and defend a boundary between 'me' and 'not me'. This applies from single-celled organisms all the way up to human beings, and many theorists have identified this as a basic conception of the 'biological self'. However, there are also more nuanced biological approaches to the self, such as those of Gerald Edelman and Antonio Damasio. These theories explain the human self as an intermixture of certain specific, mammalian features of the human brain with higher human capacities, such as cognitive knowledge and language. Rita Carter identifies neural body maps in the brain, representations of our bodies, as the physical basis of the self.

She suggest that it is these neural maps, rather than any 'actual' sensations of interaction between our skin and the air, which provide our sense of physical boundedness: evidence for this can be found in amputees some of whom suffer from 'phantom limbs' syndrome; " ... because the body map in their brains keeps telling their boundary that it is where it used to be and not where it is now, and people born without limbs may complain of phantoms even though they have never had the parts that they experience." Carter deduces from this that: "Our body maps are 'built-in' rather than learned concepts, yet they are firmly grounded in the external world and remain intact only so long as they receive appropriate sensory feedback from physical interaction between the body and the environment. The maps sometimes get 'stuck', in a configuration that is incongruent with the real body - as with phantom limbs - but normally they adapt to match the changes in the physical body so well that we are unaware of their illusory nature. They move as the body moves, grow as it grows, and age as the flesh ages. yet the boundaries of our body maps are not drawn rigidly around the surface of our skin - rather they reflect a more fluid idea of where the body begins and ends."[244] (Carter's assumption that our subjective experience of our 'physical' bodies is by definition 'illusory' reveals her Cart-Tonist allegiance.)

The neurologist, Antonio Damasio, draws attention to the fact that while the self is still generally regarded as a mystery, or an illusion, his theory of the self is based on recent, but well-established neurophysiological research: "Although much has been known about how the organism is represented in the brain, the idea that such representations could be linked to the mind and to the notion of self has received little attention. The question of what might give the brain a natural means to generate the singular and stable reference we call self has remained unanswered. I have believed for quite some time that the answer lies in a particular set of representations of the organism and of its potential actions. In Descartes' Error l advanced the possibility that the part of the mind we call self was, biologically speaking, grounded on a collection of non-conscious neural patterns standing for the part of the organism we call the body proper."[245]

Damasio, therefore, very explicitly claims that the self has a biological basis in the brain: "I have come to conclude that the organism, as represented inside its own brain, is a likely biological forerunner for what eventually becomes

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[244] Carter, Rita, 'Consciousness', 2002, Weidenfeld Nicolson, p.217

[245] Damasio, Antonio, 'The Feeling of What Happens', 2000, Vintage, p.134

the elusive sense of self. The deep roots for the self, including the elaborate self which encompasses identity and personhood, are to be found in the ensemble of brain devices which continuously and non-consciously maintain the body state within the narrow range and relative stability required for survival." Damasio calls the state of activity within this ensemble of brain devices the 'proto-self'. "The proto-self is an interconnected and temporarily coherent collection of neural patterns which represent the state of the organism, moment by moment, at multiple levels of the brain."[246] And the proto-self, Damasio states, is "... the non-conscious forerunner for the levels of self which appear in our minds as the conscious protagonists of consciousness: core self and autobiographical self."

But Damasio is very clear that by proposing the proto-self as a biological basis for the core and autobiographical selves, he is not falling into the abyss of the homunculus trap: "The 'model of the body-in-the-brain' to which I am referring is nothing at all like the rigid homunculus creature of old-fashioned neurology textbooks. Nothing in it looks like a little person inside a big person; the model 'perceives' nothing and 'knows' nothing; it does not talk and it does not make consciousness." Rather, this collection of brain devices is concerned with the automated management of the organism's life. It achieves this via a variety of innately set regulatory actions - "secretion of chemical substances such as hormones as well as actual movements in viscera and in limbs." These actions depend on the information provided by nearby neural maps which signal, moment by moment, the state of the entire organism. "Most

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[246] Ibid, p.174

importantly, neither the life-regulating devices nor their body maps are the generators of consciousness, although their presence is indispensable for the mechanisms that do achieve core consciousness."[247]

Rather than having a particular location in the brain, the proto-self provides the organism with a dynamic reference point: "The proto-self does not occur in one place only, and it emerges dynamically and continuously out of multifarious interacting signals that span varied orders of the nervous system... It is a reference point at each point in which it is." Damasio assets that; "... the proto-self is a coherent collection of neural patterns which map, moment by moment, the state of the physical structure of the organism in its many dimensions. This ceaselessly maintained first-order collection of neural patterns occurs not in one brain place but in many, at a multiplicity of levels, from the brain stem to the cerebral cortex, in structures that are interconnected by neural pathways. These structures are intimately involved in the process of regulating the state of the organism. The operations of acting on the organism and of sensing the state of the organism are closely tied." But Damasio is also clear that the proto-self is not enough to generate the richness of human consciousness: he says; "We are not conscious of the proto-self. Language is not part of the structure of the proto-self. The proto-self has no powers of perception and holds no knowledge."[248]

The Core Self: The Beginnings of Consciousness?

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[247] Ibid, p.22/23

[248] Ibid, p.154

In order to achieve full human consciousness, Damasio posits a tripartite hierarchy of selves; above the proto-self, is the ‘core self’ and above that lies the ‘autobiographical self’: “The core self inheres in the second-order nonverbal account that occurs whenever an object modifies the proto-self. The core self can be triggered by any object. The mechanism of production of core self undergoes minimal changes across a lifetime. We are conscious of the core self.” Damasio defines the core self as: “The transient protagonist of consciousness, generated for any object that provokes the core-consciousness mechanism. Because of the permanent availability of provoking objects, it is continuously generated and thus appears continuous in time. The mechanism of core self requires the presence of proto-self. The biological essence of the core self is the representation in a second-order map of the proto-self being modified.”[249]

Damasio’s account comes very close to that of Gerald Edelman, though Edelman uses the terms ‘primary consciousness’ and ‘higher-order self’. Edelman, however, is more cautious in ascribing a self to non-humans: while other animals may have primary consciousness, Edelman says, they don’t have the higher level, linguistic self of human beings: “With the possible exception of mystics, however, as humans we cannot directly experience primary consciousness in the absence of higher-order consciousness. Therefore, we cannot say whether an animal’s experience of vision, noise, or pain is quite like ours. What we can say, however, is that an animal without semantic or linguistic capabilities lacks the symbolic memory that would allow it explicitly to relate its various qualitative experiences to a

[249] Ibid, p.174/175

self. It also lacks the set of neural events that mediate that relationship by consciously linking past, present, and future. As humans, we can not only remember the history of our sensations and categorise them, but, unlike the chimpanzee, we can reflect on our own sensations and talk about them to others."[250]

The Autobiographical Self

Damasio describes the autobiographical self as based on permanent, but partially modifiable, records of core-self experiences: These records can be; "... activated as neural patterns and turned into explicit images." As examples of these personal memory records, Damasio cites; "… where you were born, and to whom; critical events in your autobiography; what you like and dislike; your name; and so on." He says that the autobiographical self requires a core self for its gradual development: "The autobiographical self also requires the mechanism of core consciousness so that activation of its memories can generate core consciousness."

Damasio also says that unlike the core self, which arises from primary consciousness, and unlike the proto-self which is a current representation of the state of the organism; "...the autobiographical self is based on a concept in the true cognitive and neurobiological sense of the term." And he concludes that: "The invariant aspects of an individual's biography form the basis for autobiographical memory. Autobiographical memory grows continuously with life-experience but can be partly remodelled to reflect new experiences. Sets of memories which describe identity

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[250] Edelman, Gerald, and Tononi, Giulio, 'Consciousness', 2000, New York: Basic Books, p.199

and personhood can be reactivated as a neural pattern and made explicit as images whenever needed. Each reactivated memory operates as a ‘something-to-be-known’, and generates its own pulse of core consciousness. The result is the autobiographical self of which we are conscious.”[251]

To explain how the autobiographical self emerges from the core self, Damasio says: “As one moves, biologically speaking, from the simple level of core consciousness, with its generic sense of self, to the complex levels of extended consciousness, the prime physiological novelty is memory for facts. As for the prime trick, it consists of more of the same.” He says that continual repetition of this simple ‘sense of self knowing’, which comprises a ‘something-to-be-known’ and ‘something-to-which-the-knowledge-is-attributed’ generates the autobiographical self. Damasio adds that; “... the final enabling factor is working memory, the ability to hold active, over a substantial amount of time, the many ‘objects’ of the moment: the object being known and the objects whose display constitutes our autobiographical self. The time scale is no longer the fraction of a second that characterises core consciousness. We are now in the scale of seconds and minutes, the time scale at which most of our personal lives are transacted and which can easily extend to hours and years.” Damasio talks about a further two tricks which the brain uses to generate extended consciousness. The first additional trick, he says, requires the gradual buildup of memories of many instances of a special class of objects; “… the ‘objects’ of the organism’s biography, of our own life-experience, as they unfolded in our past, illuminated by core consciousness. Once autobio-

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[251] Damasio, Antonio, ‘The Feeling of What Happens’, 2000, Vintage, p.173-175

graphical memories are formed, they can be called up whenever any object is being processed. Each of those autobiographical memories is then treated by the brain as an object, each becoming an inducer of core consciousness, along with the particular non-self object that is being processed. While relying on the same fundamental mechanism of core consciousness - the creation of mapped accounts of ongoing relationships between organism and objects - extended consciousness applies the mechanism not just to a single non-self object X, but to a consistent set of previously memorised objects pertaining to the organism's history, whose relentless recall is consistently illuminated by core consciousness and constitutes the autobiographical self."[252]

The second additional trick consists of holding the many images, which define the autobiographical self, simultaneously in memory for a substantial amount of time. "Extended consciousness is, then, the capacity to be aware of a large compass of entities and events, i.e., the ability to generate a sense of individual perspective, ownership, and agency, over a larger compass of knowledge than that surveyed in core consciousness. The sense of autobiographical self to which this larger compass of knowledge is attributed includes unique biographical information. Autobiographical selves occur only in organisms endowed with a substantial memory capacity and reasoning ability, but do not require language." He then refers to developmental psychologists who; "… have suggested that humans develop a 'self' by the time they are eighteen months old, and perhaps even earlier. I believe the self to which they refer is the autobiographical self." Damasio also makes a clear claim that ani-

[252] Ibid, p.197/198

mals too can have an autobiographical self: “I also believe apes such as bonobo chimpanzees have an autobiographical self, and I am willing to venture that some dogs of my acquaintance also do. They possess an autobiographical self but not quite a person. You and I possess both, of course, thanks to an even more ample endowment of memory, reasoning ability, and that critical gift called language.”[253]

The Human, or ‘Higher Order’ Self

As above, Edelman, however, reserves this highest level of the self to humans only: “Once higher-order consciousness begins to emerge, a self can be constructed from social and affective relationships. This self (entailing the development of a self-conscious agent, a subject) goes far beyond the biologically based individuality of an animal with primary consciousness”. Edelman, who uses the term ‘higher-order’ rather than autobiographical self, emphasises how the emergence of this higher self liberates the individual from immediate interaction with the environment into much bigger conceptions of time; “… an individual is freed, to some extent, from bondage to the remembered present. If primary consciousness marries the individual to real time, higher-order consciousness allows for at least a temporary divorce, which is made possible by the creation of concepts of time past and time future.”

This ‘escape’ from time opens up: “A whole new world of intentionality categorisation, and discrimination can be experienced and remembered. As a result, concepts and thinking flourish. Relationships that promise positive rewards can be fostered, resentments can be nourished, and plots

[253] Ibid, p.198

can be laid. Scenes are enriched by symbols, value connects to meaning and intentionality and can itself be modified in more richly adaptive ways by evolving neural systems that link individual learning back to the alteration of the value systems themselves."[254]

In contradiction to the Cart-Tonist de-constructors, Damasio is very clear that the biological roots of the self guarantee its unity and continuity: "The tendency toward unified control prevails during our developmental history, probably because a single organism requires that there be one single self if the job of maintaining life is to be accomplished successfully - more than one self per organism is not a good recipe for survival." Damasio then refers to Dennett's notion that the mind produces 'multiple drafts' for the organism's life script, but, for Damasio, rather than generating a random sequence of socially constructed selves, the drafts are held in check and integrated by the 'deeply biological core self and of the autobiographical self': these constantly select; "… 'drafts' that accord with a single unified self. Moreover, the delicately shaped selectional machinery of our imagination stakes the probabilities of selection toward the same, historically continuous self."[255]

Damasio also insists that this means; one person, one body; one self, one body. He mentions multiple personality disorder but points out that a) only one self is 'in charge' at any one time and b) the condition is regarded as pathological. He continues: "Why should we not commonly find two or

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[254] Edelman, Gerald, and Tononi, Giulio, 'Consciousness', 2000, New York: Basic Books, p.193-196

[255] Damasio, Antonio, 'The Feeling of What Happens', 2000, Vintage, p.225

three persons in one body? What an economy of biological tissue, or why should not persons of great intellectual capacity and imagination inhabit two or three bodies? ... Why should there not be bodiless persons in our midst you know, ghosts, spirits, weightless and colourless creatures? Think of the space savings.” But, of course, none of this is, or ever has been, possible because; “... a mind, that which defines a person, requires a body, and that body, a human body to be sure, naturally generates one mind. A mind is so closely shaped by the body and destined to serve it that only one mind could possibly arise in it. No body, never mind. For any body, never more than one mind. Body-minded minds help save the body.”[256]

In my view, the most sophisticated biological theories of the self are those that base it on a specific set of genetically determined human emotions. The most prominent, and outspoken, advocate of this position is Jaak Panksepp. We’ll look at his theory in detail in chapter sixteen, but here we can briefly present his core claims: 1) As an animal researcher, Panksepp asserts that all mammals (and possibly birds and other species) have direct, phenomenal experience of emotional states. This contradicts the mainstream position in neurophysiology, which claims that this is unknowable, apart from the case of human beings who can verbally report their inner experiences. 2) The existence of conscious, animal experience of affect is important for Panksepp’s theory when he considers human affect: again contrary to mainstream neuroscience, he posits that human beings also experience affects directly from the activation of the primordial emotional centres, in the brain’s ‘limbic’

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[256] Ibid, p.142/143

system. This contradicts the conventional view that emotions only become conscious when the neurophysiological reactions of the limbic system have been analysed by the 'higher', cognitive centres of the brain. 3) Panksepp claims to have identified seven elaborate 'emotional systems' in the human brain. He calls these evolutionary 'tools for living' and they guide the self in its confrontations with its environment.

The 'Me' and the 'I'

Several theorists of the self have proposed a split between the 'I' and the 'Me'. The science journalist, Rita Carter, for example, assigns the different functions of the 'Me' and the 'I', as follows: She describes the 'Me' as; "... the permanent, objective self that other people recognise and that we ourselves think of as being always there - the 'me' that continues to exist through the deepest, longest sleep. And there is also the active, experiencing self - the 'I' that thinks, feels and acts."[257] The Danish science writer, Tor Norretranders specifically identifies the 'I' with the deconstructed, illusory self: "It is not a person's conscious 'I' that really initiates an action. But it is quite clearly the person himself. There is a difference between the I and the person as a whole." He says that the 'whole person' is clearly more than the 'I'. But, he adds; "… the 'I' does not want to accept this. The thinking, conscious I insists on being the true player, the active operator, the one in charge. But it cannot be." Norretranders quotes the neuropsychologist, Benjamin Libet's work to the effect that it's not people themselves, it's something else, something non-conscious, which decides when to undertake an action: Libet's point is that it's

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[257] Carter, Rita, 'Consciousness', 2002, Weidenfeld Nicolson, p. 212/213

not people's consciousness that begins the process. "It is still my self who disposes, but it is not my I that has the power to dispose. It is Me." The 'I' is the illusory 'Command and Control' self of Folk Psychology, which we saw being deconstructed in chapter two. According to Norretranders, the conscious 'I' has the illusion that it's in charge: the 'I' is convinced: "…that it is the 'I' that acts; that it is the 'I' that senses that it is the 'I' that thinks. But it is the Me that does so." Norretranders equates this human 'I' with what he calls the 'User Illusion' in relation to interacting with a computer: "I am my user illusion of myself. Just as the computer contains loads of bits that a user is not interested in, the Me contains loads of bits the 'I' is not interested in. The I can't be bothered to know how the heart pumps the blood around Me"[258] He concludes that the notion of a 'conscious housekeeper' in control of the entire human organism is an illusion, though (he adds) perhaps a useful one. "At bottom, the I cannot accept that there are at work in the person powers that the I does not have access to."[259]

Norretranders goes on to say that; "The 'I' is the conscious player. The Me is the person in general." The 'I' is not 'at the wheel' in many situations, in emergencies, for example. Rather, the 'I' takes over when there's time for thought and reflection, but of course this isn't the case in many situations. The term Me, on the other hand, comprises the subject of all the bodily actions and mental processes that are not initiated or carried out by the conscious 'I', and accord-

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[258] Norretranders, Tor, 'The User Illusion', 1998, Viking Press, New York, p.292

[259] Ibid, p.257-260

ing to Norretranders, the term ‘I’ embraces all the other bodily actions and mental processes which are conscious: in other words, the ‘I’ is our conscious part and the ‘Me’ our unconscious part. (I have some very significant reservations about this simplistic division, see below.) Norretranders then appeals to empirical evidence, such as measurements of the bandwidth of consciousness, subliminal perception, and Libet's experiments, to show that the ‘I’ does not decide nearly as much as it thinks it does: “The ‘I’ tends to take the credit for decisions, computations, realisations, and reactions carried out by the Me. In fact, the ‘I’ refuses to acknowledge that there is a Me not identical to the ‘I’ itself. The ‘I’ cannot account for the Me, but just goes on pretending.” The ‘Me’ on the other hand can be seen as a biologically rooted, ‘real’ self: Norretranders says; “... I am not identical with Me. Me is more than my I. It is Me who decides when I do not.” The ‘Me’ is more than the brain, importantly, it also involves the body: “Not for nothing do we say that our emotions originate in the heart or gut. Very few of us would enjoy being identified with our brains.” Norretranders claims that the ‘Me’ has much in common with Freud’s concept of the unconscious, and has many of the same disturbing implications: the distinction between the ‘I’ and the ‘Me’ is less ‘innocent’ than it sounds: people are a lot less conscious of what they sense, think and do, than they believe they are! “Man is not primarily conscious. Man is primarily non-conscious.”[260]

Descartes’ ‘You-Me Chasm’ Vs ‘Mirror Neurones’

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[260] Ibid, p.259/260 and 292

As part of our move away from Cart-Ton world's rejection of the self, we can look briefly at the question of sociality and the self. As E.O. Wilson (the father of sociobiology) has claimed, we are a 'eusocial' species.[261] It seems to me that this hyper-sociality implies a biological (if not an emotional) self, given that managing group dynamics, which is the main preoccupation of Evolved Psychology, requires identifying individuals and monitoring their reciprocating behaviour. Cart-Ton world has a tradition of failing to recognise this human eusociality: this probably started with Descartes' idea that, as divinely implanted souls, human selves are inevitably and fundamentally isolated from each other: in the Cartesian world there can be no interpenetration of human selves.[262] This notion also appeared in the (thoroughly Cart-Tonist) tradition of Anglo-American Analytic philosophy as 'the problem of other minds', which can be formulated as follows: given that I can only observe the behaviour of others, how can I know that others have minds? And, given that behaviour on its own, no matter how sophisticated, cannot (in Cart-Ton world) guarantee the presence of mentality, the conventional Cart-Tonist answer is that you can never know whether anyone else has a mind in the way that you know you do.

However, science has moved beyond this traditional Cartesian view, specifically via the discovery of 'mirror neurones'. These were discovered accidentally in the 1980s by a team of Italian scientists. They were researching certain cells in the cerebral cortex which control fine motor

[261] Wilson, Edward O., 'The Social Conquest of the Earth', 2012, Liveright

[262] Hofstadter, Douglas, 'I am a Strange Loop', 2007, Basic Books, p.333

movements. Their methodology involved inserting tiny electrodes into individual neurones in the brains of Macaque monkeys. As the social psychologist, Jonathan Haidt explains, these neurones; "… fired rapidly only when the monkey made a very specific movement, such as grasping a nut between thumb and forefinger (versus, say, grabbing the nut with the entire hand)." However, the accidental discovery came: "… once they had these electrodes implanted and hooked up to a speaker (so that they could hear the rate of firing), they began to hear firing noises at odd times, such as when a monkey was perfectly still and it was the researcher who had just picked up something with his thumb and forefinger. This made no sense because perception and action were supposed to occur in separate regions of the brain. Yet here were neurones that didn't care whether the monkey was doing something or watching someone else do it. The monkey seemed to mirror the actions of others in the same part of its brain that it would use to do those actions itself."[263] In a nutshell, therefore, mirror neurones react to experiencing the behaviour of others: as in the experiment, when a monkey picked up a peanut and the other monkey watched this, neurones in the second monkey's brain began firing. Exactly, in fact, those neurones which the observing monkey would use if he was going to pick up the nut. In other words, our nervous systems tend to 'mirror' the behaviour we perceive in others. An example would be entering a room where a stranger is weeping. You have no idea why this person is expressing this emotional reaction, nevertheless, some of the neurones in your brain which you would use to weep will immediately be activated. You will instantly feel an intense pang of

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[263] Haidt, Jonathan, 'The Righteous Mind', 2012, Penguin, p.341-343

sadness and an impulse to weep yourself. The strength of this reaction varies between individuals.[264]

Jonathan Haidt argues that 'mirror neurones' can coordinate our eusociality, and (I would argue) answer the problem of other minds with a definite positive: Later research established that most mirror neurones fire not when they see a specific physical movement but when they see actions which indicate a more general goal or intention: "For example, watching a video of a hand picking up a cup from a clean table, as if to bring it to the person's mouth, triggers a mirror neurone for eating. But the exact same hand movement and the exact same cup picked up from a messy table (where a meal seems to be finished) triggers a different mirror neurone for picking things." Haidt also reports that in humans mirror neurones are particularly effective at making us sensitive to each other's emotions: human mirror neurones, "… have a much stronger connection to emotion-related areas of the brain - first to the insular cortex, and from there to the amygdala and other limbic areas. People feel each other's pain and joy to a much greater degree than do any other primates. Just seeing someone else smile activates some of the same neurones as when you smile. The other person is effectively smiling in your brain, which makes you happy and likely to smile, which in turn passes the smile into someone else's brain."[265]

Christian Keysers adds that; "… before the discovery of mirror neurones, our vision of brain functioning in general, and of social understanding in particular, was dominated by

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264 Keysers, Christian, 'The Empathic Brain', 2011, Social Brain Press

265 Haidt, Jonathan, 'The Righteous Mind', 2012, Penguin, p.341-343

the idea that our brain understands the world as a scientist Would, by collecting evidence and rationally deriving a theory of the world based on this empirical evidence." However, mirror neurones have shown us that; "… abstract thinking is not the only process we use while observing the behaviour of other organisms." In other words, our tendency to justify our judgements about the world by saying 'I felt it was right' is a more accurate account than a; "… rational scientist's vision of the mind as a logical, disembodied information processing computer."[266]

The philosophical implications of the discovery of mirror neurones can be summarised as follows: rather than being 'skin-encapsulated egos' peering out at our fellow creatures and struggling to analyse and interpret their behaviour, we are, in fact, hard-wired to be empathic. ('Mirror neurones' do, in fact, represent a recent and empirically grounded refutation of the Cartesian 'inter-personal chasm'.) We react to the manifest behaviour of others, especially our conspecifics, automatically and without control from the higher brain centres. This means that the traditional philosophical 'problem of other minds' isn't a problem at all: we are constantly and spontaneously reacting to the mental and emotional states of those around us. We don't need to construct an inner 'theory of other minds' to work out what other people are feeling, our nervous systems are hard-wired to experience this immediately and directly. There are exceptions; people with autism suffer from 'mind blindness', they probably simply have no mirror neurones, and psychopaths may recognise other people's motives and emotions, but feel no necessary impulse to empathise with

[266] Keysers, Christian, 'The Empathic Brain', 2011, Social Brain Press, p.29/30

them. However, in people with physiologically and socially healthy nervous systems, mirror neurones automatically guarantee empathy between people in close proximity. In the context of Whit-Tum world, mirror neurones can be seen as an example of how our nervous systems convert the universal experiential ‘feelings’ of Whiteheadian ontology into conscious and evolutionarily useful experience. (We’ll expand on this theme in parts three and four.)

Re-Installing the ‘Affective Heart’

Let me now address the reservations I referred to above, and, once again, this will involve some leaping ahead into the ontology of Whit-Tum world. This split between the ‘Me’ and the ‘I’ is a useful and realistic characterisation of the functioning of the human brain-mind. I’d like to link this division with the notion of two distinct sensory channels between the organism and the environment posited in Whitehead’s ontology and which I’m calling (partly following the psychologist, Nicholas Humphrey) Prehension and Perception. I’m going to argue that the ‘Me’ is the receiving, feeling centre for Prehension, while the ‘I’ is the constructed agent of Perception: in this model, the ‘I’ constitutes that part of our internal model of the world which represents the centre and receiver of our Perceptions. This is very much the Cart-Tonist model of the ‘self’. What they neglect (in my view) is the ‘real’ self, i.e. the ‘Me’. This is (to me) is an insightful and realistic model of the ‘self-system’: the ‘Me’ is the profound, affective self which emerged and developed in conjunction with the organism. It is the ‘root self’ that we emotionally identify with, and defend from physical and psychological threats. As above, I don’t agree that it is the ‘I’ that ***feels***: rather, feeling is the profoundly important function of the ‘Me’.

For this reason, I object to what I called Norretranders' simplistic division into an unconscious 'Me' and a conscious 'I': the problem with this is that it turns the 'Me' into the 'philosophical zombie' of numerous thought experiments, i.e., an unconscious automaton, with no qualic experience and which feels nothing ***consciously***. This is precisely the opposite of Whitehead's notion of Prehension, which is the sensory channel devoted to ***feeling***! Returning to Norretranders' dichotomy between the 'I' as our conscious part and the 'Me' as our unconscious part, if the 'Me' is (as I'm suggesting) the centre of reactive feeling, the question arises as to the accuracy of this assignment of consciousness. My own position here is that feeling, sentience, is the essence of consciousness. Consequently, we can reverse the labelling, i.e. the 'Me' is our conscious part (or rather the part of us which is capable of consciousness) whereas the 'I' is an unconscious cognitive agent, much in the style in which Dennett describes our 'illusion' of consciousness. Of course, I don't buy Dennett's argument that 'consciousness', as we think we experience it, is an illusion. On the other hand, I think he's right when he deconstructs and dismisses the 'I' (as described above) as the origin of consciousness, which many in the consciousness studies community currently believe. The reality is that we have a reactive centre of feeling, the 'Me' or (as I shall argue below) the emotional self, which is our only conscious self. This self ranges over the content of our minds, sensory, personal, cognitive, propositional, etc. and reacts to them, evaluating them as positive, negative or neutral (as per Damasio's description of the interactions between affect and reasoning). We'll unfold these ideas about the self at greater length in chapter sixteen.

Part Three: From Cart-Ton World to Whit-Tum World

In part three we look at how we can justify persuading the community of science-orientated consciousness studies to move its current Cart-Tonist ontological position to what I'm calling 'Whit-Tumist' ontology. There are two major theoretical resources that I'll attempt to synthesise in this effort; the first is quantum theory and the second is the later ontological work of Alfred North Whitehead.

Chapter Nine: The Quantum Challenge to 'Cart-Ton World'

In this first chapter of part three we'll look at those aspects of quantum mechanics which directly contradict classical physics, and thus Cart-Ton world's ontology. In subsequent chapters in part three we'll look firstly at quantum's measurement problem, which is where a role for consciousness in the theory is mainly focused. The following chapter will examine what the implications of quantum theory mean for our experience of reality. Chapter twelve presents Whitehead's ontology and chapter thirteen is an effort to synthesise this ontology with a lot of the innovations, relating to consciousness, which have emerged in recent decades.

Quantum Characteristics

The theory of quantum mechanics is the result of our scientific efforts to observe reality at the extreme micro-level of sub-atomic phenomena. In the process, it has generated a plethora of counter-intuitive concepts. The Oxford physicist, Ian Aitchison, has characterised quantum as a physics of 'lumps and jumps'. As the physics writer, Danah Zohar explains; "The 'lumps' appeared in the early days of quantum theory when Max Planck proved that all energy is radiated in individual packets, called 'quanta', rather than in flowing streams over a continuous spectrum; the 'jumps' appeared a few years later when Niels Bohr demonstrated that electrons jump from one energy state to another in discontinuous 'quantum leaps', the size of the leap depending on how many quanta of energy they have absorbed or given off."[267] Unlike the concepts of classical physics, the quantum world of lumps and jumps does not fit into our common-sense world view of everyday 'Folk Physics'. The consciousness writer, David Hodgson suggests that there are two broad alternative interpretations of quantum mechanics: an objective version and another in which consciousness plays a crucial role. The French physicist, Bernard d'Espagnat is clearly coming from this second alternative when he says; "'Phenomena', as we have seen, include an important component contributed by human beings, in the sense that it is our perceptual and intellectual faculties which in large measure demarcate these phenomena within the body of the real."[268] Hodgson notes that even the 'objective' view has two profound implications for the nature of matter and of reality, namely indeterminism, and a 'non-material' view of matter, following from the indeterminacy and non-locality of the quantum world. On the first of these, indeterminism, he says: "Consideration of quantum physics confirms that there is genuine indeterminism in quantum systems. Physical measurements, physical events, and physical laws can at best give probabilities for individual micro events; and, while that does not necessarily involve indeterminism for macro events, it can do so. As to the second, the 'non-materiality' of matter, Hodgson says; "… quantum mechanics does not deny reality to the macro objects and macro events of our experience, but … it does suggest that in certain respects their fundamental nature is not as we assume it to be."[269]

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[267] Zohar, Danah,'The Quantum Self', 1990, Harper Collins, p.13/14

[268] d'Espagnat, Bernard, 'Reality and the Physicist', 1989, Cambridge U.P., p.215

[269] Hodgson, David, 'The Mind Matters', 1991, Clarendon Press, p.374/375

Given the strange and almost incomprehensible world which quantum physics insists is the reality of things at the atomic level, how can we explain the fact that it is not the world we see at the macro level of everyday objects? In attempting to explain this, Hodgson says: "… a macro object may be considered (quantum mechanically) as a many-particle system, with strong mutual interactions among the subsystems of which it is composed. The numbers of subsystems and the strength of their mutual interactions involve significant correlations, such that: 1) in interactions between the system comprising the macro object and other systems, macroscopically sharp values of macro observables can be manifested; and, 2) such values exhibit the substantial permanency and consistency of behaviour characteristic of a macro object." Hodgson goes on to say that; "… macro observables of (macroscopically sharp) position, motion, shape, colour, etc. would generally be established by the state function with practical certainty; in the case of states involving millions upon millions of particles, the standard deviations around the expectation values for such macro observables would for the most part be so small that sharpness by macro standards was not prejudiced."[270] This can (I think) be summarised by saying that, although macro objects are indeed composed of 'millions upon millions of particles' behaving according to the bizarre rules of quantum mechanics, because of the huge numbers involved, the probabilities cancel each other out, leaving us with the stable, predictable objects of everyday life. Given all this, in what specific ways does quantum physics challenge 'Cart-Ton world'? The major items in this list include; Indeterminacy and uncertainty, wave/particle 'complementarity' and

[270] Ibid, p.372/373

especially the issues around measurement and the role of the observer. All of these features of quantum theory undermined the predictable world of passive ‘billiard-ball’ particles, observed from a ‘God’s eye’ perspective, which characterised the previous scientific paradigm. In this chapter we’ll examine them in turn.

Indeterminacy and Uncertainty

The first two characteristics of quantum mechanics which contradict the ontology of Cart-Ton world are indeterminacy and uncertainty. The principal founders of quantum mechanics, Niels Bohr and Weiner Heisenberg, argued that fundamental reality is essentially indeterminate; “… there is no clear, fixed, underlying ‘something’ to our daily existence that can ever be known. Everything about reality is and remains a matter of probabilities. An electron might be a particle, or might be a wave, it might be in this orbit, it might be in that - indeed, anything might happen.” In the quantum world, reality is nothing but a collection of possibilities. Consequently, we are left with what Danah Zohar calls the central unanswered problem of quantum theory: “how can anything in this world ever become actual, or fixed? It's the very opposite of the dilemma raised by Newton's clockwork universe, in which there is no scope for the new. Reading Newton, we have to ask: how can anything ever happen? With the Bohr-Heisenberg interpretation of quantum mechanics, the great problem becomes: how can anything ever be?”[271] And quantum physics involves not only indeterminism in relation to predictions of the future, but also uncertainty or indeterminacy in relation to existing states: Hodgson says; “Heisenberg’s celebrated uncertainty principle asserts that a micro entity cannot at the same time

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[271] Zohar, Danah,‘The Quantum Self', 1990, Harper Collins, p.11/12

have a precise position and a precise motion (or momentum). This principle is sometimes presented as if it followed simply as a practical matter from the process of measurement, from the disturbance necessarily caused to micro entities by the interaction necessary for measurement: however, in fact it follows from a precise mathematical relationship, … In other words, the mathematics of quantum theory entails the uncertainty principle."[272] Zohar says that according the uncertainty principle; "… the wave and particle descriptions of being preclude one another. While both are necessary to get a full grasp of what being is, only one is available at any given time. Either we can measure the exact position of something like an electron when it manifests itself as a particle, or we can measure its momentum (its speed) when it expresses itself as a wave, but we can never get a measure of both, exactly at the same time."[273]

Hodgson tries to elucidate the nature of quantum uncertainty via the mathematics of quantum measurement: he says the mathematics; "… does not indicate or represent position or motion in any direct way: what it does in substance is to enable calculation of the probability of the particle in question being found to have a position or momentum (to a greater or lesser degree of precision) if an appropriate measurement is made. What if anything this mathematical object actually represents, in the absence of any measurement being made (that is, what the quantum physical state really is) is a matter of controversy, as we will see: we can say with certainty, however, that it does not represent a particle

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[272] Hodgson, David, 'The Mind Matters', 1991, Clarendon Press, p. 91

[273] Zohar, Danah,'The Quantum Self', 1990, Harper Collins, p.10

having a definite position and motion as contemplated by classical physics and common-sense views of the world. And this is not to say that the mathematical object is in any sense incomplete: the view generally accepted by physicists is that it contains all the information which there can be concerning the particle's position and motion."[274]

So, Hodgson wants to make it clear that uncertainty is an essential feature of quantum reality and not, as is sometimes suggested, just a consequence of the difficulty of measurement at the micro-level: "It should be noted carefully that the uncertainty principle follows mathematically from the mathematics of quantum mechanics, and in particular from the nature of the mathematical representation of the state of a particle. It is a necessary consequence of the quantum theory itself. It is not, as some discussions might suggest, merely a practical consequence of the disturbance caused to a particle by measuring its position or momentum."[275] And Zohar emphasises the full implications of quantum uncertainty for our conception of reality; it "… replaces the old Newtonian determinism where everything about physical reality is fixed, determined and measurable with a vast 'porridge' of being where nothing is fixed or fully measurable, where everything remains indeterminate, somewhat ghostly and just beyond our grasp… It's as though we were forever condemned to seeing only shadows in the fog. The full nature of this quantum indeterminism goes straight to the heart of the central philosophical prob-

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[274] Hodgson, David, 'The Mind Matters', 1991, Clarendon Press, p.258

[275] Ibid, p.263

lem raised by quantum mechanics - the nature of reality itself."[276]

Complementarity: Wave/Particle, Knowledge/Action

A third major Cart-Ton-challenging feature of quantum physics is 'complementarity'. This is associated with the uncertainty principle and is attributed to Niels Bohr. At one level, this views micro entities as having dual natures, as being both particles and waves. As particles, they may have precise position, but not precise motion or momentum, as waves, they may have precise momentum, but not precise position. In quantum physics, Zohar explains, both waves and particles are equally fundamental: "Each is a way that matter can manifest itself, and both together are what matter is. And while neither 'state' is complete in-itself, and both are necessary to give us a complete picture of reality. It turns out that we can never focus on both at once."[277] And as Hodgson puts it: "Experimental arrangements for precise measurement of one aspect (say, position) preclude those for precise measurement of the other aspect (momentum), so no incompatibility can arise in practice." He adds that: "Bohr's philosophy of complementarity suggests that, in areas where our concepts are inadequate, it may be necessary to use two modes of description of an entity which are mutually exclusive, yet involve no practical inconsistency in that the conditions under which the entity is manifested under one description preclude the possibility of its manifestation under the other description."[278] Bohr saw this

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[276] Zohar, Danah,'The Quantum Self', 1990, Harper Collins, p.11/12

[277] Ibid, p.10

[278] Hodgson, David, 'The Mind Matters', 1991, Clarendon Press, p.92

view of micro entities as having dual natures, as an analogy applicable to the brain-mind: in other words, when the brain-mind is observed and tested as a physical object, with physical processes, its manifestation as a conscious mind would be precluded.[279] "Thus, the brain-mind may have two apparently contradictory aspects (as a mechanistic physical object and as a free-willing mind) which cannot simultaneously be displayed, so that no incompatibility can arise in practice."[280]

Zohar seizes on the principle of complementarity as the; "… most revolutionary statement that quantum physics makes about the nature of matter and perhaps being itself." What follows from quantum's description of the wave/particle duality is; "… the assertion that all being at the subatomic level can be described equally well either as solid particles, like so many minute billiard balls, or as waves, like undulations on the surface of the sea. Further, quantum physics goes on to tell us that neither description is really accurate on its own, that both the wave-like and the particle-like aspects of being must be considered when trying to understand the nature of things, and that it is the duality itself which is most basic. Quantum 'stuff' is, essentially, both wave-like and particle-like, simultaneously." She adds that this Janus-like nature of quantum being entails that; "… each way of describing being, as a wave or as a particle, complements the other and that a whole picture emerges only from the 'package deal'. Like the right and left hemispheres of the brain, each description supplies a kind of information that the other lacks. Whether at any

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[279] Bohr, Neils, 'Atomic Physics and Human Knowledge', 1958, Dover Books (2010), 92/93

[280] Hodgson, David, 'The Mind Matters', 1991, Clarendon Press, p.91

given time elementary being displays itself as one or the other depends on the overall conditions." And the most crucial of these conditions are; "… whether or not anybody is looking, or when they are and what they are looking for!"[281]

Quantum Holism

In addition to indeterminacy, uncertainty and complementarity, a fourth feature of quantum mechanics which tends to undermine the classical approach to physics is 'holism': this is the theory that the whole can be regarded as greater than the sum of its parts. And this can be explained by the fact that the parts of a whole are in intimate interconnection. They cannot exist independently of the whole, nor can they be understood without reference to the whole. In relation to this, Hodgson says of quantum theory that it implies that; " … the behaviour of composite systems is not always a function of, or calculable from, or caused by, the behaviour of the component parts of that system which can themselves be understood in isolation from the whole system: in at least certain situations, where micro events are measured, the behaviour of component parts of a composite system is rather a function of behaviour of the whole system."[282] The American physicist, Henry Stapp makes a similar point by claiming that each physical event; "… has both a psychologically described aspect, which is essentially an increment in knowledge, and also a physically described aspect, which is an action that abruptly changes the mathematically described set of potentialities to one that is concordant with the increase in knowledge. This coordination of the aspects of the theory that are described in physi-

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[281] Zohar, Danah,'The Quantum Self', 1990, Harper Collins, p.9/10

[282] Hodgson, David, 'The Mind Matters', 1991, Clarendon Press, p.92

cal/mathematical terms with aspects that are described in psychological terms is what makes the theory practically useful."[283]

As Stapp points out, this means that the proper subject matter of science is not; "… what may or may not be 'out there', unobserved and unknown to human beings. It is rather what we human beings can know, and can do in order to know more." As he explains, the founding fathers of quantum mechanics, in formulating their new theory, focused on the knowledge-acquiring actions of human beings, and the knowledge acquired by these actions, rather than around a conjectured causally sufficient mechanical world. From having previously ignored our knowledge, the thrust of physical theory shifted to become essentially about our knowledge. And this included, according to Stapp, a concern with; "… the effects of the actions that we take to acquire more knowledge upon what we are able to know."[284] The main actions referred to here are, of course, measurements. Stapp elaborates on this new quantum conception by explaining that; "… the physically described world is built not out of bits of matter, as matter was understood in the nineteenth century, but out of objective tendencies - potentialities - for certain discrete, whole actual events to occur."[285] The French physicist, d'Espagnat, again stresses the mental aspect of this process and introduces the notion of a 'deep' or 'veiled' reality: he claims that the world of observed macroscopic objects (including brains and braincells) is a construct of the human mind. This construct, he

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[283] Stapp, Henry, 'Mindful Universe', 2007, New York: Springer, loc:173

[284] Ibid, loc:137

[285] Ibid, loc:173

continues, is built up from regularities in observed phenomena. But, in contrast to classical physics, he's not referring to regularities in physical reality. Rather, these are the regularities of a 'deeper' or 'veiled' reality, which cannot be equated with either the physical notions of everyday life, nor even with localised mathematical entities.[286]

A Role for Consciousness in Physical Processes?

The final, and for our purposes the most important, anti-classical feature of quantum mechanics is its emphasis (in most versions) on the role of consciousness; particularly the suggestion that consciousness has a causal role in the physical world. Hodgson asks; "… at what stage in a process of measurement can it be said that the measurement is actually made, so that a particular result becomes actual and the other possibilities are eliminated?" This question is key because in quantum theory the existence of a range of possibilities prior to measurement is due, not to incomplete knowledge of the system, but is an objective property of the system itself. In addition, after measurement the actuality of one result and the elimination of the others is also an objective property of the system: "So it is meaningful and important to ask, when does this change (which is sometimes called 'the collapse of the wave function') occur?" Another way of putting this question is; 'what causes the wave function to collapse?' Hodgson cites one important answer proposed by the distinguished physicists Eugene Wigner: the collapse occurs; "… when the person making the measurement actually becomes conscious of the result." This suggestion is clearly a radical rejection of Cart-Ton world's ontology. However, Hodgson points out that; "… it is signi-

[286] d'Espagnat, Bernard, 'Reality and the Physicist', 1989, Cambridge U.P., p.157-167

ficant that distinguished physicists, who are researching directly the very physical matter whose behaviour is supposed to explain mind, have found it necessary to invoke mind to explain the behaviour of that physical matter."[287] The British psychologist, David Rose expresses this mental aspect of quantum theory as follows: "One idea within quantum physics is that observing events in some way influences those events: there is an interaction between the observer and the physical world." Rose goes on to say that given this, it's not far to the idea that human consciousness, via acts of observation, interacts with the physical world at the quantum level. This, of course, is the 'Copenhagen interpretation' as proposed by Niels Bohr, and, if this is accepted, it certainly implies that; "… the origin of consciousness is in some way linked with really fundamental aspects of the physics of the universe. To understand consciousness we have to look right down to events at the quantum level."[288] (This perspective is very congruent with the ontology of Whit-Tum world which I'm promoting in this book.)

The bigger context within which the classical rejection versus the quantum acceptance of conscious will is that of 'scientific materialism'. d'Espagnat is anxious to emphasise that the advent of quantum theory entails the demise of scientific materialism, the philosophical status of which was always dubious: he says that the doctrine of 'scientific materialism' was based on a 'plainly unjustified extrapolation' from science itself: "In fact, although the association of the two words 'scientific' and 'materialism' was always

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[287] Hodgson, David, 'The Mind Matters', 1991, Clarendon Press, p.92

[288] Rose, David, 'Consciousness; Philosophical, Psychological and Neural Theories', 2006, Oxford U.P., p.155

judged too bold by some philosophers, it did, though, have some legitimacy at the time of 'classical physics', for at that time physicists thought they could define matter as the ensemble of all atoms *plus* fields, and deemed themselves capable of formulating their science without any reference - not even implicit - to the states of consciousness (or otherwise said, to the sense impressions) of scientific observers. In consequence, the thinkers of that time were justified in their conjecture that 'matter' thus defined is the only irreducible reality. Nowadays though, things are clearly quite different."[289] Stapp similarly criticises the failure of classical physics to accommodate mind and consciousness within its theoretical framework; "… in spite of intense efforts spanning more than three centuries. The reasons for this failure are easy to see: classical physics systematically exorcizes all traces of mind from its precepts, thereby banishing any logical foothold for recovering mind. Moreover, according to quantum physics all causal effects of consciousness act within the latitude provided by the uncertainty principle, and this latitude shrinks to zero in the classical approximation, eliminating the causal effects of consciousness."[290]

d'Espagnat also considers the idea that the achievements of modern biology may contradict quantum's claims of a metaphysical revolution: the apparent ability of biology to explain life entirely in materialist terms seems to undermine the idea that quantum mechanics has banished scientific materialism. d'Espagnat says: "It is true that biolo-

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[289] d'Espagnat, Bernard, 'Reality and the Physicist', 1989, Cambridge U.P., p.206

[290] Stapp, Henry, 'Mindful Universe', 2007, New York: Springer, loc:522

gists, to some degree, manage to explain life in terms of physics alone. But at the same time the principles of that physics have changed so much that fundamentally … they can no longer be formulated without some reference (admittedly often implicit) to sense impressions and hence to the notion of the human mind. The fact that biology is principally concerned with large molecules, for which the classical laws and concepts (easier to handle than their quantum counterparts) in practice provide quite adequate approximations, does not affect the fundamental significance of this epistemological change, though it may for a time obscure it in some respects. The truth is that in so far as materialism claims to be more than just a philosophically irrelevant methodology … it cannot be considered as a scientific conception (that is to say, a conception that science supports)."[291] In other words, it's the fact that modern biology deals mainly with large molecules which 'disguises' quantum's full impact on it. But when it comes to the study of consciousness, this apparent 'quantum immunity' of biology in no way diminishes the implications of quantum's insistence on a role for consciousness in physical theory.

Does Quantum Indeterminism Underlie Free Will?

As regards quantum indeterminism and freedom of the will, it was noted by the English astronomer, physicist and mathematician, Arthur Eddington as early as 1927 that the indeterminism provided by quantum physics left room for the operation of freedom of the will.[292] Hodgson states that; "In more recent writings by physicists and mathematicians

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[291] Ibid, p.206

[292] Edington, Arthur, 'The Nature of the Physical World', 1928, Macmillan, see chapter 14

such as Richard Schlegel, Henry Margenau, Henry Stapp, and Roger Penrose, the notion of quantum indeterminacy leaving room for the operation of rational choice is revived and advocated (see Schlegel 1980:262-89; LeShan and Margenau 1982:2404; Stapp 1985; Penrose 1987, 1989)."[293] And, in fact according to Stapp, the most radical change wrought by the switch from classical to quantum mechanics is the injection of certain choices made by human beings directly into the dynamics of physical processes. He says; "Human actions enter, of course, also in classical physics. But the two cases are fundamentally different. In the classical case the way a person acts is fully determined in principle by the physically described aspects of reality alone. But in the quantum case there is an essential gap in physical causation. This gap is generated by Heisenberg's uncertainty principle, which opens up, at the level of human actions, a range of alternative possible behaviours between which the physically described aspects of theory are in principle unable to choose or decide." According to Stapp, this gap in 'causal certainty' opens the way for another kind of cause: one which is eminently knowable, both in principle and in practice, namely our conscious choices about how we will act.[294]

Werner Heisenberg (one of the founders of quantum mechanics) notes that during the nineteenth century some scientists believed that all psychological phenomena could ultimately be explained on the basis of the physics and chemistry of the brain. However: "From the quantum-theoretical point of view, there is no reason for such an assumption."

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[293] Hodgson, David, 'The Mind Matters', 1991, Clarendon Press, p.93

[294] Stapp, Henry, 'Mindful Universe', 2007, New York: Springer, loc:181

Heisenberg goes on to explain that: “We would never doubt that the brain acts as a physico-chemical mechanism if treated as such; but for an understanding of psychic phenomena we would start from the fact that the human mind enters as object and subject into the scientific process of psychology.”[295] In other words, mind is an independent phenomenon! Stapp certainly shares this assumption: he follows John von Neumann’s rigorous mathematical formulation of quantum mechanics in which he calls the effects of free choices upon the physically described world ‘***interventions***’.[296] Stapp states that; “These choices are ‘free’ in the sense that they are not coerced, fixed, or determined by the physically described aspects of the theory. Yet these choices, which are not fixed or determined by any law of orthodox contemporary physics, and which seem to us to depend partly upon ‘reasons’ based on felt values, definitely have potent effects upon the physically described aspects of the theory. These effects are specifically described by the theory.”[297] It’s curious and ironic to hear an eminent physicist appealing to ‘reasons’ and ‘felt values’ in order to explain choices, when the neuroscience and philosophic establishment is trying to banish such explanations!

d’Espagnat insists that, taking a quantum perspective, it is logically unacceptable to try to deduce the origin of consciousness as arising from matter: he says; “To define any notion - in particular the notion of consciousness - by refer-

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[295] Heisenberg, Werner, ‘Encounters with Einstein’, 1989, Princeton U.P., p.94

[296] von Neumann, John, ‘Mathematical Foundations of Quantum Mechanics’, 1932, (1955, Robert Beyer’s English translation)

[297] Stapp, Henry, ‘Mindful Universe’, 2007, New York: Springer, loc:188

ring to the notion itself is to get caught up in a vicious circle. That is why, once more, the concept of consciousness is necessarily prior to the concept of phenomena, since the latter is defined (as we have seen it must be, …) in terms of appearances valid for all, that is to say, in terms of facts of consciousness." However, d'Espagnat is also careful to point out that consciousness seems always to be associated with an empirical reality that is material. He then asks how these two facts, which at first glance seem to rule out one another, can be reconciled? He answers this question as follows; "… my own view is that it can be done by conceiving thought and empirical reality as two complementary poles which give rise to each other within the realm of independent reality."[298] Hodgson is prepared to spell out this dual-aspect-monist position in much less obscure language: he says: "If it is accepted that the best theory of matter requires references to consciousness, whether that of individual human beings (or animals) in the measurement-by-consciousness approach, or that of a community of human beings in some neo-Copenhagen approach, then the consensus (Cart-Ton) project of capturing mind and consciousness in terms of matter seems fatally flawed: what is strongly suggested is that mind and matter are interdependent and complementary, rather than that one is secondary to the other."[299] What both d'Espagnat and Hodgson are saying here is entirely compatible with the Whit-Tum world ontology advocated in this book. In the next chapter we'll consider in detail the quantum problem of measurement, which is the locus within quantum theory of the proposed causal role of consciousness.

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[298] d'Espagnat, Bernard, 'Reality and the Physicist', 1989, Cambridge U.P., p.212

[299] Hodgson, David, 'The Mind Matters', 1991, Clarendon Press, p.378

Chapter Ten: Quantum's Measurement Problem - A Quantum/Classical Boundary or Misplaced Concreteness?

Having, in the last chapter, presented a general survey of the ways in which quantum mechanics differs from classical physics, in this chapter we'll consider what is arguably the major difference; namely, what has come to be known as the 'measurement problem'. This raises some major philosophical (or, as I would prefer to say, ontological) problems. Among these fundamental questions we can list the following: 1) Can consciousness be regarded as a cause in physical processes? 2) Is there a boundary between a 'realm' of classical physics and that of quantum mechanics, or do quantum laws apply everywhere? 3) Is experience more 'real' than physical matter? 4) Does reality 'stop' at what we are able to observe, or is it scientifically and/or philosophically legitimate to enquire what lies 'behind' them? We shall, in this chapter, address all four of these questions. There are, of course, no definite and indisputable answers, but (to anticipate my conclusions) I'm going to argue that any serious effort to account for consciousness will require a bold (but unfashionable) turn into the realm of ontology, ultimately arriving (for me) at the ontology of what I call 'Whit-Tum world' as giving the most plausible explanation of the nature and function of consciousness.

Defining the Problem

The measurement problem concerns the question of how (or whether) the wave function collapses. This is a problem because of our inability to observe this process directly. The hidden puzzle is as follows: the wave-function evolves deterministically according to the Schrödinger equation as a linear superposition of different states, but actual measurements always find the physical system in a definite state. Any future evolution is based on the state the system was discovered to be in when the measurement was made, meaning that the measurement 'did something' to the system that is not obviously a consequence of the Schrödinger evolution. According to quantum theory, the Schrödinger wave equation determines the wave function at any later time. So, if observers and their measuring apparatus are themselves described by a deterministic wave function, why can't we predict precise results for measurements, but only probabilities?[300]

d'Espagnat acknowledges that accounting for the measurement process is one of the main problems of quantum theory. He says: "It is important to stress that the meaning of the word 'measurement' as used in microphysics is not quite the same as its meaning in macroscopic physics or in everyday language." He gives the example of measuring a table with a tape measure: one can assume that the length of a table is accurately represented by the marks on the tape. "This is because the table is a macro-system and its various characteristics cannot therefore be significantly changed by the interaction of the instrument I subjected it to in order to take the measurement. However, with a measurement carried out on a 'microscopic' system, such

300 Hodgson, David, 'The Mind Matters', 1991, Clarendon Press, p.321

as an atom or a molecule, the situation is very different. Since the measuring instrument is macroscopic, it can easily disturb the system quite considerably while the measurement is being made." Consequently, we can't simply assume that the value obtained represents the quantity measured immediately before the measurement operation. "It is even conceivable that the quantity had no well-defined value at that time."[301] But, we continue, in any case, to talk about 'the result of the measurement', although in reality this merely designates the number that the instrument has registered (and that we can read on the dial).

The Australian philosopher, David Chalmers presents the measurement problem in quantum mechanics as follows: "Most of the time, the state evolves according to the Schrödinger equation, but when a measurement is made, the state evolves according to the measurement postulate." In this view, the world consists of waves that usually continue in a superposition, but occasionally collapse into a more definite state when a measurement is made. But, as he says, it's not easy to make sense of this picture: "The problems all stem from the measurement postulate. According to this postulate, a collapse occurs when a measurement is made, but what counts as a measurement? How does nature know when a measurement is made? 'Measurement' is surely not a basic term in the laws of nature." Hodgson adds that, "… no part of the mathematics of quantum theory defines what constitutes a measurement."[302] Chalmers argues that if the idea of measurement causing wave func-

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[301] d'Espagnat, Bernard, 'Reality and the Physicist', 1989, Cambridge U.P., p.259/260

[302] Hodgson, David, 'The Mind Matters', 1991, Clarendon Press, p.21

tion collapse is to be accepted as a clear and objective process; "… then we need clear, objective criteria for when it occurs." He suggests that one solution, though clearly unsatisfactory, is to say that a collapse occurs whenever a quantum system interacts with a measuring apparatus. But, he points out: "The problem here is that it is just as implausible that the notion of 'measuring apparatus' should appear in the basic laws as it is that the notion of 'measurement' should. Before, we needed criteria for what counts as a measurement; now, we need criteria for what counts as a measuring apparatus."[303] The implication of Chalmers' comments is that the causal agent in collapsing the wave function can't be simply equated with the 'measuring apparatus' involved. An obvious alternative is to move 'up' the chain of the measurement process and identify consciousness as the causal agent.

In connection with the measurement problem, Whitehead talks about the modern notion of 'private psychological fields', which, he says, is the logical result of David Hume's doctrine, though Hume apparently refused to accept it. Whitehead says: "This modern doctrine raises a great difficulty in the interpretation of modern science. For all exact observation is made in these private psychological fields. It is then no use talking about instruments and laboratories and physical energy. What is really being observed are narrow bands of colour-sensa in the private psychological space of colour-vision. The impressions of sensation which collectively emerge from this entirely private experience 'arise in the soul from unknown causes'. The spectroscope is a myth, the radiant energy is a myth, the observer's

[303] Chalmers, David, 'The Conscious Mind' 1996, OUP USA, p.228

eye is a myth, the observer's brain is a myth, and the observer's record of his experiment on a sheet of paper is a myth. When, some months later, he reads his notes to a learned society, he has a new visual experience of black marks on a white background in a new private psychological field. And again, these experiences arise in his soul 'from unknown causes'. It is merely 'custom' which leads him to connect his earlier with his later experiences."[304]

Consciousness as Cause

The various efforts to solve these problems of measurement have given rise to different interpretations of quantum mechanics. The conventional interpretation, and (according to Stapp) the one most used by working physicist, is known as the Copenhagen school. It postulates that the wave function collapses because of the intervention of consciousness during acts of measurement or observation. Chalmers reports the 'consciousness' interpretation as follows; "… a measurement takes place when a quantum system affects some being's consciousness. … The corresponding interpretation of the calculus is reasonably elegant and simple in its form, and it is the only literal interpretation of the calculus that has any wide currency. This interpretation was first suggested by London and Bauer (1939), but it is most closely associated with Wigner (1961)."[305] However, the 'consciousness' interpretation does not explain why or how the intervention of consciousness causes the wave function to collapse. Hodgson also quotes London and Bauer, in support of this consciousness-as-cause position; they say

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[304] Whitehead, Alfred North, 'Process and Reality', 1927/1979, Macmillan, p.326

[305] Chalmers, David, 'The Conscious Mind', 1996, OUP USA, p.339

"It is only the consciousness of an 'I' who can separate himself from the former function … and, by virtue of his observation, set up a new objectivity."[306] Hodgson is optimistic that this view does solve some of the difficulties associated with the quantum measurement problem: "If measurement is effected by the first registration on human consciousness, then it is not surprising that the mathematics of quantum physics, dealing with the objective world, does not represent it. Further, a reasonably clear distinction is drawn between measurement, on the one hand, and the physical processes which are represented by the mathematics of quantum physics, on the other. A reasonably clear indication is given of where the cut between 'observed systems' and 'observing systems' is to be drawn."[307] From this point of view the measurement can be seen as embodying the psychophysical nature of quantum mechanics; the 'observed system' is the physical side, the 'observing system' is the psychological side.

Chalmers points out that the 'consciousness' interpretation presupposes mind-body dualism. He explains that if consciousness were just another physical property, then this interpretation would amount to nothing but the view that the wave functions of physical systems just happen to collapse in the context of certain complex physical configurations. On the other hand, if dualism is true, then using consciousness as the criterion for collapse provides a truly fundamental explanation. Chalmers adds that; "… the fact that the cause of collapse is external to physical processing al-

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[306] London and Bauer, 'The Theory of Observation in Quantum Mechanics', trans., in Wheeler , J.A. and Zurek, W.H.(eds.), 'Quantum Theory and Measurement', Princeton U.P., N.J. 1983, p.252

[307] Hodgson, David, 'The Mind Matters', 1991, Clarendon Press, p.329

lows for a much simpler theory. All purely physical systems are now governed by the Schrödinger dynamics alone, and the very different measurement dynamics have an independent source." This, however, immediately highlights just one of this interpretation's many counterintuitive consequences: he cites the example of a measuring apparatus with a pointer designed to measure the state of an electron. Before the measurement, the electron is in a superposed state. If there is no consciousness in the vicinity, then the whole system, including the pointer, will be governed by linear Schrödinger dynamics. As a consequence of this; "… it follows that a superposed electron state will produce a superposed pointer state. That is, the theory predicts that the pointer is pointing to many different locations simultaneously! It is only when I look at the pointer that it points to a definite position."[308]

As we have seen, the Copenhagen school tried to avoid this total retreat into conscious causation by postulating; "… a 'cut' between the system being measured, and the system doing the measuring: on one side of the cut, quantum physics applies; on the other, classical physics. So, a measurement is treated as a classically describable event, with the measuring device acting according to classical physics". In other words, the Copenhagen school treats measuring systems as classical objects, operating according to classical physics. The rules of quantum physics are invoked only to predict the outcome of measurements. As Chalmers says, treating the measurement apparatus as classical means that; "… a measurement occurs whenever a quantum system in-

[308] Chalmers, David, 'The Conscious Mind',1996, OUP USA, p.339

teracts with a classical system."[309] Given this, Hodgson concludes that: "As to what 'happens' (so far as a measured system is concerned) between or in the absence of such measurements, one can only refer to the mathematical objects used in quantum physics: one should not otherwise attempt to describe what, if anything, 'really happens'."[310] Chalmers analyses this 'measure-but-don't-ask' policy in more detail. He claims it's the dominant view among working physicists. But it comes in two versions: "According to the first version, maybe something is going on in the world, but we can never know what it is. The calculus gives us all the empirical information that we will ever have, so that anything further is pure speculation." This I would describe as the 'methodological' version; in other words, ***because*** it has (thus far) proved impossible to reveal ***via empirical observation*** what is 'really happening', ***therefore*** it's perfectly OK to stop worrying about it and to continue making these useful calculations. (This difference among physicists is very much like the difference between methodological and ideological Behaviourists: the former leave out mind and consciousness because they can't be measured, while the latter deny that such phenomena exist at all!)

As Chalmers says; "This view makes sense for practical purposes, but is unsatisfying for anyone who wants physics to tell us about the basic level of reality. Given that the calculus works, we want to have at least some idea of how it could possibly work. Perhaps we can never know for sure, but it makes sense to ask." (This impulse to ask is the starting point for the sort of ontological explanation which I'm

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309 Ibid, p.339

310 Hodgson, David, 'The Mind Matters', 1991, Clarendon Press, p.322

putting forward in this book under the title, 'Whit-Tum world'.) Chalmers' second version takes a harder ontological line: it claims that there is no fact of the matter about what is going on in the world. The fact that the calculus works is enough. But, as Chalmers justifiably complains: "It offers us a picture of reality that leaves out the world! … By giving up on a fact of the matter about what lies behind our measurements, this view gives up on an independently existing reality."[311]

A Quantum/Classical Boundary?

This solution to the measurement problem by positing a 'cut' (or boundary) between a 'classical' measuring system and a quantum observed system, raises the issue as to the location, or perhaps even the existence of, a boundary between the classical and the quantum 'realms'. Cart-Tonist have seized on the notion of a classical/quantum boundary as a means of 'taming' the wild concepts of quantum mechanics by reducing their scope to the micro-level of the subatomic realm: everyday reality is still subject to classical physics and thus quantum's disturbing concepts can be safely ignored when considering phenomena such as the operation of neurones and their networks. The alternative Whit-Tumist view is to question the very existence of any such boundary. However, anyone presenting a basic account of quantum mechanics is, in short order, confronted with the challenge of explaining why the bizarre phenomena of quantum mechanics don't spill over into the everyday macro world. Hodgson's explanation is based on the limited physical dimensions of the brain; "… whatever it is that can make up a single mind must have some spatial lim-

[311] Chalmers, David, 'The Conscious Mind', 1996, OUP USA, p.343

itations, certainly as regards possible outputs from that mind, so as to ensure that faster-than-light communication, at the macro scale of detectable events, is avoided. The distances involved within a human or animal brain would be unlikely to cause any such problem."[312] However, he points out that if a single mind were to be based on a single neural network which stretched over millions of kilometres, then there would be a possibility of such quantum spillovers into the everyday world. This position may represent a curious reversal of the classical explanation of consciousness, where the macro world is the fundamental reality and quantum mechanics is limited to a purely mathematical 'explanation' for what goes on at the sub-atomic level - highly abstract, but pragmatically convenient. In Hodgson's new model, however, it is the macro world which has come into being for our everyday convenience in the physical world, while our consciousness is fed from the 'deeper reality' of the quantum world.

Chalmers notes that Bohr put great emphasis on the 'classical' nature of a measuring apparatus. Chalmers suggests that as a consequence of Bohr's views; "… only classical (or macroscopic) objects have an objective state. Questions about the real state of an object described by a superposition are simply proscribed." This view, however, relies on the existence of some sort of 'boundary' between the classical and the quantum worlds systems, which is (to say the least) counterintuitive; "… it is hard to imagine that reality simply 'fades out' as we descend from the macroscopic to the microscopic level." Chalmers concludes that such a view offers a 'picture' of fundamental reality which is no

[312] Hodgson, David, 'The Mind Matters', 1991, Clarendon Press, 399

picture at all![313] Whitehead also concluded that because, in quantum mechanics, all scientific measurements are only concerned with the the ***potentialities*** out of which actualities arise, this means that; "… physical science is solely concerned with the mathematical relations of the world."[314] And Whitehead is always very clear that 'the mathematical relations of the world' are an extreme ***abstraction*** from what the world truly is in reality. Mistaking the mathematics for the reality (as Cart-Tonist frequently do) is an example of what Whitehead calls the '**fallacy of misplaced concreteness'**. This involves mistaking an abstract belief, concept or opinion for a physical or 'concrete' reality: "There is an error; but it is merely the accidental error of mistaking the abstract for the concrete."[315] Whitehead proposed the fallacy in a discussion of the relation of spatial and temporal location of objects. He rejected the Cart-Tonist notion that a concrete physical object can be ascribed a simple spatial or temporal extension. Rather, in Whitehead's view an object cannot be 'located' without reference to its relations to other spatial or temporal extensions; "… among the primary elements of nature as apprehended in our immediate experience, there is no element whatever which possesses this character of simple location." He suggests that; "… by a process of constructive abstraction we can arrive at abstractions which are the simply located bits of material, and at other abstractions which are the minds included in the scientific scheme."[316] Both of these abstrac-

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[313] Chalmers, David, 'The Conscious Mind', 1996, OUP USA, p.343

[314] Whitehead, Alfred North, 'Process and Reality', 1927/1979, Macmillan, p.326

[315] Ibid, p.52

[316] Ibid, p.59

tions, Whitehead claims, commit the fallacy of misplaced concreteness.

In line with Whitehead's objections, Chalmers assets that treating the measurement apparatus as classical is clearly unsatisfactory: "Quantum theory is meant to be a universal theory, and it should apply to processes within a measuring instrument just as much as it applies to processes elsewhere." The alternative, he continues, involves assuming; "… that there are two fundamentally different kinds of physical objects in the world - a supposition that would require the development of an entirely new theory." Chalmers further points out that the expression 'classical system' cannot be a term in a fundamental law of nature any more than the concept of 'measurement' can.[317] All this poses the question as to how we can establish a correspondence between quantum and classical reality? Hodgson comments: "This would not be a severe problem if there were a clear demarcation between a domain in which quantum theory operated (for example, in relation to atoms and their constituents) and a domain in which it did not operate. However, there is no such demarcation."[318] And d'Espagnat insists that the measuring; "… instruments are themselves made of atoms, that is to say, of quantum systems." Consequently, we have to consider not only the atom, or the quantum system, which we are trying to measure, but also the complex systems comprising all the atoms of all the measurement instruments, and possibly also their environment as well! Despite the vast complexity involved in this approach to the measurement problem (and the consequent

[317] Chalmers, David, 'The Conscious Mind', 1996, OUP USA, p.338

[318] Hodgson, David, 'The Mind Matters', 1991, Clarendon Press, p.321

reluctance of physicists to countenance it), d'Espagnat asserts a simple, irrefutable conclusion; "… any system of atoms comes under the jurisdiction of quantum mechanics. So far, despite valiant efforts, physicists have not been able to 'put their finger on' any exception to this simple rule."[319]

Consequently, in reality experimenters ***ought*** to consider both their instruments, as well as the system they're trying to measure, in terms of quantum mechanics, since the instruments are also, of course, made out of atoms! So, while this Copenhagen, quantum/classical 'cut' in the measuring system works in practice, it avoids rather than answers the problems of measurement: it certainly does not explain in quantum mechanical terms what a measurement is. Hodgson identifies three particular problems: 1) It makes a crucially important distinction between the system being measured and the measuring device, yet does not specify in quantum mechanical terms where this 'cut' is to be placed. 2) It implies that the interactions of the systems, including the system being measured and the measuring device, can be represented by quantum mechanical formalism. However, as Hodgson points out, that representation involves only the deterministic development of the state function, and not the sudden and partly unpredictable change of the state function which results from measurement. 3) This sudden, and partly unpredictable, change to the state function brought about by measurement is treated as part of the quantum theory, but no explanation is provided as to why measurement has this effect while other interactions apparently do not.

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[319] d'Espagnat, Bernard, 'Reality and the Physicist', 1989, Cambridge U.P., p.191

As Hodgson points out; "… it seems wrong to suggest that this effect occurs only in measurement, and does not occur if interactions similar to those involved in measurement occur spontaneously; yet if the effect arises whenever certain kinds of interaction occur, there is no identification of what kinds of interaction have this effect."[320] In other words, trying to make 'measurement' the cause of the collapse, rather than the intervention of consciousness, doesn't really work.

Actuality from Collapse?

Accepting that the registration of a measurement on the consciousness of one person could 'collapse' a quantum physical state, so as to show a definite value, for that person, raises the question; what about other people? Hodgson says; "… one has to suppose that registration of a measurement on the consciousness of one person reduces the state so as to show a definite value so far as everyone is concerned." (Any alternative view on this would fall into the philosophical category of 'solipsism', the theory that the self is all that can be known to exist.) For example, when a person opens the box containing Schrödinger's cat, and observes it to be dead, that observation makes the cat dead for everyone else who subsequently looks at it. Hodgson worries that this seems prima facie implausible: in particular, it raises the question as to how this conscious mental event in one person can somehow reach out to the observed world and/or to the minds of other persons, so as to collapse the state for them too.[321] "A further aspect of this

[320] Hodgson, David, 'The Mind Matters', 1991, Clarendon Press, p.323

[321] cf, Putnam, Hilary, 'The Logic of Quantum Mechanics' in 'Mathematics, Matter and Method', Putnam, Hilary (ed.), 1979, Cambridge U.P., p.165

problem is raised by the Northern Irish physicist, John Bell[322]: if the interaction between the mind and the rest of the world, which on this view reduces the quantum state, occurs at an instant in time, then, for consistency with special relativity, it must also occur at a single point in space; and this seems highly unlikely." A further difficulty with this consciousness-as-cause position is the possibility of mistakes during observation: Hodgson asks; "What if the first person who opens the box sees what (but for some aberration of his brain-mind) would be interpreted as a dead cat, but which is in fact interpreted by him as a living cat? Is the state reduced, and if so to which alternative?" If you claim that mistakes are not possible, in the sense that whichever state is perceived becomes the reality for all others; "… then the implausibility of this affecting the external world and other minds is emphasised." Hodgson then considers mistakes arising from the possible malfunctioning of the equipment involved: he suggests, for example, that (with the box unopened) the monitor of the cat's vital systems gives an erroneous reading indicating death. Surely, he says; "…the observation which is thereby mistaken does not determine the value to which the state collapses; and equally surely it could not reduce the state to the correct value which is not observed." In addition, if the measurement involves many (perhaps continuous) possible values; "… so that there can be degrees of accuracy in reading an apparatus, what degree of accuracy in reading the apparatus is necessary to collapse the state?"[323]

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[322] Davies, P.C.W and Brown, J.R., 'The Ghost in the Atom', 1986, Cambridge U.P., p.54/55

[323] Hodgson, David, 'The Mind Matters', 1991, Clarendon Press, p.330

Yet another problem for the Copenhagen, consciousness-as-cause position, is raised by the possibility of registering the result of a measurement by mechanical means, for example photographs.[324] Hodgson provides the following example: “A measuring instrument is applied to a system, no one looks at the reading, but two photographs are taken, one after the other.” Someone then looks at the second photograph taken. Does this act, of observing the second photograph, reduce the state of the original system, the measuring device, and does it also reduce the state depicted in the first photograph? Imagine that both photographs are taken far away from each other and from the measuring device, Then three different people (at a pre-arranged time) look (one each) at the two photographs and at the measuring device. (The pre-arranged time can ensure that the three events have space-like separation, thus, according special relativity, none can be considered prior in time to either of the others.) “Again, it seems prima facie implausible that some one of these three events could reduce the state function for all persons and all purposes.”[325]

Another approach to the measurement problem, Hodgson suggests, is to see it as an inaccuracy in quantum theory. The inaccuracy consists of quantum theory’s proposed dichotomy between (deterministic) time development and (random) state reduction: in objective reality (which we can’t access by direct empirical observation), the development of events, may not actually accord with such a dichotomy. Hodgson adds that: “It may also be that no mathem-

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[324] see for example, Davies, P.C.W, ‘Other Worlds’, 1982, Sphere, London, p.134

[325] Hodgson, David, ‘The Mind Matters’, 1991, Clarendon Press, p.331

atics-based theory can accurately represent such development… the best such a theory can do is to predict the results of observations by means of a formalism which involves this inaccurate dichotomy." As long as the theory gives accurate predictions, it can be accepted as an established theory in physics, but, without a solution to the measurement problem, such a theory must fail, claims Hodgson. He suggests that this may; "… indicate the inability of objective science to deal with consciousness." Hodgson then argues that the measurement problem involves the question as to whether or not; "… objective reality always wholly determines in advance the content of perceptions, or whether sometimes the perceived phenomenon is determined in part by the conscious perception itself." Clearly, perception does provide us with spatial extension, shape, colour, etc., so (Hodgson suggests); "… it may not be a large step to say that sometimes, for example in cases of measurement, it also provides determinacy. Viewed that way, it may not seem so surprising if it is perception (accurate or inaccurate) which completes measurement; whether this be Schrödinger's cat hearing the click of a Geiger counter, or three space-like separated persons looking at photographs, or whatever." He uses the example of a photograph to illustrate the power of consciousness to produce the content of perceptions. He says that; "… in the perception of a macro object such as a photograph, objective reality provides only abstract properties, which are nonlocal and include superposed potentialities; but that (normally at least) such superposed potentialities do not involve any indeterminacy in macroscopic properties of the photograph. In conscious perception, these abstract properties are translated or decoded into the substantive properties of spatial extension, shape, colour, etc."[326]

Hodgson concludes that: "It is our perceptions, which we know to be actualities and not mere potentialities, and which we know to be determinate rather than being superpositions of potentialities." He suggests that this is because our perceptions are identical with certain physical events. These physical events become determinate, when (via the collapse of the wave function) they are transformed from superposed potentialities into actualities. Consequently, their associated mental events simultaneously also become determinate. However, he points out that; "… conceivably all else could be indeterminate, could be superposed potentialities. Thus, when a perception occurs, its associated (determinate) physical events occur: it is possible that at that time one element of a superposition of potentialities becomes an actuality, and all other elements of that superposition are eliminated." So, Hodgson is clear that; "… if one has a perfectly operating chain of connection between an observable to be measured, and a conscious entity such as a human observer, then perception of the result of measurement will reduce the quantum state to one involving a definite value of the measured observable, namely that perceived." On the other hand, if this is not the case, if there is some element of error in the connection, then, says Hodgson; "… while the occurrence of a perception in the human observer will in some way or other reduce a quantum state by eliminating inconsistent possibilities, there will not be the same simple connection between what is perceived and a particular value of the micro observable. One can say that

[326] Ibid, p.377/378

some potentialities are eliminated, but not necessarily that a particular measured value of a micro observable is thereby established."[327]

Experience as a Fundamental Reality?

Having restated and reconfirmed the Copenhagen, consciousness-as-cause position, Hodgson is now ready to deal with some of the problems inherent in it, which he raised above: firstly, the problem of solipsism. Hodgson had earlier worried about how a conscious mental event in one person, when collapsing a state function, could somehow reach out to the minds of other persons, so as to collapse it for them too. He also raised a related problem, cited by John Bell, namely if the interaction between the mind and the rest of the world, which reduces the quantum state, occurs at an instant in time, then, for consistency with special relativity, it must also occur at a single point in space. This prohibition of faster-than-light communication by relativity, makes it seem impossible that an observation by one conscious human should instantaneously collapse the state function for all humans. The answer, Hodgson states, can be found in the non-locality of quantum processes: "This means that, despite the theory of relativity, correlated distant potentialities can be eliminated instantaneously: this could solve both the problem of reducing quantum states for other persons, and Bell's problem about simultaneous interactions at different places in the brain." This issue of faster-than-light communication at a sub-atomic level, despite its apparent prohibition by relativity is a crucial matter for Hodgson. (It plays a large role in his own theory of consciousness.) Hodgson says that the non-local character of

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[327] Ibid, p.331

quantum states, as shown by Bell's theorem, poses a very difficult question for science. This question was precisely formulated by the physicist, Nick Herbert, in 1985: "Why does nature need to deploy a faster-than-light subatomic reality to keep up merely light-speed macroscopic appearances?" The answer provided by Hodgson is as follows; "… to make possible consciousness and mental events."[328]

Faster-than-light communication can also solve the problem of function collapse via photographs: as above, Hodgson imagines that, rather than a direct measurement, two photographs of the reading are taken. Suppose, he suggests, that both photographs are removed to distant places. Thee different persons then (at a pre-arranged time) look at the photographs and the measuring device: these three events have space-like separation, so according to relativity, none can be considered prior in time to the others. So, again, it seems implausible that any one of these three events could reduce the state function for all persons. But, Hodgson argues that; "… the taking of photographs of the reading of a measuring device could give rise to a single widely extended quantum state, which could in turn be reduced by space-like separated events in a way which does not involve the assigning of time order to those events."[329] So, again, faster-than-light communication makes it possible for all humans to experience the collapse, from a single observation, simultaneously.

Thus, Hodgson's claim is that quantum non-locality makes consciousness possible, presumably because consciousness

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[328] Ibid, p.385

[329] Ibid, p.330-332

is an essential part of 'nature'. And, indeed, the American physicist, Henry Stapp expands this speculation into the claim that quantum theory is perfectly formulated to accommodate a duality of the physical and the psychological. Stapp refers to John von Neumann's version of quantum theory in which; "… each of the quantum events in the brain has both a psychological aspect and a physical aspect. The physical aspect is the jump of the quantum state of the brain to that part of itself that is compatible with the increment in knowledge specified by its psychologically described aspect." It's this tight linkage (Stapp says) between the psychological and the physical aspects of events that keeps a person's brain in alignment with his or her experiences. These repeated reductions are necessary because; "… the indeterminacy present at the microscopic/ionic level, keeps generating at the macroscopic level a profusion of brain states corresponding to mutually incompatible observations." These interventions, which can't be explained by physical theory alone, provide the basis for mental causation. Stapp concedes, however, that all this depends on accepting the quantum mechanical conception of nature as based on; "… a sequence of macroscopically localised psychophysical events, rather than on the notion of mindless matter."[330] (This description by Stapp is strikingly similar to Whitehead's ontology of the fabric of reality as composed of 'drops of experience'.)

This notion of reality as 'a sequence of macroscopically localised psychophysical events', is known, in the philosophy of mind, as double-aspect theory or dual-aspect monism. In this view the mental and the physical are two as-

[330] Stapp, Henry, 'Mindful Universe', 2007, New York: Springer, loc:941

pects of, or perspectives on, the same substance.There's a similar theory called neutral monism. However, neutral monism allows the context to determine whether the neutral elements are; mental, physical, both, or neither. By contrast, double-aspect theory requires the mental and the physical to be inseparable and mutually irreducible (though distinct). In this sense, double, or dual-aspect theory can be clearly contrasted with physicalism and idealism, as well as with Cartesian dualism. A well-known formulation of dual-aspect monism is the, so-called, 'Pauli-Jung conjecture': the famous psychologist, Carl Jung and the physicist Wolfgang Pauli speculated that the mental and physical aspects of reality may show a complementarity in a quantum physical sense. That is, the Pauli-Jung conjecture implies that with regard to mental and physical states there may be incompatible descriptions of different parts that emerge from the whole. This stands in close analogy to quantum physics, where complementary properties cannot be determined jointly with accuracy. The physicist, Paul Bernays sought to explain this by stating that: "Two descriptions are complementary if they mutually exclude each other, yet are both necessary to describe a situation exhaustively."[331] This could explain why, in common-sense and Cartesian dualism, mental and physical phenomena are seen as completely distinct and mutually exclusive, whereas, according to dual-aspect monism, they are simply different aspects of a single, underlying reality.

The physician and philosopher, Raymond Tallis remarks on the popularity and, prima-facie plausibility of double-as-

[331] Atmanspacher, Harald, 'Dual-Aspect Monism à la Pauli and Jung', 2012, Journal of Consciousness Studies. 19 (9–10): 96–120 (25)

pect theory. He explains its major claim as follows: “While there is only one set of events - what we see in the brain - these events have two sides: a neural side and an experiential side.” But, Tallis has a major (though rather simplistic) objection to what he calls this ploy: he asks what is meant by ‘aspects’ or ‘sides’, and continues: “We know what it is like for an object, such as a house, to have one aspect when it is looked at from behind and another aspect when it is looked at from the front. But we cannot imagine any kind of entity that has an experiential (or mental) front end and a neural (or material) back end. … the difference between different aspects of a house … is nothing like the difference between a material event such as a discharge of nerve impulses and a conscious event such as having the experience of yellow. What is more, the notion of two aspects of a house presupposes observers who see the house from different angles. The house does not, in or of itself, have two aspects or indeed any aspects. … To invoke doubled aspects is to cheat: it smuggles consciousness in to explain how it is that neural activity, which does not look like experience, actually is such experience.”[332] Tallis' objection collapses, however, if we take seriously the analogy just made, between double-aspect theory and quantum complementarity: the wave-particle complementarity could be objected to with the same simplistic arguments, however its validity is asserted by the entire establishment of modern physics. In addition, however, Tallis is right to suspect trickery in any theory which seeks to ‘magic up’ sentience out of physical processes. (For me this is, of course, the attraction of Whitehead’s ontology: the sentience is built into the fabric of reality - no magic required!)

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[332] Tallis, Raymond, ‘Aping Mankind: Neuromania, Darwinitis and the Misrepresentation of Humanity’, 2011, Routledge, loc:1946

An Ontology to Accommodate Consciousness?

Henry Stapp reasserts the orthodox quantum principle that reduction events occur; "… at the boundary between the physically described and psychologically defined aspects of our scientific understanding of nature." Rejecting this, he says, is what creates 'The Hard Problem' in consciousness studies, and makes a mystery out of how subjective experience arises from neural computation. Stapp identifies the principle problem with all quasi-classical approaches: within approaches which do not involve consciousness, where; "… can one find either any reason for any reduction to occur at all, or any objective principle that specifies where, between one single atom and the more than 10^{24} atoms in the brain, do the collapses occur?" Orthodox quantum theory ties together these two problems of 'consciousness' and 'collapse' in a way which is useful in practice. In doing so, it also provides; "… a way for the universe to acquire meaning."[333] In other words, consciousness causes reductions in the brain, determines where they will occur and, consequently, makes meaning, in the human sense possible. The error in the classical approach lies, according to Stapp, in ignoring the fact that reduction events in the brain lead to increments in the subject's knowledge. Instead such events are seen only in terms of classical physics. The problem with this, Stapp says is that; "… one loses the essential connection between physical description and subjective experience that quantum theory is designed to provide." The 'quasi-classical' approach, as Stapp calls it, accepts quantum mechanics at the microscopic level, but ties reduc-

[333] Stapp, Henry, 'Mindful Universe', 2007, New York: Springer, loc:970

tion events in the brain to; "… some objective condition of classicality, rather than to the subject's experiences." This 'micro-level limit' (as in Dennett's theory of mind and consciousness) is, Stapp says, at least somewhat better than simply accepting a fully classical conception of the brain, which ignores a hundred years of development in physics. However, Stapp continues; "… in the context of solving the problem of the mind-brain connection, it inherits the fatal deficiency of the classical approach: the conceptual framework does not involve mind."[334] In other words, in the classical approach, there's no place for, or need for, our conscious experiences. Indeed, classical physics provides no reason for consciousness to exist at all. Consequently, neither does it provide any principle as to how conscious experiences are tied to brain activity.

The French physicist, Bernard d'Espagnat, summaries the (perhaps unconscious) philosophical outlook of the modern-day physicist: he explains firstly that Nineteenth Century physicists could interpret physics as a faithful, though incomplete, description of 'what is really real', without any objections from within science. d'Espagnat continues: "Even today some physicists consider their science should hold fast to this ideal. But most of them assign a more modest goal to physics, and to knowledge in general. Science, they say, (and ordinary knowledge as well) is indissolubly linked with human experience. Once and for all it must therefore give up the unattainable goal of describing whatever some thinkers may mean when they speak of 'reality in itself' or 'reality as it really is'." In other words, the task of science is simply the description of 'phenom-

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[334] Ibid, loc:962

ena', i.e. things, events, etc.; "… as they are organised by human collective experience. The human means of apprehension and the human means of data processing on which this human experience rests cannot be kept out of consideration and science should not try to do so."[335]

d'Espagnat also says that the mathematical descriptions within quantum theory; "… refer not exclusively to Reality, but, to a great degree to our minds as well."[336] Hodgson also dismisses so-called 'objective' solutions to the measurement problem by concluding that; "… there are reasons for questioning whether references to consciousness can be eliminated from any mathematics-based theory which is as satisfactory and comprehensive as the quantum theory."[337] At this point, d'Espagnat makes a link between this introduction of a mental dimension into physics with the philosophical views of Immanuel Kant: in order to try to resolve the dichotomies of Cartesian dualism, i.e. the divisions between mental and physical phenomena and to tackle the mind and body problem, Kant posited a world of 'a priori forms'. This 'deeper' world underlies mind and matter and exists at a more basic level of reality. Examples of these a priori forms, include space and time, and they are (according to Kant) necessary preconditions for human understanding. d'Espagnat comments that the stance of quantum physics certainly comprises parts of Kant's philosophical doctrine, but it is considerably less detailed and specific.

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[335] d'Espagnat, Bernard, 'Reality and the Physicist', 1989, Cambridge U.P., p.232

[336] Ibid, p.157

[337] Hodgson, David, 'The Mind Matters', 1991, Clarendon Press, p. 377

Consequently, he says, it is not necessary to be a 'Kantian' in order to subscribe to philosophically quantum approaches to physics. In fact, according to d'Espagnat, many modern physicists and philosophers subscribe, explicitly or implicitly, to such 'Kantian' views, even if they've scarcely heard of, nor taken any interest in Kantian philosophy.[338] As I shall argue at length later, I believe that the 'Whit-Tum' ontology, which I'll be describing, is a better philosophical doctrine to accommodate the Copenhagen-von-Neumann-Stapp tradition of quantum mechanics.

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[338] d'Espagnat, Bernard, 'Reality and the Physicist', 1989, Cambridge U.P., p.232

Chapter Eleven: Quantum Reality and Experience

As we saw in the last two chapters, both the characteristics of quantum mechanical theory and especially 'the measurement problem' within it, severely challenge the metaphysical assumptions underlying Cart-Ton world's Realist vision of physical reality (based as it is on the ontology of classical physics). The purpose of this chapter is to begin the process of considering the philosophical implications of the apparently paradoxical findings of quantum mechanics. In terms of the book's thesis, this process needs to achieve two related objectives with regards to our conceptualisations of reality: firstly, to refute the assertion of 'ideological empiricism' that there is nothing behind our observations. (In other words, there's literally nothing for ontologists to meaningfully speculate about.) Secondly, to suggest that this 'independent' or 'veiled' reality (as Bernard d'Espagnat variously calls it) is accessible to us in a fruitful way. (Among other arguments, d'Espagnat's notion, below, that all great art originates in 'veiled' reality, hopefully manages to achieve both these objectives.)

As d'Espagnat and others have noted, there's been a deep reluctance on the part of physicists, from the founding fathers of quantum mechanics onwards, to seriously consider these philosophical implications, especially in regard to any attempt to formulate an ontology which might claim to be consistent with them. The history of theoretical initiatives relevant to quantum mechanics, including those of Einstein, Everard and Bohm, can be interpreted as a series of efforts to remove the paradoxical implications rather than accepting them and attempting to build an ontology around them. This compacted reluctance by mainstream physics, and its related philosophical establishment, can (in my view) be described as a collective state of ontological denial. If (like me) you believe that scientific progress requires a balance, on the one hand, of increasing predictive power via empirical experiment with, on the other hand, an advance in rational ontological understanding of the processes underlying the empirical findings, then such ontological denial must inevitably produce certain negative outcomes. Let me suggest that amongst these negative outcomes are the following two problems: a) an obvious deficit in scientific progress (given that you believe that understanding is necessary to such progress). b) I would further posit that everyone who thinks about a scientific topic has recourse, whether consciously or not, to an ontology. (In this sense, the concept of ontology is very similar in meaning to the science historian, Thomas Kuhn's notion of a scientific paradigm.) Consequently, in the absence of an appropriate, adequately 'thought-out' ontology, the thinker in question is likely to default to the last relevant and established ontology, i.e. Cart-Ton world.

Exploring Quantum 'Strangeness'

We can start this process of confronting quantum theory with our intuitive notions about reality by looking at two areas of 'reality description' where these two accounts are in direct conflict; firstly, quantum non-locality and, secondly, the micro-macro division. Danah Zohar observes that quantum non-locality is probably the most counter-intuitive feature of the quantum world: "A vision of reality which holds truck with instantaneous action at a distance, or non-locality as it is more properly called, (the principle that something can be affected in the absence of a local cause), has obvious mystical overtones.” It flatly contradicts both common sense and classical physics. They both incorporate the intuitive notion that reality is ultimately composed of minute indivisible particles, which are inherently separate. Intuition and classical physics further claim that any observable effects for one particle must have been caused by some other particle. In addition to this, according to relativity theory, no cause (or even signal) can travel from one part of reality to affect any other part faster than the speed of light. Consequently, the notion of instantaneous causation should be impossible. Given all this, Zohar notes that the problem of non-locality was; “… so difficult that it wasn’t even raised in the early days of quantum theory, and it’s only in recent years that physicists have attempted to come to terms with it.”[339] All this does not mean that faster-than-light signals are ‘possible’, in the everyday sense of this word. If faster-than-light signals were possible in this sense, we could signal to our own past, and this seems unacceptable. In addition, there are proofs by the physicist, Philippe Eberhard and others that according to quantum mechanics any measurable influence must travel at the speed of light or slower. It would seem that the instantaneous correlations shown by Bell's theorem and the Aspect experiments are, in the words of the American physicist, Nick Herbert; “… private lines accessible to nature alone”. This thought lead Herbert to ask: “Why … does nature need to deploy a faster-than-light subatomic reality to keep up merely light-speed macroscopic appear-

339 Zohar, Danah,‘The Quantum Self’, 1990, Harper Collins, p.18

ances?"[340] As before, Hodgson's answer to this question is; "… to make consciousness possible".[341]

As to the micro-macro division, David Hodgson insists that the world of experience must be composed of micro objects which only quantum theory can describe in a satisfactory manner. Therefore; "… the substantive reality of our experience, the macro objects and events of our experiential world, is based on the reality of the quantum world. The macroscopic properties which we observe are relatively sharp and stable because they manifest the statistics of huge numbers of states and events of the quantum world: we perceive such properties because our perceptual apparatus in general responds to such statistics." Clearly, for the everyday lives of ordinary people, it is the familiar world of macro objects and events which is primary, and the bizarre world quantum phenomena which is secondary and derivative. However, despite our 'folk physical' prejudices, the world is thoroughly quantum from micro to macro and there is no upper boundary after which we can safely revert to classical physics. As to the 'non-materiality' of matter, Hodgson observes that: "The entities described by quantum mechanics are very different in many respects from the substantive reality of our experience." Such entities are; indeterminate (consisting at least in part of superposed potentialities), they have quantifiable probabilities for observable properties, and, in addition, they are non-local, capable of making instantaneous correlations between spatially separated events. Hodgson then asks; "… whether the quantum physical descriptions represent entities and events which are real, or whether at best they are merely rules giving

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[340] Herbert, N., 'Quantum Reality', 1985, Rider, London, p.44

[341] Hodgson, David, 'The Mind Matters', 1991, Clarendon Press, p.369

some sort of connection between the macro objects and events which are the 'true' reality. I suggested that the quantum physical descriptions do (at least approximately) represent entities and events which are real; even though these entities and events are difficult to describe and comprehend in our ordinary language, dependent as it is on concepts associated with macro objects and classical physics." What Hodgson is saying here is that our classical, 'billiard-ball' conception of matter is based on the macro world we experience, while the reality of matter is based on the very different, micro world of quantum mechanics.[342] Given this, let me suggest that we can turn the Cart-Tonist dismissal of quantum effects on its head: instead of safely 'quarantining' quantum phenomena to the extreme micro-level of the sub-atomic realm, we can rather make the macro everyday world the 'special case'. The 'illusions' of the macro world are convenient for creatures of our size, but the ultimate reality of the universe within which we exist is irremediably quantum in nature. In other words, it is the familiar 'human' world which is the exception (in which rules which are practical for us appear to operate) within a universe which is essentially and predominantly quantum.

What can we say about this quantum level of reality? Hodgson talks about particles as potentialities with individual existence; he says that quantum mechanics still treats particles as the ultimate constituents of matter. However, in any but the simplest case, such particles cannot be considered as having either separate identities or simple location, except when they are subject to measurement or other measurement-like interactions: "Then they are mani-

[342] Ibid, p.375/376

fested as having such identities and/or location. In the absence of such interactions, they are potentialities without individual existence or simple location, with no better description than that given by a many-particle quantum state function or state vector."[343] And Zohar talks about 'causeless events', using the example of an electron transitioning from one energy state to another within an atom; "… it does so in a completely random and spontaneous way. Suddenly, with no prior warning and certainly without 'cause', a previously, 'quiet' atom may experience chaos in its electron energy shells. It's largely a matter of chance. And the electrons may, with equal probability, make a transition from a higher energy state to a lower one, or from a lower energy state to a higher one." It's for this reason that time is said to be reversible at the quantum level: events can occur in any temporal direction.[344] In many quantum processes this 'virtual' state is an intermediate state, which is also sometimes described as 'imaginary'.

Elaborating on the subject of the reality of quantum indeterminacy, or 'built-in inaccuracy' (as he calls it), Hodgson says that according to quantum theory; "… there cannot be a wholly accurate representation of anything less than the whole universe. Any part of the universe which one selects to be represented in quantum physical formalism will have interacted with other parts of the universe so as to create correlations of potentialities with such other parts." Consequently, this representation will be inaccurate in not providing for the effect of these correlations. However, in our everyday perception, we make a natural separation of

[343] Ibid, p.360

[344] Zohar, Danah,'The Quantum Self', 1990, Harper Collins, p.15

the object being observed from the rest of the universe. This object is then seen as an actuality. In addition, we make no representation of superposed potentialities, so, as a result we do not misrepresent these potentialities because of a failure to correlate them with the entire universe.[345] Perhaps even stranger than all this, David Bohm suggested that; "… in many ways, the concept of a virtual transition resembles the idea of evolution in biology, which states that all kinds of species can appear as a result of mutations, but that only certain species can survive indefinitely, namely, those satisfying certain requirements for survival in the specific environment surrounding the species."[346] The many species generated by mutations can be seen as various possibilities (virtual states) which nature can explore as new ways via which she can express her potential. Bohm notes that the less viable possibilities do eventually die out, but they often leave some trace of themselves which goes on to become part of life's fabric. Zohar explains how this might be possible: "Two unviable mutations might, for instance, crossbreed to form some third species which is capable of long-term survival (a real transition). Quite possibly we human beings are the result of such a crossbreeding between two 'virtual species', a successful secondary mutation of some shadowy life forms known only as 'the missing link'."[347] A possible interpretation of this metaphor may be that, just as natural selection 'chooses' between the biological forms produced by nature, so human consciousness 'chooses' between the potentialities continually being generated by quantum processes.

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[345] Hodgson, David, 'The Mind Matters', 1991, Clarendon Press, p.377

[346] Bohm, David, 'Quantum Theory', 1951, Prentice Hall, p.414

[347] Zohar, Danah,'The Quantum Self', 1990, Harper Collins, p.17

Physics Loses its Ontological Assumptions

Clearly, our everyday experience, which permeates our languages and cultures, is very different from 'quantum reality'. The French physicist, Bernard d'Espagnat expresses this as follows: "The sensory data of various individuals generally converge in such a way that they can be described all together by means of a model which is realistic on the macroscopic scale and which is based on the notion of separable macroscopic objects." This is the reason why we developed languages based on the assumption of such separate objects. As a consequence, empirical reality cannot be equated with Being. This is because the assumption of macroscopic objects (which underpins Empiricism), is vague and, in addition, is entirely dependent on reference to the community of human beings. So, as soon as we turn our attention away from the domain of the macroscopic, we can no longer rely on the notion of separable objects; we can only predict the results of observations (even though we're very good at doing this).[348]

Having established that our everyday, 'classical' world is very different from quantum reality, d'Espagnat is opening up here a whole series of questions as to whether quantum physics truly reveals a 'deeper' reality or even ultimate 'being', and if so, can we access it and by what means? d'Espagnat says that in the traditional, classical conception the world was seen as having its own existence in itself and therefore having its own, independent system of laws; "… consequently, an investigator subscribing to such conceptions spontaneously draws a sharp distinction between laws

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[348] d'Espagnat, Bernard, 'Reality and the Physicist', 1989, Cambridge U.P., p.166

and methods. For him, laws have the status of givens; obviously then there is no question that he could change them in any way; whereas methods, by contrast, are free for him to invent." In the quantum world, however, methods; "… can gradually be reified as elements of a 'description of nature' without the theoreticians responsible being themselves truly aware of the conceptual slide that is involved." The danger of this slide, d'Espagnat continues, is; "… the ease with which it enables us to construct 'natural entities'. [This] is obviously fraught with danger - notably the danger of a proliferation of partial models and procedures elevated to the status of things, forming such a swarm that any substantive vision, however fleeting, of the real may well be lost."[349] It seems to me that the danger that d'Espagnat is referring to is the loss, in the practise of quantum physics, of a clear division between methodology and ontology: the problem being that the ontological status of methodological constructs becomes confused - are they merely theoretical models employed only to assist empirical investigation or are they real entities with a reality of their own?

This disappearance of ontology leads d'Espagnat to ponder the nature of science in regard to the relationship between the totality of experience and the totality of the real. He says; "… science is a theoretico-experimental construct. In a first characterisation, this means that its base is experience and that theory is the cement that binds together the many components of that experience. In a second, science may be seen, no doubt rightly, as the model which most closely approaches the ideal (attainable or not) of a body of knowledge firmly based and free from the play of opinion

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[349] Ibid, p.200/201

and mood." In this first version of science, d'Espagnat argues, it can be simply equated with communicable experience. The second, however; "… suggests that the entire domain of true knowledge may well coincide with the totality of experience, indeed ultimately with the ensemble of all assertions that are verifiable and have been verified." These two approaches to science lead d'Espagnat to posit two distinct conceptions of reality, which he calls; 'independent reality' and 'empirical reality'. He then uses this distinction to contrast the scientific objectives of two different physicists, Bell and Wheeler. d'Espagnat says: "The objective of Bell's approach is independent reality (which he is optimistic enough to deem knowable …), while Wheeler's approach can perhaps be interpreted as having the more modest objective of describing empirical reality."[350] It can perhaps be said that 'revealing' independent reality was the goal of early, classical physics. This was based on naive realism and adopted a 'God's eye view', which effectively eliminated the observer from physical theory. Following the paradigm shift to quantum physics this conceptual clarity has been lost. Physics is limited to describing and making predictions based on systematic and verifiable observations without speculating as to the ontology underlying them - in other words, empirical reality only.

Philosophy, Ontology and Physics

In order to comprehend what's happened to the 'independent reality' assumed by naive realism, d'Espagnat imagines a world in which no 'scientific revolutions' have taken place, and where, therefore, it would still be possible to

[350] Ibid, p.202/203

formulated the whole content of science in strongly objective terms. If this had been the case, he says, then: “Like Laplace before us, we would simply say that the ensemble of verifiable and verified claims anchored in experience and constituting science, is, in principle, adequate to describe the totality of the real.”[351] However, given the scientific revolutions which ***have*** actually take place, a philosophical adjustment has to be made. As d’Espagnat comments, the positivists of the Vienna Circle arrived at a philosophy in which the notion of independent reality was regarded as meaningless on the grounds that it was impossible to construct an operational definition of it. And, d’Espagnat goes on to suggest that the physicists of the Copenhagen School; “… though they were verbally opposed to several theses of the positivism of the philosophers, … built up a quantum mechanics in which certain lines of reasoning when followed closely suggested, … rather similar views.”[352] As a consequence, the question of what is ‘real’ has now become problematic for ‘mature science’: d’Espagnat says; “… it is precisely within the formalism of the ‘mature’ physics of today that it is proving hard to see, among the ‘algorithms’ - particles, waves, statistical operators, S matrices, positive linear functionals and so on - used by theory to synthesise experience, just which ones it is appropriate to prefer over others to receive the epithet ‘real’ without thereby affecting the efficacy of the theory.”[353]

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[351] Ibid, p.202

[352] Ibid, p.200

[353] Ibid, p.203

Why should this conceptual confusion matter? As an answer d'Espagnat highlights the paradox that concepts such as reality, existence, etc. are clearly 'occasioned by experience', so banning all use of them because they do not conform to a strictly operational code is scarcely coherent or practical: "Operationalism … requires that the meaning of a concept, that is to say the content of the intellectual representation which it purports to express and which its definition renders explicit, should in no way go beyond its referent, that is to say the ensemble of given facts to which it has been verified that the concept applies and from some of which the concept was devised." But, when this requirement is rigorously imposed on all concepts, including words in everyday usage, it results in operational definitions which can be too restrictive; "… forcing the concepts into narrow moulds which tend to make them less intelligible rather than more so, as the definitions were originally supposed to do."[354] This can perhaps be summarised as follows; with increasing operational rigour as to the meaning of a concept, the comprehensibility of the concept is reduced.

In trying to deal with this challenge to the fundamental concepts of physics, many physicists, claims d'Espagnat, don't realise that such debates are taking them beyond 'the narrow framework of pure science'. As a remedy he recommends accepting this breach of scientific insularity and openly and frankly engaging in philosophical debate. But, he says, if this is to be achieved, it's; "… necessary that partisans of mathematical realism refrain from elevating to an absolute dogma the principle that the real is totally intelligible." And, he continues, it is also necessary, that those

[354] Ibid, p.209/210

physicists who assign to science the more modest objective of simply describing phenomena (synthetically and mathematically, of course) refrain from systematically condemning any effort to engage with independent reality. d'Espagnat attributes this latter attitude to 'the spirit of the Vienna Circle', for whom the word 'metaphysics' is simply a synonym for a nullity - something absurd and worthless. In other words, d'Espagnat is rebuking both those physicists who claim that science can explain everything, and (perhaps especially) those physicists who limit themselves to observations only and condemn speculation about metaphysics and ontology. These limited and mistaken views as to the ultimate implications of quantum physics, are, according to d'Espagnat, based on; "… the principle that science should consider only those assertions that refer to facts and to tests of an experimental kind." In contrast, d'Espagnat asserts that; "… the 'real' in itself as it truly is, (a notion that we found to be meaningful) is very likely not reducible to - more exactly, is almost certainly not isomorphic to - the ensemble of assertions based on collective experience, the totality of which constitutes science." d'Espagnat speculates as to why this should be the case. Why is it that the totality of independent reality is not reducible to what can be described by science? He makes several suggestions: there may be 'too much' reality for science to deal with or reality may be something quite different in kind, with only partial correspondences, from the ontological assumptions underlying contemporary science.

Whatever the causes of this limitation of science, d'Espagnat claims that its inevitable consequence is to 'open a window' looking beyond the narrow confines of 'scientism': as he explains; "… this means that if somebody does not want to limit his horizons to the set of what has to do with observations and experiments, and which science therefore can describe, if he aims to look further and be concerned with the whole of reality, his ambition or project cannot a priori be deemed incoherent and therefore illegitimate. Somewhat pictorially, but without exaggeration, we could say that this conclusion opens a window in the enclosure within which many minds have unwittingly locked themselves away for so long."[355]

The bizarreness of the emergence of this 'window' is something that d'Espagnat is keen to emphasise: he says that its existence; "… is so important because of its truly surprising nature, which clearly is that of an opening that is made by rational means - based indeed on today's scientific facts - and that nevertheless leads to something lying beyond the totality of experience while not being just an empty yonder." However, the enormous value of having stumbled upon this 'window' should not hide from us the fact that it is very small. Given our current level of knowledge; "… it is by no means certain that through it we shall be able to look upon a landscape the features of which we can discern." This seems to be an appeal by d'Espagnat for us to use the opening provided by a scientifically rigorous quantum theory in order to engage in metaphysical speculation as to the ultimate nature of reality.

But this leap into metaphysics should not, d'Espagnat warns, be undertaken too lightly: he notes the very high degree of plausibility which scientific materialism has attained, because of its combination of great simplicity with considerable explanatory power over things, as currently understood. Given this, it's understandable that conceptions

[355] Ibid, p.204/205

incompatible with it should be regarded with scepticism. As d'Espagnat says: "It is hard to see how an unprejudiced, objective mind should find credibility in a way of seeing things which explains little if there is another which explains much more. But correspondingly, if new phenomena come to light which the latter cannot explain, and if for that reason the plausible becomes implausible, then the other possible conceptions, which the objective minds previously left to the dreamers, become once more a priori worthy of consideration." In such a situation (which d'Espagnat implies is the current one for contemporary scientists) those seeking objective truth, may feel; "… more inclined to seek new ideas that, though not being as precise as the current ones, would offer some gains in scope. This is why, in this field, the objective mind that is conscious of the serious deficiencies of both scientific materialism and of (strict) positivism will be more inclined than most to find out whether there are not other conceptions that are better able to reconcile human beings with themselves than either of those two approaches."[356]

How to Access Independent Reality?

If quantum mechanics has indeed opened a 'window' through which we may be able to glimpse ultimate reality, how can we make sense of this project? d'Espagnat complains that independent reality refuses to tell us what it is - or what it is like. On the other hand, it does condescend to let us know, to some extent, what it is not. As he says: "It does not conform to the classical schemes of mechanics, of atomistic materialism, or of objectivist realism - in short, to any variant of 'near realism'." (As I would put it in other words, it's not Cart-Tonist!) Given all this, d'Espagnat de-

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[356] Ibid, p.205-207

cides to describe reality 'in itself' as 'distant'. It therefore appears as; "… more or less chimerical to hope ever to construct a scientifically exact (implying the absence of all arbitrariness) model of it using concepts borrowed from mathematics (as Einstein hoped). Consequently it seems proper to describe it either as 'unknowable' or as 'veiled'." Having considered both these terms, d'Espagnat opts for the second, 'veiled', as the more correct. This is the case, he claims, because; "… if independent reality were absolutely unknowable it could not even suggest anything to us." If this were the case, then the only scientific concepts we could have would be those which are embedded in the structure of our minds, as the philosopher Kant believed. However, d'Espagnat insists that: "Now we know that the evolution of physics since Kant has invalidated that conclusion. This lends plausibility to the idea that independent reality, though not knowable in the usual sense of the term (a sense which we have seen implies the possibility of precise, exhaustive knowledge) is not absolutely unknowable; once more, it is veiled."[357]

d'Espagnat invokes an analogy developed by Bertrand Russell in order to illustrate this notion of veiled reality. In this analogy independent reality is compared to a musical concert while empirical reality is compared to a recording of the concert on, say, a vinyl disc: "Obviously the pattern of the disc is not totally independent of the structure of the concert, but obviously too the recording, consisting of a spatial arrangement in the form of minute hills and hollows in grooves, cannot be identified purely and simply with the concert, which is arranged in time. It would be clearly absurd to suppose that concert and disc constitute one and the

[357] Ibid, p.208

same thing." He then goes on to speculate as to how a Martian, newly landed on Earth and having discovered the disc, would be able to decipher its secrets. Clearly, d'Espagnat asserts, the Martian would never, by studying the detailed spatial structure of the disc, be able to reconstruct the concert, no matter how intelligent he might be. But, d'Espagnat continues: "Is that to say that studying it would give him no ideas about the concert whatsoever? Clearly that would be wrong, since he can indeed get to know the abstract structure of the concert, in a quite quantitative way too. If he is imaginative, and if he is endowed with hearing, he may be able to guess that the hills and hollows he is studying owe their origin to the emission of sounds." Perhaps the Martian might even have a vision as to how the music was originally created. But, warns d'Espagnat, even as he's engaged in the process of trying to imagine the concert, he cannot avoid an awareness of the; "… inevitable arbitrariness inherent in his proceedings." d'Espagnat suggests that our relation to independent reality is like that of the Martian to the concert. Just as he can both grasp and appreciate the essentials of it, so can we discern and appreciate some very significant features of the real. However, it would clearly be wrong to claim that we can know 'veiled' reality (in the exhaustive sense of knowing).[358] I'd like to claim that these philosophical speculations from an eminent physicist open the door to the sort of ontological construction that I'm going to be proposing, later in this book, when presenting 'Whit-Tum world'.

d'Espagnat moves on to consider two important, and interrelated, issues concerning this dichotomy between independent and empirical reality; firstly, what is the relation-

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[358] Ibid, p.209

ship between independent reality and consciousness? And secondly, how does the phenomenon of life fit into this dichotomy between independent and empirical reality? He begins by briefly considering the notion (proposed by 'Ideological Empiricists') that independent and empirical reality can be regarded as having an equivalent ontological status, but concludes that plainly they do not: "Indeed, given that empirical reality is by definition the ensemble of those phenomena that human beings can become acquainted with, the question of its accord with independent reality becomes essentially that of the relation between human consciousness and such reality." This question, in its turn, raise the question of the relation between life and independent reality. d'Espagnat asks: "Must we put life rather 'on the side' of independent reality, or on the side of empirical reality?" While, nowadays we tend to see life as essentially a particular ensemble of phenomena which operate at the macromolecular level, he goes on to say that; "… we seem to be in no position at present to make any hard and fast claim as to whether life is or is not reducible to physics. Nonetheless, it is true on the one hand that currently there is no convincing argument that it is not, while on the other, … there are two facts of a very general kind that tend to support the 'reductionist' thesis. The first is that simple equations may have highly complex solutions … The second is the emergence of order from disorder, which as is well known is characteristic of certain phenomena that are at the same time open and out of equilibrium." So, d'Espagnat's conclusion is that, on balance, life can be included (without fundamental conceptual difficulties) within what he's calling 'empirical reality'.[359]

[359] Ibid, p.210/211

But is consciousness also moderately reductive and capable of inclusion in empirical reality? d'Espagnat starts his answer by saying that consciousness is always associated with life and that, therefore; "… consciousness follows in some way, via the intermediary of life, from the phenomena of physics." Though here d'Espagnat warns against the habit of conceiving everything in mechanistic terms. (This is especially a danger, he says, for people whose scientific education has been elementary.) d'Espagnat states that: "It is certainly true that the complicated arrangement of the macromolecules which make up living cells can 'in the main' be described in (mechanical) terms. This is because the more the dimensions of a physical system approach the macroscopic scale, the greater the degree to which the laws of classical physics - and hence mechanistic descriptions - constitute normally acceptable approximations to the laws which truly govern the system, which of course are quantum laws." This 'license' for the use of classical laws is permissible because the macromolecules involved are; "… generally large enough for this kind of approximation, which has the advantage of being relatively simple, to be perfectly adequate for the kind of problems to be dealt with." Consequently, we can generally be satisfied with descriptions of biological phenomena that are expressed in terms of classical laws. But d'Espagnat warns against the mistaken conclusions that this acceptance of classical approximations can lead to; namely that this 'natural' chain of thought can result in the mistaken belief that the molecules, for example in a living organism, are truly objects whose existence is quite independent of the human mind. If we think in this way, it can become normal to consider consciousness as a simple emanation from some or other of these molecules or aggregates composed of them. However, d'Espagnat cautions that falling into such habits of thought can result in incoherence and illogicality: we should remember that molecules, e.g. those in the brain, are phenomena. And, in a theory whose objectivity is only weak (which he suggests is the case with modern biology) phenomena amount, essentially, merely to 'appearances that are valid for all'. Since, "… the notion of an appearance obviously is meaningful only if the concept of a state of consciousness is first posited, then clearly the merely weak objectivity of the true (quantum) laws tends to reverse the order of subordination. Instead of the existence of consciousness following from the existence of objects, the existence of objects now seems somehow to follow from the prior existence of consciousness (or consciousnesses)." In other words, consciousness is necessarily prior to phenomena, since the latter is defined in terms of appearances valid for all, that is to say, in terms of consciousness. But, says d'Espagnat, this conclusion; "… in no way negates the obvious fact … that consciousness seems always to be associated with an empirical reality that is material. How to reconcile these two facts, which at first glance seem to rule out one another?" d'Espagnat suggests that; "… it can be done by conceiving thought and empirical reality as two complementary poles which give rise to each other within the realm of independent reality."[360]

Apprehending Independent Reality

The advent of quantum mechanics represented a transition from independent reality to empirical reality, and finally revealed the existence of 'veiled reality' (as d'Espagnat calls it). Classical physics was firmly convinced that reality was independent. Positivists and the Copenhagen school have contented themselves with empirical reality (a posi-

[360] Ibid, p.211/212

tion I call 'Ideological Empiricism'). What is clear however, is that the empirical reality of quantum physics is not the reality of everyday experience, given its inclusion of phenomena such as; non-locality, entanglement, etc. An alternative 'reality' strategy, pursued by Dennett and others and which favours Realism, is the attempt to limit the quantum realm to the sub-atomic level. Those who don't accept the existence of this boundary insist that we need to move on to consider the nature of the veiled reality underlying observed phenomena. But exploring this deeper level of reality cannot be done using empirical methods, not at least within the present scientific paradigm and perhaps never. An example of this limitation of current empirical science can be found by considering how quantum theory deals with macro objects: Hodgson says that macro objects can be adequately represented by a state function (leaving consciousness aside). This is; "… because a macro object needs to be considered only in relation to its interactions; and its state function can adequately account for all its interactions with other systems." But if the macro object in question is conscious, then a form of representation is needed which does more than merely account for its interactions with other systems. "A state function of a conscious macro (such as a human brain) has not been interpreted so as to account for, either consciousness itself, or the occurrence and sequence of conscious events. On the other hand, neither has a classical representation of such an object. Accordingly, one need not suppose that the representation of a brain by means of a state function is any less adequate to account for consciousness than is the classical representation of it as a material object." In other words, trying to account for consciousness in terms of the brain as a classical object, would require postulating that some pattern of events involving its component parts would somehow also involve conscious events. Hodgson claims that; “I would think one could suggest with (at least) equal plausibility that it is, rather, that some patterns of quantum potentialities involve conscious events.”[361] In other words, rather than trying to explain conscious events via the movements of classical objects in the brain, perhaps the movements of classical objects in the brain can be explained via conscious events.

In this quantum way of seeing things, matter and consciousness are held to be two realities in themselves, which are capable of mutual interaction: these two realities have certain things in common, but it’s clear that they can’t be identified. d’Espagnat states clearly that; “… consciousness as I think of it cannot in any way, for straightforward reasons of logical coherence, be reduced to a mere property of matter: for it is consciousness which in a sense carves out the atoms within the body of reality.” However, consciousness achieves this by means of operations such as deploying an instrument or observing a signal, which, as d’Espagnat comments, have nothing particularly ‘reflexive’ about them. Consequently: “Animals could thus quite well be channels of such ‘thought’ too.” ‘Phenomena’, therefore, says d’Espagnat; “… include an important component contributed by human beings, in the sense that it is our perceptual and intellectual faculties which in large measure demarcate these phenomena within the body of the real.” As he says, this raises the classical philosophical problem of causal relations, i.e., which is the cause and which the effect? The traditional answer has been that ‘the cause comes before the effect’. However, in quantum reality, a cause is a

[361] Hodgson, David, ‘The Mind Matters’, 1991, Clarendon Press, p.374

phenomenon which is directly dependent on us.[362] This is the answer to British psychologist, Max Velmans' objection to conscious causation: "Experiments reviewed by Libet (1996), for example, suggest that it takes at least 200 milliseconds for neuronal states adequate to support a conscious experience to form … In short, consciousness of an external event takes place later in time than the event itself. If so, how could the resulting conscious experience affect its prior cause? This would seem to require backward causation in time!"[363] But, as we've seen above, d'Espagnat is clear that, in quantum physics, consciousness is necessarily prior to empirical phenomena.

d'Espagnat claims that by following these quantum principles; "… we now have a solidly-based idea of an independent reality that is neither totally inaccessible nor totally reducible to trivial notions." However, he then turns to what philosophers have referred to as 'an immediate apPrehension of the thing itself', and further claimed that such an apPrehension is ultimately the truest communication human beings can have with the real. What can we make of such a notion? (d'Espagnat asks.) He answers that it's ambiguous and heavy with erroneous meanings and possibly illusions. We might, he suggests, assume that an object we apprehend is simply a physical object localised, singular and unique, and that this object truly constitutes an element of reality itself. But, he says; "… such a return to near realism can only be accepted by minds ignorant of physics. However, looking at it from another angle, how could we remain in-

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[362] d'Espagnat, Bernard, 'Reality and the Physicist', 1989, Cambridge U.P., p.214/215

[363] Velmans, Max, 'Understanding Consciousness', 2000, Routledge, p.17

sensible to the impression of direct communication with the localised, singular object evoked by the philosophers concerned, and from which artists, poets and composers draw their finest inspirations - ultimately the most precious part of our lives?" A cynical view would be to equate such experiences with optical illusions, but d'Espagnat insists that the idea that such; "… impressions of this kind are indications of truths about reality in itself cannot be refuted."[364]

Not only, says d'Espagnat, do we need to give up the conception of physical realism, in which the notions of independent and empirical reality were conflated, but it also seems probable that reality in itself is prior to space-time. At any rate, he says; "… the tension between quantum physics and the notion of locality makes the idea that effectively this is so seem plausible. Under the circumstances, then, we must recognise that although the reversible time of mathematical physics remains a quite essential element in a set of immensely effective calculation rules, its 'ontological status' appears nonetheless precarious. It is not an element of independent reality, and as an element of empirical reality it has to give way to irreversible time, … at least in respect of most of the phenomena we normally refer to by that term." Irreversible time seems inevitable in our everyday experience. In other words, time belongs to the world of phenomena and is therefore part of empirical reality. Consequently, as with all elements of empirical reality, it cannot be simply assumed to be a feature of independent reality. But, in contrast with reversible mathematics, d'Espagnat suggests that it is not absurd to speak (albeit loosely) of irreversible time as being 'more real' than

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[364] d'Espagnat, Bernard, 'Reality and the Physicist', 1989, Cambridge U.P., p.216/217

the reversible kind. And this, he says, provides justification for those philosophers who identify 'true time' with the consciousness human beings have of time (what Henri Bergson called 'duration').[365] We can thus conclude that removing the veil from the deeper levels of reality demands a move into metaphysics. As we shall see, Henry Stapp suggests that the ontology developed by Alfred North Whitehead can provide a basis for grappling with this problem. I share this view and have coined the term 'Whit-Tum world' to represent this synthesis of Whitehead's ontology and some of the philosophical implications of quantum mechanics. In the next chapter we'll take a tour of the new scientific-philosophical paradigm constituted by 'Whit-Tum world'.

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[365] Ibid, p.217/218

Chapter Twelve: Whitehead's Ontology

Having referred tangentially to Whitehead's ontology thus far, it's now time to directly present its relevant features. Having done that, we'll move on to the implications for physics, psychology and finally free will. Whitehead's ontology, built up over the latter half of his long life, is extremely extensive and very complex, and has frequently faced the criticism of intentional obscurantism. My purpose in this book is not to try to present a comprehensive summary of it, something which has been attempted by many others. (I quote several of these commentators on Whitehead in this book, often in preference to citing the work of Whitehead himself. While rejecting the accusations of intentional obscurantism, I have done this because Whitehead's prose style is often difficult to interpret.) Rather I have turned to Whitehead's work primarily because the main features of his system provide the most scientifically viable escape route out of the metaphysical cul-de-sacs of Cart-Ton world and Ideological Empiricism. I would support the description 'scientifically viable' on the following two grounds; a) his ontological work was inspired by the emergence of the 'new physics', with which he was intimately familiar as a professional mathematician at Cambridge, and b) Whitehead's scientific training and status: his system was authored, not by a 'New Age Guru' but by an eminent figure in the history of modern Western mathematics and philosophy.

As to the advent of the ‘new physics’ as a motive for Whitehead’s innovations in ontology, Whitehead’s former student, Victor Lowe emphasises Whitehead’s; “… belief that the educated man’s implicit conception of the universe has not responded to the advance from the seventeenth-century physics of inert matter to the late nineteenth-century physics of energetic vibrations described in terms of vectors.” Lowe suggests that the unconscious philosophy of the general public is not shaped by formal systems of philosophy but rather by; “… the success of the materialistic ideas of science.” As I’ve argued previously, this has resulted in a clear mismatch between the Cart-Tonist ontology believed in by the general public and the implications of the ‘new physics’, especially quantum mechanics. Again, a major reason as to why this has come about can be found in the refusal of the ‘quantum fathers’ to engage in ontological speculation in relation to the bizarre empirical findings with which they were confronted. Given the ‘ontological vacuum’ of the ‘new physics’, people generally and unconsciously reverted to the Cart-Tonist ontology of the ‘old physics’. Lowe asserts (I think correctly) that no new formal system of philosophy or religion can successfully challenge Cart-Tonist ontology: rather; “… only a new and equally scientific set of ideas about nature and nature's relation to human experience, can hope to get this philosophy displaced.”[366]

This new ‘set of scientific ideas’ is precisely what Whitehead’s ontology embodies. We have already referred to some aspects of Whitehead’s work, but let me now identify the three main features of Whitehead’s ontology which I

[366] Lowe, Victor, ‘Understanding Whitehead’, 1962, Johns Hopkins U.P., p.222

intend to incorporate into 'Whit-Tum world', my own metaphysical challenge to Cart-Ton world and Ideological Empiricism. These features are as follows: firstly, Whitehead's rejection of substance in preference for processes of experience (or 'feeling consciousness') as the ultimate components of reality. Secondly, his notion of two channels of perception; 'ordinary' sensory perception and his conception of 'Prehension'. Thirdly, Whitehead's continual reference to emotion as a significant factor in the construction of mind and consciousness. I'll now try to expand on each of these features of Whiteheadian ontology with a view to illustrating their relevance to a theory of consciousness as feeling.

Whitehead's Rejection of Passive 'Dead' Substance

A very common notion in Western thought (both ancient and modern) is the idea that the world's most fundamental actual entities, or substances, have two interrelated characteristics; a) they are 'atomistic', in a 'billiard-ball' sense, i.e. internally solid, passive and without spontaneous reactivity, and b) they endure, unchanging through time, unless subject to external mechanical action or forces. The early modern natural philosophers, such as; Rene Descartes, Francis Bacon, and Isaac Newton, asserted that everything in the world, with the exception of the human soul, is composed of atoms (like tiny, hard billiard balls devoid of feeling) moving in a vacuum. All the movements of these 'dead' atoms are totally determined by natural law. Whitehead rejected all this: "In physics there is abstraction. The science ignores what anything is in itself. Its entities are merely considered in respect to their extrinsic reality."[367] Modern science, with its; "… Cartesian scientific doctrine of bits of matter, bare of intrinsic value."[368] By way of contrast, in early Cart-Tonism it was only the human soul which was supernatural and free of the iron laws of material nature. According to Whitehead, this Cart-Tonist ontology has resulted in a generalised negative attitude toward nature in our culture: it's fostered; "… the habit of ignoring the intrinsic worth of the environment which must be allowed its weight in any consideration of final ends."[369] In contrast, Whitehead asserts that: "Everything has some value for itself... By reason of this character, constituting reality, the conception of morals arises. We have no right to deface the value experience which is the very essence of the universe."[370]

In Whitehead's alternative account of physical ontology, the ultimate building blocks of reality are 'drops of experience or feeling'. Whitehead called these 'actual entities' or 'actual occasions'. He says, these; "… are the final real things of which the world is made… The final facts are, all alike, actual entities, and these actual entities are drops of experience, complex and interdependent." As the theologian, Robert Mesle puts this; "… experience/feeling/emotion goes all the way down to subatomic particles. Imagine that electrons, protons, neutrons, and other subatomic

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[367] Whitehead, Alfred North, 'Process and Reality', 1927/1979, Macmillan, p.153

[368] Ibid, p.195

[369] Ibid, p.196

[370] Whitehead, Alfred North, 'Modes of Thought', 1938/1968, The Free Press, p.110

'particles' are drops of spatial-temporal experience. They experience their physical relationships with the world around them as vectored emotions - feelings that drive them this way and that. Think of energy as the transmission of physical feelings."[371] Whitehead took this concept of the drop-like (atomic or indivisible) character of experience from William James: "Your acquaintance with reality grows literally by buds or drops of perception. Intellectually and on reflection you can divide them into components, but as immediately given they come totally or not at all."[372]

These 'drops of experience' constitute the smallest units of existence like electrons or quarks, but these entities or occasions also form the mind. An enduring individual (such as an electron, a living cell, or a human self) is analysable into momentary 'actual entities' and 'actual occasions' (which are the potential phase of the process of existence). A flow of awareness, for example, is a series of such events. There is, thus, no mental-physical split or separation in Whitehead's ontology. "You experience the feelings of previous moments in your life, especially, but not exclusively, the most recent ones. You also react to the feelings of the actual entities composing your body. An electron feels the spatial-temporal feelings of other actual occasions, and these physical feelings constitute the physical structure of the universe that physicists describe in other

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[371] Mesle, C. Robert, 'Process-relational Philosophy', 2008, Templeton Foundation Press, loc:656

[372] William James, 1911, quoted in Stapp, Henry, 'Mindful Universe', 2007, New York: Springer, loc:1038

language."[373] So, the ultimate building blocks of reality; "… are drops of experience, not tiny billiard balls or little hard things totally devoid of feeling as modern materialist world views usually suppose."[374] Whitehead also refers to both of these process phases as 'occasions of experience'. The word 'experience' in this term indicates Whitehead's belief that the ultimate, un-analysable nature of reality is 'experience', meaning a capacity for feeling.

One of Whitehead's major criticisms of Cart-Tonists ontology concerns its tendency to mistake abstractions for actualities. As we saw in chapter ten, Whitehead coined the term, 'the fallacy of misplaced concreteness', to describe this erroneous outlook. (It's sometimes also called, 'confusing the map with the territory'.) While consciously substituting an abstraction for a concrete reality may be very useful for certain purposes, the Cart-Tonist tendency to lose touch with the abstraction/reality distinction leads to the sort of negative attitudes to nature which Whitehead criticised above. The philosopher, David Griffin makes explicit some of the negative consequences of the fallacy of misplaced concreteness; "… the assumption that the real electrons, protons, neutrons, photons, and other 'elementary particles' at the base of nature are adequately described by the abstractions that physicists have found generally adequate for their (limited) purposes. Whitehead's view was that these abstractions, while they are adequate for most questions of interest to physicists, do not describe these entities in their concreteness. Just as the externalist concepts

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[373] Mesle, C. Robert, 'Process-relational Philosophy', 2008, Templeton Foundation Press, loc:1659

[374] Ibid, loc:1639

of psychological Behaviourism abstract from what human beings are in themselves - namely, conscious individuals."[375]

Pan-Experientialism, Not Panpsychism!

A common misunderstanding of Whitehead's ontology is that it can be equated to the doctrine of panpsychism. This is a misunderstanding because 'experience' in Whitehead's sense is by no means synonymous with consciousness. Consequently, Whitehead's ontology can, much more accurately, be described as 'Pan-experiential'. As Griffin claims: "On the basis of this Pan-experientialism, the unanswerable questions faced by materialists as well as dualists - where and how did things with experience, spontaneity, intrinsic value, and internal relations emerge out of bits of matter wholly devoid of these?- need not be asked." Mesle makes the same point specifically against Cartesian Dualism; this; "… is the view that the world is composed of matter that is in space but has no experience and of minds that are not in space but have experience… this makes it impossible to account for the existence of minds apart from supernatural forces. Minds cannot emerge from matter totally devoid of experience."[376] And Griffin adds that: "Evolution involves real emergence, but it is the emergence of higher types of spontaneous experience out of lower types."[377] Griffin goes on to characterise Whitehead's position by the more complete label; 'Pan-experien-

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[375] Griffin, David Ray, 'Whitehead's Radically Different Post-Modern Philosophy', 2007, SUNY Press, loc:1627

[376] Mesle, C. Robert, 'Process-relational Philosophy', 2008, Templeton Foundation Press, loc:1641

[377] Griffin, David Ray, 'Whitehead's Radically Different Post-Modern Philosophy', 2007, SUNY Press, loc:196

tialism with organisational duality'. The function of this expression, 'organisational duality' is, as Griffin explains; "… to distinguish between 'aggregational organisations', which as such have no experience or spontaneity, and 'compound individuals' which do."[378] This distinction is Whitehead's answer to the familiar critique of pan-psychic theories; "how can a stone have consciousness?" Whitehead is clear that it doesn't. This is because, while a stone ***is*** ultimately composed of experience (which is really, in a common-sense context, not much stranger than saying, in post-Einsteinian physics, that it's composed of condensed energy) its organisation is aggregational rather than compound.

Mesle makes this point with regard to living and non-living entities: "In Whiteheadian terms, rocks are simply not organised to produce any level of experience above that of the molecules that form them. In living organisms, however, there can be varying degrees to which the organism is structured to give rise to a single series of feelings that can function to direct the organism as a whole." He also comments that Whitehead's ontology can explain how 'higher' animals, like chimps and dogs, can possess a psyche and be capable of consciousness: "This psyche draws experience from the whole body (with varying degrees of directness and clarity), often crossing a threshold into some degree of consciousness, and is able in turn to use that awareness to direct the organism toward actions that help it to survive and achieve some enjoyment of life." In other words, the self and the mind arise out of the experience which ultimately composes everything. Mesle concludes: "There is one kind of reality - experience. But experience has both its

[378] Ibid, loc:202

physical and mental aspects."[379] To illuminate this distinction between aggregational and compound objects from a different angle, let me turn to a descriptive remark from Karl Marx: in accounting for the low-revolutionary potential of the peasantry, he described them as nothing more than 'potatoes in a sack',[380] meaning that they have no common interests and consequently do not interact in a positive, creative way leading to effective 'class consciousness'. So, by analogy, a Whiteheadian aggregational object, like a stone, has no consciousness, while a mammal, such as a human being, constitutes a compound object and is hence capable of intense and complex consciousness. Mesle has another way of explaining this by moving between macrocosm and microcosm: if, when using the words 'experience', 'feeling' and 'emotion'; "… we confine ourselves to consciousness, then clearly they do not go all the way down. Consciousness probably depends on a brain and central nervous system. But even most of our feelings are not conscious. Our bodies are taking in an enormous amount of data in each moment, and only a tiny portion of that information is raised to the level of consciousness… Consciousness is only a tiny tip of the iceberg of human experience, and, I am arguing, human feeling is only a tiny tip of the feeling that is present in the larger world."[381]

Griffin refers to exactly this point in explaining why pan-

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379 Mesle, C. Robert, 'Process-relational Philosophy', 2008, Templeton Foundation Press, loc:718

380 Marx, Karl, 'The Eighteenth Brumaire of Louis Napoleon', 1852, New York Labor News Company (1951), chapter seven

381 Mesle, C. Robert, 'Process-relational Philosophy', 2008, Templeton Foundation Press, loc:633

psychism is often considered to be self-evidently absurd; "… this is partly because the 'pan' in panpsychism is often taken to mean that literally all things, including aggregations such as sticks and stones, have experience." In reality, however, Whitehead's doctrine insists that only 'genuine individuals' have experience: genuine individuals are of two types. There are simple individuals, which are the most elementary units of nature (whether these are quarks or even simpler units) and, secondly, there are; "… what Charles Hartshorne, in developing Whitehead's Pan-Experientialism more fully, called 'compound individuals', which are compounded out of simpler individuals, as when atoms are compounded out of subatomic particles, molecules out of atoms, living cells out of macromolecules, and animals out of cells." In compound individuals the combined experience of their constituents generates a higher-level experience. This becomes what the philosopher, Hartshorne called the 'dominant' member of the compound individual: "This dominant member gives the compound individual a unity of experience and a unity of action, so that it can act purposively with a degree of freedom. These compound individuals hence differ in kind from mere aggregations of individuals, such as rocks and telephones, in which the experiences of the individual molecules do not give rise to a higher level, inclusive experience. For this reason, I emphasise that Whitehead's doctrine should be called not simply 'Pan-Experientialism' but 'Pan-Experientialism with organisational duality.'"[382]

And what empirical evidence (if any) is there for Pan-Experientialism? Griffin, writing in 2007, suggests the follow-

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[382] Griffin, David Ray, 'Whitehead's Radically Different Post-Modern Philosophy', 2007, SUNY Press, loc:864

ing; "… some leading ethologists now posit experience at least as far down as bees. Going much further down, there is now a wide range of evidence suggestive of the idea that single-cell organisms, such as amoebae and paramecia, have a primitive type of experience. Going still further, to the prokaryotic level, some biologists have provided evidence for a rudimentary form of decision making, based on a rudimentary form of memory, in bacteria. Furthermore, although DNA molecules were originally pictured in mechanistic terms, later studies suggested a more organismic understandings. Going all the way down, quantum physics has shown entities at this level not to be analogous to billiard balls, and, as physicist David Bohm and philosopher William Seager have said, quantum theory implies that the behaviour of the elementary units of nature can be explained only by attributing to them something analogous to our own mentality. Accordingly, the prejudice that experience cannot go all the way down, far from being supported by any scientific evidence, is being increasingly undermined by the relevant evidence."[383]

Escaping the 'Dead' Matter of 'Cart-Ton World'

Since Cart-Ton world has, from the early modern period, conceived of the cosmos as made out of non-experiencing matter, it's obvious that, within the confines of Cart-Tonist ontology, no natural (that is, material) process could possibly give rise to the human mind and/or consciousness. The only alternative, therefore, was to assume that souls were created supernaturally by divine fiat. Consequently,

[383] Ibid, loc:883

human minds came to be seen as separate from and unrelated to the natural world.[384] As above, Cartesian Dualism asserted that; "… the world is composed of matter that is in space but has no experience and of minds that are not in space but have experience." These assumptions make it impossible to account for the existence of minds except via supernatural forces. "Minds cannot emerge from matter totally devoid of experience." Cartesian dualism, also had the unfortunate consequence of apparently making impossible the interactions between our minds and our bodies that we all experience in every moment of our lives.[385] Mesle observes that these; "… what looks to us as a thoroughly secular science was originally part of an effort to separate human souls from the natural world in order to provide support for traditional Christian belief in the supernatural nature and immortality of the soul." However, when, during the course of the Nineteenth Century, dualism all but disappeared from scientific culture, how could experience (including human consciousness) be smuggled into the 'dead' matter of Cart-Ton world? As Mesle puts this; "… how does it get to be present in the animals where we clearly believe it to be present - or in ourselves?"

If we acknowledge, he continues, that feeling is not a; "… supernatural reality injected uniquely into human beings, then doesn't it make sense to see it as permeating the world in varying degrees? Doesn't it make more sense to think this than to see it as arising out of a totally non-experien-

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[384] Mesle, C. Robert, 'Process-relational Philosophy', 2008, Templeton Foundation Press, loc:199

[385] Ibid, loc:1641

cing world?"[386] David Griffin claims that Whitehead's Pan-Experientialist ontology removes the main reasons for denying the full-fledged reality of conscious experience: "If we hold that neurones are sentient, the insoluble problem of how conscious experience could emerge out of insentient neurones does not arise. Even (the philosopher, Colin) McGinn grants this point, saying that if we could suppose neurones to have 'proto-conscious states', it would be, 'easy enough to see how neurones could generate consciousness.'" Griffin also quotes Charles Hartshorne to the effect that; "… cells can influence our human experiences because they have feelings that we can feel. To deal with the influences of human experiences upon cells, one turns this around. We have feelings that cells can feel." Griffin comments that: "As this statement shows, Pan-Experientialism involves a radically new conception of causation. Rather than, with materialists, thinking of billiard-ball collisions as paradigmatic or, with dualists, thinking in terms of two radically different kinds of causation - that between minds, and that between bodies - and then wondering how minds and bodies can interact, Pan-Experientialism conceives of all causation as involving causation that is analogous to the transference of feeling between two moments of our own experience."[387]

So how, according to Whitehead, do his rudimentary 'drops of experience' become transformed into the consciousness that we experience? Mesle asserts that: "Complex animal bodies like yours are organised precisely to channel experi-

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[386] Ibid, loc:656

[387] Griffin, David Ray, 'Whitehead's Radically Different Post-Modern Philosophy', 2007, SUNY Press, loc:922

ence and organise it into a single individual who is able to achieve awareness and direct the whole organism away from harm and toward food, etc. This individual experiencer, which draws together the vast wealth of experience of the cells composing your body, is your mind. If the connecting chains of nerve cells and brains cells that make this possible are disrupted, you stop being able to do this integrating. Whitehead speculated that trees and other plants do not have centralised experience because they don't have any central organ of perception or cognition. They don't have brains, so the experience of a tree is only the experience of its individual living cells. He saw plants as 'democracies', while higher animals and human beings are more like 'monarchies' with a 'presiding personality'."[388] Griffin emphasises that Whitehead (and perhaps William James before him) make a clear distinction between 'consciousness' and 'experience'; "… it is important to see that they are not saying that consciousness is a function of the brain. Rather, consciousness is called a function of experience." In other words, the rudimentary experience which constitutes the ultimate building blocks of reality, whether manifested in physical or mental phenomena, can be mobilised to produce consciousness. For Whitehead: "Experience is an aboriginal stuff … But it is not, of course, an aboriginal stuff different in kind from the stuff out of which material things are made. The whole point of Pan-Experientialism is that creative experience is the aboriginal stuff out of which human experience and what we call 'material objects' are both made. However, in human beings and other highly complex compound individuals, experience can give rise to

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[388] Whitehead, Alfred North, 'Process and Reality', 1927/1979, Macmillan, p.108/109

conscious thoughts, which have a function that is not enjoyed in the experience of low-grade individuals."[389]

Whitehead's Two Modes of Perception

The second feature of Whitehead's ontology, which makes it a convivial theoretical receptacle for consciousness, is described by Griffin as; "… a deconstruction of sensory perception, showing it to be a hybrid composed of two pure modes of perception." The previous philosophic tradition tended to limit our sensory input to what Whitehead called, 'perception in the mode of presentational immediacy'. This can be described as our 'ordinary' conception of perception in which the external world is represented in the brain via our sense organs. This 'mode of perception' is, of course, associated with the doctrine of representation with all its problems and controversies. According to Whitehead, however, there is a more fundamental mode, which he calls, 'perception in the mode of causal efficacy'. Griffin says: "In this more fundamental mode, we directly perceive other actualities as exerting causal efficacy upon us - which explains why we know that other actualities exist and that causation is more than Humean constant conjunction." [390]Mesle notes a similarity between Whiteheadian process thinkers and Kant: namely; "… that the world of our sensory perception is always a construct. To use Kant's language, the world of our sensory experience is a 'phenomenal' world."

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[389] Griffin, David Ray, 'Whitehead's Radically Different Post-Modern Philosophy', 2007, SUNY Press, loc:916

[390] Ibid, loc:916

This world is the world our brain ‘paints’ for us out of the inputs from sight, sound, taste, smell and touch. “The sensory world of our ‘now’ is never identical with the world as it is in itself.” Kant contrasted this phenomenal world with what he called the ‘noumenal’ world as it is in itself. (This is what d’Espagnat, in the last chapter called ‘Veiled Reality’.) Kant believed that this hidden world is forever inaccessible to us and also that it is a world without space, time, or causality. Whitehead, on the other hand; “… argued that the world ‘out there’, the world ‘in itself’ does have space, time and causality and that we can know this because we experience ourselves as part of that larger causal world through perception in the mode of causal efficacy.”[391] In this context, Mesle draws our attention to the; “… familiar fact that when we look at a star that is eight light years away we are seeing light that left that star eight years ago. Thus, we never see the star as it is right now; we always and only see it as it was in the past.” This, of course, applies to all the extraterrestrial objects we can see: “The stars, moon, and sun as we see them are always constructs of our brains, taking our most recent experience and painting the world with it. But this clearly does not deny the existence or causal impact of the stars, moon, and spatial fields in which we all exist.”[392] (This argument goes a long way toward demonstrating the existence of Veiled Reality, and, indeed to justifying the necessity of ontology and the refutation of Ideological Empiricism.)

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[391] Mesle, C. Robert, ‘Process-relational Philosophy’, 2008, Templeton Foundation Press, loc:1125

[392] Ibid, loc:1096

In addition to ‘perception in the mode of causal efficacy’, Whitehead also (thankfully!) called this deeper mode of ‘causal’ perception ‘Prehension’. In this mode of perception, we are aware; “… that our sensory organs are causing us to have certain experiences, as when we are aware that we are seeing a tree by means of our eyes. Such Prehension, while presupposed in sensory perception, is itself non-sensory. In seeing a tree, I do not see my brain cells or my eyes, but I do prehend them and hence the data they convey.”[393] Mesle extends this awareness of causality to our physical interactions with the world: “I push and the world pushes back. If I am struck, I feel the presentational immediacy of pain constructed by my nerves and brain, but I experience that pain with and arising out of the physical causal energy of what strikes me.” A flying rock, for example, conveys a physical force, and it is this force which causes my sensory experience of the impact and the pain associated with it. And, of course, we are constantly engaged in such causal interactions with the world: “My body arises out of this web of causal relations, and my mind arises out of the causal interactions of my body. In each moment, I experience myself - through perception in the mode of causal efficacy - as arising out of that causal web. That, Whitehead so persuasively argues, is why we all believe in causation. We believe in causation because we experience it in every moment of our becoming and experience ourselves in each moment as being caused by that past world.”[394]

The Role of Emotion in Whitehead’s Ontology

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[393] Griffin, David Ray, ‘Whitehead’s Radically Different Post-Modern Philosophy’, 2007, SUNY Press, loc:165

[394] Mesle, C. Robert, ‘Process-relational Philosophy’, 2008, Templeton Foundation Press, loc:1112

As in the introduction to this chapter, the third element of Whitehead's ontology that I want incorporate into the synthesis I'm calling 'Whit-Tum world', is his emphasis on emotion as a crucial element in the generation of mind and consciousness. (In later chapters, I'll be appealing to innovative emotion researchers, such as Panksepp and Damasio, for additional contributions to the Whit-Tum world synthesis.) For example, Whitehead stressed the evaluative role of emotions in Prehension. Victor Lowe describes how: "The subjective forms of conceptual Prehensions are 'valuations', up or down; this or that possibility is felt to be important or trivial or irrelevant, or not wanted. We see again how, in trying to make theory correspond to the character of immediate experience, Whitehead insists that emotional feeling, not pure cognition of a neutral datum, is basic."[395] Whitehead believed that, with the exception of mathematical patterns, no sense-data are emotionally neutral; red, for instance, is a possibility of warmth and blue of coolness. And Whitehead says of sense-data: "Unfortunately the learned tradition of philosophy has missed their main characteristic, which is their enormous emotional significance." Instead of this, Whitehead adds, traditional philosophy has promoted the erroneous notion that sensory input is received in a neutral way and later; "… for no obvious reason … acquires an affective tone." (The view Whitehead is describing here is almost exactly what Panksepp call 'readout theory', see below.) This is the very opposite of the true explanation, which is that, via sense-perception, the qualitative characters of affective tones inherent in bodily func-

[395] Lowe, Victor, 'Understanding Whitehead', 1962, Johns Hopkins U.P., p.43

tionings are transmuted into the external world."[396] Consequently, Whitehead expended great efforts; "… to encourage philosophers in the first quarter of the twentieth century to think of the process of experience in terms other than those of pure cognition."[397] His alternative was a rational metaphysics of living, emotional, purposive experience. Whitehead believed that sense impressions are simple emotional forms transmitted from occasion to occasion.

Whitehead believed that that 'the primitive core' of all qualia should be conceived of as an 'indefinable definiteness of emotion'. Lowe explains this as follows, using the example of an experience of green; "… the eye receives the green light as an emotional quality which then is intensified, supplemented, raised to consciousness, and projected upon the green leaf seen." Lowe also refers to; "… Whitehead's famous protest in Science and the Modern World against stripping nature of qualities." This is the quote from Whitehead which Lowe is referring to: "Nature gets credit which should in truth be reserved for ourselves: the rose for its scent, the nightingale for its song, and the sun for its radiance. The poets are entirely mistaken. They should address their lyrics to themselves and should turn them into odes of self-congratulation on the excellence of the human mind."[398] What Whitehead is saying here is that without the qualia-generating emotions of the human mind, these beautiful natural phenomena would consist of nothing but the drab, colourless motion of atoms and the featureless

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[396] Whitehead, '33, quoted in Ibid, p.51

[397] Ibid, p.262/263

[398] Whitehead, Alfred North, 'Science and the Modern World', 1925/1997, The Free Press (Simon & Schuster), p.77

forces which mobilise them. Lowe concludes that without this theory from Whitehead that qualia are produced by the interaction between sensory input and emotion: "I do not see how the poets' attitude toward nature can be other than mistaken (so long as they take the leaf and the light as natural things rather than divine symbols)."[399]

But, of course, in Whitehead's system, the experience of emotion is not limited to humans, to mammals or even to all living things - it goes all the way down! If this is not the case, Mesle asks, how can it be that any being, including animals and us, can experience feelings? He says: "If we acknowledge that feeling is not a supernatural reality injected uniquely into human beings, then doesn't it make sense to see it as permeating the world in varying degrees? Doesn't it make more sense to think this than to see it as arising out of a totally non-experiencing world?"As above, Mesle invites us to seriously try to imagine that experience, feelings and emotions go all the way down to subatomic particles and that electrons, protons, neutrons, and other subatomic 'particles' are in fact drops of spatial/temporal experience, and that they experience their physical relationships with their environment as 'vectored emotions', driving them in one or another direction. He also suggests that energy should be thought of as the transmission of physical feelings. Mesle points out that; "… the word particle is a misleading carry-over from seventeenth-and eighteenth-century physics when atoms were thought of as little billiard balls. Today, we think of electrons as bundles of energy, or as waves, without clear, sharp location. We speak

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399 Lowe, Victor, 'Understanding Whitehead', 1962, Johns Hopkins U.P., p.373

of gravitational fields and electromagnetic fields and of space as having shape."

We can still keep and use all the existing language of physics, but, in addition, we can also think of; "an electron as a bundle of spatial-temporal experience, as a drop of feeling of causal relationships in space-time. An electron, we imagine, is feeling (not consciously, of course) its physical relationship with all of the other bundles of energy/experience in the field of causal relationships - that is, in the whole world around it."[400] After all, this amounts to no more than; "… simply thinking about all of that in a slightly different way. What would happen if we thought of these subatomic bundles of interconnected energy as bundles of experience, vectored emotions of spatial-temporal energy relationships, out of which higher levels of experience will be created in much the same way as higher orders of macrocosmic objects like dogs and people are built out of electrons and protons?"[401] The answer, he says, is that we could finally escape from the ontological trap of Cartesian dualism and move beyond a supernatural view of the human mind. In other words, we could finally see ourselves as belonging one hundred percent to the natural world which surrounds us.

The Primacy of Affect

Psychiatrist and literary critic, Ian McGilchrist also argues that affect comes first, cognitive thought later. He cites research confirming that: "We do not make choices about

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[400] Mesle, C. Robert, 'Process-relational Philosophy', 2008, Templeton Foundation Press, loc:656-670

[401] Ibid, loc:678

whether we like something on the basis of explicit assessment, a balance sheet, weighing up its parts. We make an intuitive assessment of the whole before any cognitive processes come into play, though they will, no doubt, later be used to 'explain', and justify, our choice." This 'primacy of affect' means that we make an immediate holistic assessment: pieces of information are judged in the light of the whole, rather than the other way round. "The disposition towards the world comes first: any cognitions are subsequent to and consequent on that disposition, which is in other words 'affect'. Affect may too readily be equated with emotion. Emotions are certainly part of affect, but are only part of it. Something much broader is implied: a way of attending to the world (or not attending to it), a way of relating to the world (or not relating to it), a stance, a disposition, towards the world - ultimately a 'way of being' in the world."[402] Such a perspective prompted Jaak Panksepp to write: "From such a vantage, Descartes' faith in his assertion 'I think, therefore I am' may be superseded by a more primitive affirmation that is part of the genetic makeup of all mammals: 'I feel, therefore I am.'"[403] Despite the classical Western prejudice which elevates 'reason' as the pinnacle of human superiority, McGilchrist insists that: "Emotion and the body are at the irreducible core of experience: they are not there merely to help out with cognition. Feeling is not just an add-on, a flavoured coating for thought: it is at the heart of our being, and reason emanates from that central core of the emotions, in an attempt to limit and direct them, rather than the other way about. Feeling

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[402] McGilchrist, Iain, 'The Master and His Emissary', 2009, Yale U.P., loc:4945-4972

[403] Panksepp, Jaak, 'Affective Neuroscience', 1998, Oxford U.P., p.309

came, and comes, first, and reason emerged from it."[404] (All of these statements are very congruent with Whitehead's ontology.)

The work of the neurophysiologist, Jaak Panksepp in Affective Neuroscience (a term which he coined himself) supports the Whiteheadian view that affect is basic and 'goes all the way down': Panksepp describes the conventional (Cart-Tonist) view as 'readout theory'. Such theories, Panksepp argues, are a heritage of the James-Lange model of emotions: modern readout theories may differ in detail, but; "… the principle remains the same: The emotional states of the brain are higher brain responses to or reflections of lower brain or bodily processes. It was strongly argued, by eminent neuroscientists, that the ancient subcortical brain regions that we share homologously with other mammals do not possess intrinsic affective properties." These beliefs have had a clear effect on both the research priorities and the ontological assumptions of conventional, Cart-Tonist neuroscience: "To the extent that modern neuroscientifically oriented readout theorists express any interest in affect (the feeling dimension of emotions), which is rare, they tend to conclude that affective experiences emerge only when unconscious emotional information is read out by the cognitive-thinking parts of the brain (especially by the neocortex)." This is what underpins; "… the most popular current view of emotional feelings and all other forms of phenomenal consciousness, namely that they are simply a variant of higher cognitive processes."[405] Ant-

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[404] McGilchrist, Iain, 'The Master and His Emissary', 2009, Yale U.P., loc:4945-4972

[405] Panksepp, Jaak, 'Affective Neuroscience', 1998, Oxford U.P., p.309

onio Damasio, in his earlier work, provides an example of this Cart-Tonist tendency; "… regular feeling comes from a 'readout' of the body changes."[406] And this 'readout' is supposed to guide the cognition that is doing the reading. As McGilchrist comments that Damasio is here (apparently unconsciously) repeating 'Descartes' error'. McGilchrist suggests that Damasio is doing this because; "… in the context of intellectual discourse we are always obliged to 'look at' the relationship of cognition to affect from the cognitive point of view."[407]

In opposition to 'readout' theory, Panksepp produces an alternative (Whitehead-oriented) theory of affect. Panksepp acknowledges the neuroscientist, Paul MacLean as a late convert and explains that: "Concurrently and independently, both became interested in understanding the social-emotional networks of the brain - especially of separation distress, social bonding, and playfulness. Both were followers of Cannon and Darwin, because they recognised that emotional feelings were direct reflections of specifiable activities in distinct brain networks, rather than peripheral feedback or higher brain readouts." In this alternative, minority view; "… the ancient affective brain is designed to intrinsically anticipate life-challenging events with affective-instinctual unconditioned responses." These very basic affective responses help to guide our learned behaviours and our thinking in general.[408] McGilchrist is per-

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[406] Damasio, Antonio, 'Descartes' Error', 1994, Vintage, p.128

[407] McGilchrist, Iain, 'The Master and His Emissary', 2009, Yale U.P., loc:4987-5001

[408] Panksepp, Jaak,'The Archaeology of the Mind', 2012, New York, W.W. Norton and Company, p.67-69

haps more ambitious than Panksepp when it comes to moving the scientific study of affect toward what is in effect a Whiteheadian position.

McGilchrist, however, admits that what it might mean to adopt an 'affective viewpoint' is, within the current scientific paradigm, scarcely comprehensible. (Though this is not, as we hope to demonstrate, the case within Whiteheadian ontology.) McGilchrist, however, comforts himself with a historical analogy: "Asking cognition … to give a perspective on the relationship between cognition and affect is like asking an astronomer in the pre-Galilean geocentric world whether, in his opinion, the sun moved round the earth or the earth round the sun. To ask the question alone would be enough to label one as mad."[409] Let me take this opportunity to cast Whitehead as the metaphorical Copernicus in this historical analogy, i.e. the one who transformed what was regarded as madness into our closest approximation to the truth.

Whitehead's Ontology and Quantum Mechanics

Whitehead thought of actualities as ***processes*** rather than substances. (His work is often characterised as 'Process Philosophy'.) Victor Lowe suggests the advent of the 'new physics' encouraged Whitehead to adopt this conception; "… now that the basic idea of physics has become the flux of energy rather than the particle of Newtonian matter."[410]

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[409] McGilchrist, Iain, 'The Master and His Emissary', 2009, Yale U.P., loc:4987-5001

[410] Lowe, Victor, 'Understanding Whitehead', 1962, Johns Hopkins U.P., p.50

Given this, it's perhaps not surprising that the American physicist, Henry Stapp claims that Whitehead's ontology is particularly relevant for relativistic quantum field theory because he says: "Both are built around psychophysical events and objective tendencies (Aristotelian 'potentia', according to Heisenberg) for these events to occur. On Whitehead's view, as expressed in his Process and Reality (Whitehead, 1929/1978), reality is constituted of 'actual occasions' or 'actual entities', each one of which is associated with a unique extended region in spacetime, distinct from and non-overlapping with all others. Actual occasions actualise what was antecedently merely potential, but both the potential and the actual are real in an ontological sense.

A key feature of actual occasions is that they are conceived as 'becomings' rather than 'beings' - they are not substances such as Descartes' res extensa and res cogitans, or material and mental states: they are processes." According to Stapp, quantum theory is primarily, "a synthesis of the idealistic and materialistic world views." It also partially reconciles the monistic and pluralistic attitudes and provides a naturalistic understanding of creation. This is because quantum theory, unlike classical physics, does not (as a basic assumption) exclude mind and consciousness: as Stapp says; "… the orthodox version of quantum mechanics, unlike classical mechanics, is not about a physical world detached from experiences; detached from minds. It is about predictions of relationships - entailed by a particular theoretical structure - between certain specified kinds of experiences." As Stapp also points out the traditional, philosophical notion of substance does not apply to the; "… natural ontological character of the 'physical' aspect of quantum theory." This part, he says is described in terms of; "… a wave function or quantum state". It is; "… a 'potentia' or 'tendency' for an event to happen. Tendencies for events to happen are not substance-like: they are not static or persisting in time. When a detection event happens in one region, the objective tendency for such an event to occur elsewhere changes abruptly. Such behaviour does not conform to the philosophical conception of a substance." As the science writer, Arthur Koestler, once remarked; "Matter has disappeared in the hands of the materialists!" Given this deconstruction of our traditional notion of matter, Stapp says that; "… the state of the brain represents not an evolving material substance but rather an evolving set of potentialities for a psychophysical event to occur."[411]

According to Stapp, in Whitehead's ontology, objective and absolute actuality consist of a sequence of psychophysical quantum reduction events. The accumulation of these events creates a growing 'past' of fixed and settled 'facts'. Each 'fact' is specified by an actual occasion or entity which has both a physical aspect and a mental aspect, and also a region in spacetime from which it views reality. Stapp draws attention to Whitehead's basic distinction between the two kinds of realities upon which his ontology is based: Whitehead describes these as; "'continuous potentialities' versus 'atomic actualities': Continuity concerns what is potential, whereas actuality is incurably discrete."[412] (This corresponds to the wave/particle complementarity in quantum mechanics.) Whitehead is clear that the conversion from potential to actual is what decides

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[411] Stapp, Henry, 'Mindful Universe', 2007, New York: Springer, loc:1138-1194

[412] Whitehead, Alfred North, 'Process and Reality', 1927/1979, Macmillan, p.61

things. For example, transforming a business idea into an actual commercial empire. Whitehead says: “Actual entities … make real what was antecedently merely potential.”[413] And again: “Every decision is referred to one or more actual entities… Actuality is decision amid potentiality.”[414] And, most decisively, Whitehead says: “Actual entities are the only reasons.”[415] Stapp contrasts Whitehead’s idea of the growing ‘past’ with the corresponding idea in non-relativistic quantum physics: “In non-relativistic quantum physics the growing ‘past’ lies behind an advancing (into the future) sequence of constant-time instants ‘now’.”[416]

In defence of this ‘complementarity of subjective and objective’ in both quantum theory and Whitehead’s ontology, Stapp cites two quotations from Werner Heisenberg. They concern the nature of the probability function and how observation changes it discontinuously, transitioning from possible to actual: firstly, Heisenberg says: “The probability function combines objective and subjective elements. It contains statements about possibilities or better tendencies (‘potentia’ in Aristotelian philosophy), and these are completely objective, ... and it contains statements about our knowledge of the system, which of course are subjective in so far as they may be different for different observers.”[417] So, according to Heisenberg, in the probability function’s

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[413] Ibid, p.72

[414] Ibid, p.43

[415] Ibid, p.24

[416] Stapp, Henry, ‘Mindful Universe’, 2007, New York: Springer, loc:1065-1101

[417] Heisenberg, Werner, ‘Physics and Philosophy: The Revolution in Modern Science’, 1958, Harper Perennial Modern Classics, p.53

mix of objectivity and subjectivity, the objective part concerns its statements about tendencies, while the subjective part consists of its statements about our knowledge of the system, because this may be different for different observers. Secondly, Heisenberg says: "... the transition from the 'possible' to the 'actual' takes place during the act of observation. The observation itself changes the probability function discontinuously; it selects of all possible events the actual one that has taken place. Since through the observation our knowledge of the system has changed discontinuously, its mathematical representation has also undergone the discontinuous change and we may speak of a 'quantum jump'."[418] Heisenberg is here describing the collapse of the probability wave function. The act of observation changes the function discontinuously, selecting one actual event out of all the possible ones. As a result, both our knowledge of the system and the mathematical representation of this knowledge change discontinuously. This discontinuous change can be called a 'quantum jump'.

Stapp claims that: "The core issue for both Whiteheadian process and quantum process is the emergence of the discrete from the continuous." He then illustrates this problem by referring to; "… the decay of a radioactive isotope located at the centre of a spherical array of a finite set of detectors, arranged so that they cover the entire spherical surface. The quantum state of the positron emitted from the radioactive decay will be a continuous spherical wave, which will spread out continuously from the centre and eventually reach the spherical array of detectors. But only one of these detectors will fire. The total space of possibilities has been partitioned into a discrete set of subsets, and

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[418] Ibid, p.54

the prior continuum is suddenly reduced to some particular one of the elements of the selected partition."[419] Stapp then asks; "But what fixes, or determines, this particular partitioning of the continuous whole into the discrete set of subsets?" As he points out: "The orthodox answer is that the experimenter decides. Yet if the experimenter himself is made wholly out of physical particles and fields then his quantum representation by a wave function must also be a continuous function. But how can a smeared-out continuum of classically conceivable possibilities be partitioned into a set of discrete components by an agent who is himself a continuous smear of possibilities. How can the definite fixed boundaries between the discrete elements of the partition emerge from a continuous quantum smear?"[420]

Stapp's answer refers to von Neumann's analysis of measurement. This shows that, for all practical purposes, events can actually come into being without requiring any human observation. But; "… some sort of intervention is then needed, and a natural possibility is that any actual intervention is formally like an actual human observation." This formal similarity to a human intervention involves a number of elements: firstly, the making of the required choice from a basis in a vector space. According to Stapp, this choice, von Neumann says, injects an; "… element of wholeness completely foreign to classical physical principles". Secondly, formal similarity to a human intervention imposes a conceptual element which resolves the ambiguities, generated by the uncertainty principle. All this, Stapp says, is; "… in accordance with Whitehead's demand for a

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[419] Stapp, Henry, 'Mindful Universe', 2007, New York: Springer, loc:1015

[420] Ibid, loc:1015-1021

mental pole. This conceptual component can have no more complexity than the physical structure that will, after the event, represent it in the quantum physical state." This last statement of Stapp's reflects the complementarity of the mental and physical in Whitehead's ontology. Stapp is critical of Bohr's pragmatic quantum philosophy because of its emphasis on the active role of human beings in the development of scientific knowledge. This approach, Stapp says; "… can easily lead to an anthropocentric conception of reality." Stapp brings in Whitehead's ontology as, "… a rational escape from this parochialism." Whitehead can achieve this because; "He created a conception of natural process that captures the essential innovations wrought by quantum theory in a way that allows the human involvement specified by quantum theory to be understood within a fundamentally non-anthropocentric conception of nature as a whole."[421]

What Stapp is referring to here is, I believe, Whitehead's notion that all events, including those in the human mind and consciousness unfold according to the same basic principles. Whitehead noted that it was obvious that 'physical science is an abstraction', but to leave it at this would be 'a confession of philosophic failure'. In going beyond this, Whitehead promoted the notion of physical energy as; "… an abstraction from the complex energy, emotional and purposeful, inherent in the subjective form of the final synthesis in which each occasion completes itself."[422] Victor Lowe suggests that what Whitehead is proposing here is a 'universal teleology; a quantum-theory of growth': "White-

[421] Ibid, loc:1005 to 1125

[422] Whitehead, Alfred North, 'Adventures of Ideas', 1933, Cambridge Press, p.17

head, though sympathetic with Bergson's reaction against materialism, was teaching by example that it is possible for theoretical concepts to express the inner growth of things. His conception of growth has points of similarity with Hegel's, but differs in having no use for 'contradiction', and in presenting a hierarchy of categories of feeling rather than a hierarchy of categories of thought."[423] So, when Stapp refers (above) to Whitehead's ontology as a theory that; "… allows the human involvement specified by quantum theory to be understood within a fundamentally non-anthropocentric conception of nature as a whole"[424] he is asserting that Whitehead has finally healed the Cartesian split: humankind is now part of nature, but unlike the Cart-Tonist version of dispensing with the split by rejecting the mental and spiritual realms, humankind as part of nature is also a ***causal*** part of it.

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[423] Lowe, Victor, 'Understanding Whitehead', 1962, Johns Hopkins U.P., p.50

[424] Stapp, Henry, 'Mindful Universe', 2007, New York: Springer, loc:1015

Chapter Thirteen: Synthesising 'Whit-TumWorld'

Having presented Whitehead's ontology in the previous chapter, I want to move on in this one to see how this ontology might be integrated with recent developments in the areas of science and philosophy associated with consciousness studies. Hopefully, this will result in a coherent philosophical position which I'm calling 'Whit-Tum world' (my abbreviation of 'Whitehead-Quantum'). I'll start by looking in a little more detail at what Whitehead's ontology means for quantum mechanics. This is mainly concerned with how Whitehead's perspective moved away from the Copenhagen School's anthropomorphic conception of consciousness as an intrusive causal force and toward a non-anthropomorphic view of consciousness (or at least its raw material, 'experience') as an inherent component of reality. The next major topic will be Nicholas Humphrey's theory of 'Sensation' and 'Perception' as two distinct channels of interaction between organism and environment.

I find this a very close analogy with Whitehead's two modes of perception and I attempt to 'merge' them in a meaningful way. We then move on to look at the metaphor of the Watt governor, which provoked an extensive discussion of representation among theorists of the Embodied Mind and their critics. Next we'll look at sensation in single-celled organisms, including a very brief look at self organisation. Then we consider an example of a developmental and psycho-dynamic approach to emotion. The final major topic of the chapter is the work of the neurophysiologist, Jaak Panksepp. His affirmation of the vital and primary role of emotion for the integrity and homeostasis of the organism is also highly consistent with Whitehead's ontology.

The Implications of Whitehead's Ontology for Physics

A major problem for quantum theory has been its lack of, and indifference to, ontology: in other words, it doesn't ask what's really going on behind the observations. As in the introduction, I would describe this reluctance as a loss of 'ontological nerve' on the part of the founders of the quantum paradigm and their successors. Despite all the very challenging philosophical developments in quantum mechanics, most physicists, according to such eminent observers as Bernard d'Espagnat and Henry Stapp, have been reluctant to even try to construct an ontology compatible with the new physics. They have simply pragmatically accepted quantum rules because of their outstanding success at validating predictions (while ignoring the role played by 'our causally efficacious conscious thoughts').

As Stapp says; "… due to this reticence on the part of quantum physicists we are faced today with the spectacle of our society being built increasingly upon a conception of reality erected upon a mechanistic conception of nature now known to be fundamentally false. Specifically, the quintessential role of our conscious choices in contemporary physical theory and practice is being systematically ignored and even denied." He goes on to criticise 'influential philosophers', who pretend to speak for science, claiming, on the basis of a grotesquely inadequate, old scientific theory, that the (empirically manifest) influence of our consciousness, which constitutes both the rational and the intuitive basis of our functioning in this world, is nothing but an illusion.[425] To fill this theoretical lacuna, I agree with Stapp and others, that Alfred North Whitehead's process ontology is the ideal candidate.

In physics, the main thrust of Whitehead's ontology, according to Stapp, is its focus on the fundamental process of; "… combining the pre-existing psychologically and physically described aspects of reality together to form a new psychophysical actual entity, or actual occasion." This can be identified as an actual event, in Heisenberg's sense. By linking together all these concepts, Stapp says that he is; "… merely proposing that Heisenberg's incomplete ontology be completed by accepting what I regard as Whitehead's main ideas. The aim of this approach is to understand how the psychological and physical aspects of reality conspire to select the events that actually occur." Stapp argues that combining the ontologies of Heisenberg and Whitehead; "… allows the basically anthropocentric features of the pragmatic epistemological Copenhagen interpretation to be embedded within the general framework of a non-anthropocentric world process."[426] What Stapp is referring to here is a major criticism of the Copenhagen interpretation; namely that it requires the intervention of an (unexplained) human consciousness to make quantum mechanics 'work'. Whereas in Whitehead's ontology, consciousness (or at least the experiential 'raw materials' of consciousness) is a natural and inherent part of the universe, rather than an unexplained intrusion.

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[425] Stapp, Henry, 'Mindful Universe', 2007, New York: Springer, loc:998

[426] Ibid, loc:1201

To illustrate these differences in ontological position, Stapp points out that Niels Bohr accepted that our conscious intentions cause (at least in part) our intentional actions, but he did so only pragmatically. Whitehead, on the other hand, accepts conscious causation as a basic feature of reality: quantum reduction events can be seen as the physical manifestations of the termination of a psychophysical process: "The physical and psychological aspects of reality are thus tied together in the notion of a quantum event." However, we need more, argues Stapp, than a framework of merely pragmatic rules. He describes this 'pragmatic anthropocentric theory' (in other words the Copenhagen interpretation) as; "… a useful distillation from an underlying non-anthropocentric ontological structure that places the evolution of our conscious species within the broader context of the structure of nature herself. We need a fundamentally non-anthropocentric ontology within which the anthropocentric pragmatic theory is naturally imbedded." And this, of course, is Whitehead's ontology, which beautifully accommodates orthodox pragmatic quantum theory.

As Stapp says: "The paradigmatic example of an actual occasion is an event whose mental output is an addition to a human stream of conscious events." He goes on to explain that the physical output from this same actual occasion is the; "… actualised neural correlate of that mental output." In other words, the neural activity in the brain which underlies that conscious event. Stapp describes such events as 'high-grade' actual occasions, but adds that Whitehead's quantum ontology includes simpler occasions which have lower-grade outputs. This leads Stapp to claim that; "… the Whitehead quantum ontology is essentially an ontologicalisation of the structure of orthodox relativistic quantum field theory, stripped of any anthropocentric trappings, but supplied with an internal creative process that makes ideas dynamically effective." This means that the physically described and psychologically described aspects of contemporary orthodox relativistic quantum field theory can be taken as examples of a general non-anthropocentric ontology. So, by looking behind quantum observations, Whitehead has created an ontology in which consciousness and ideas are a creative and (as above) an inherent part of nature, rather than an unexplained intrusion.[427]

There's a general but subtle misunderstanding about quantum processes to the effect that once the wave function collapses, we leave the quantum world and enter the world of classical physics. Stapp seeks to refute this view. He argues that (counter-intuitively) this 'entry into actuality'; "… cannot be adequately represented within the conceptual framework of classical physics." He's concerned here with the role of consciousness. Stapp says that his, "… proposal is not that every quantum event need be associated with a reality of exactly the kind that populate our human streams of consciousness." It's rather that such events ***include*** our conscious thoughts, ideas, and feelings. So, while it may not be the case that every quantum event produces an event in consciousness, it is absolutely the case that ***every*** quantum event does 'reside in a realm' that contains consciousness and feelings, and that consequently cannot be adequately described by classical physics. Stapp calls Whitehead's actual entities or occasions the psychophysical building blocks of reality: he claims that each of these entities is identified with a quantum reduction event, and each of them; "… has a 'mental pole' and a 'physical pole'.

[427] Ibid, loc:978 to 1237

There are two kinds of actual occasions. Each actual occasion of the first kind is an intentional probing action that partitions a continuum into a collection of discrete experientially different possibilities. Each actual occasion of the second kind selects (actualises) one of these discrete possibilities, and obliterates the rest." So, according to Stapp, actual occasions of the first kind are equivalent to conscious observation of the wave function, as in the classical Copenhagen interpretation, creating a range of 'experientially different possibilities'. More innovatively, he then suggests that occasions of the second kind select and 'actualise' one of these possibilities and eliminates the rest. Whitehead also specifies that all actual entities have a mental and a physical 'pole'. These poles consist of inputs and outputs. Stapp says that: "The mental inputs and outputs have the ontological character of thoughts, ideas, or feelings. The mental inputs are drawn primarily from the mental outputs of the prior occasions, and the mental output of the current occasion is the bud of experience created by/at this current event or occasion." According to Whitehead, the process by which mental and physical inputs are combined to produce mental and physical outputs involves appetites, evaluations, and satisfactions. Consequently, he's asserting that these idea-like qualities enter into the dynamics of the basic process that creates the actual occasions, and hence reality itself.[428]

Space and The Self Composed of Drops of Experience

Stapp relates Whitehead's conception of a growing past to a famous debate between Newton and Leibniz about the nature of space: Newton's conception of space was essen-

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[428] Ibid, loc:1092 to 1125

tially a receptacle conception; "… in which space is an empty container into which movable physical objects can be placed." Leibniz, however, argued for a relational view of space in which it is nothing but relations among actually existing entities. Consequently, according to Leibniz, completely empty space is a nonsensical idea. Whitehead's conception of spacetime is filled by actual atomic entities and so is not empty. "On the other hand, there is also a yet-to-be-filled spacetime future, which, however, is still a mere potentiality." So, we can conclude that Whitehead's actual spacetime favours the account of Leibniz, while Whitehead's conception of the space-time future could be said to lean towards Newton's view. Whitehead also appeals to William James's claim that: "The thought is itself the thinker": as James explains; "If the passing thought be the directly verifiable existent, which no school has hitherto doubted it to be, then that thought is itself the thinker, and psychology need not look beyond."[429] Stapp interprets this as follows; "… the 'actual entities' are the 'drops of experience' themselves, not some soul-like entities that know them. Your awareness of your 'self' must be an aspect of your thoughts, and there is no rational need for, additionally, something besides or beyond the reality that is that awareness itself." In other words, Stapp is claiming that in order for us to have our undeniable experience of self (or soul), nothing further is needed than a continuous flow of Whitehead's 'drops of experience'.[430]

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[429] James, William, 'The Principles of Psychology' 1890, Thoemmes Continuum, p.401

[430] Stapp, Henry, 'Mindful Universe', 2007, New York: Springer, loc:1037-1066

Consistent with these views of Whitehead and Stapp, the philosopher Galen Strawson insists that we know exactly what consciousness is. He also provides a pragmatic definition of 'consciousness'; "… experience of any kind whatever. It's the most familiar thing there is, whether it's experience of emotion, pain, understanding what someone is saying, seeing, hearing, touching, tasting or feeling. It is in fact the only thing in the universe whose ultimate intrinsic nature we can claim to know. It is utterly unmysterious." On the other hand, Strawson claims that the nature of physical stuff is mysterious except insofar as consciousness is itself a form of physical stuff. This point, which is at first extremely startling, was well put by Bertrand Russell in the 1950s in his essay 'Mind and Matter': "We know nothing about the intrinsic quality of physical events," he wrote, "except when these are mental events that we directly experience." In having conscious experience, he claims, we learn something about the intrinsic nature of physical stuff, for conscious experience is itself a form of physical stuff.[431]

The 'Obviousness' of Consciousness

According to Strawson, consciousness is a sort of 'self-confirming' phenomenon: "We know what conscious experience is because the having is the knowing: Having conscious experience is knowing what it is. You don't have to think about it (it's really much better not to). You just have to have it. It's true that people can make all sorts of mistakes about what is going on when they have experience, but none of them threaten the fundamental sense in which we know exactly what experience is just in having it." When it comes to matter, however, we don't have this privileged, self-confirming access: "We don't know the intrin-

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[431] Galen Strawson, New York Times article, May 16, 2016

sic nature of physical stuff, except - Russell again - insofar as we know it simply through having a conscious experience."[432] Strawson comments that many people think that physics has solved, or is in the process of solving all questions about matter. However, while it's true that physics is magnificent, as Strawson says: "It tells us a great many facts about the mathematically describable structure of physical reality, … (it) doesn't tell us anything at all about the intrinsic nature of the stuff that fleshes out this structure. Physics is silent - perfectly and forever silent - on this question." Strawson explains that, if asked, many physicists would reply that; "… all particles are made of the same substance: energy," but, if you then go on to ask: "What is the intrinsic nature of this energy, this energy-stuff?" The answer, here again, is that we just; "… don't know, and that physics can't tell us; that's just not its business. This point about the limits on what physics can tell us is rock solid, and it arises before we begin to consider any of the deep problems of understanding that arise within physics - problems with 'dark matter' or 'dark energy', for example - or with reconciling quantum mechanics and general relativity theory."[433]

"So The Hard Problem is the problem of matter (physical stuff in general). It's not the physics picture of matter that's the problem; it's the ordinary everyday picture of matter. It's ironic that the people who are most likely to doubt or deny the existence of consciousness (on the ground that everything is physical, and that consciousness can't possibly be physical) are also those who are most insistent on

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[432] Ibid

[433] Ibid

the primacy of science, because it is precisely science that makes the key point shine most brightly: the point that there is a fundamental respect in which the ultimate intrinsic nature of the stuff of the universe is unknown to us - except insofar as it is consciousness."[434] This conclusion can, I believe, be extended to all human knowledge. In other words, we can claim that knowledge can only come through consciousness, starting with sensation and ultimately communicable via language; none of which could take place without consciousness. All this can, of course, be seen as a consequence and confirmation of Whitehead's ontology. The notion of process is central to Whitehead's ontology, he says: "The many become one, and are increased by one."[435] According to Stapp, this Whiteheadian concept of process means that; "… the world of fixed and settled facts grows via a sequence of actual occasions. The past actualities generate potentialities for the next actual occasion, which specifies a new spacetime standpoint (region) from which the potentialities created by the past actualities will be prehended (grasped) by the current occasion."[436] In other words, nature is a self-generating process which continually generates new actual entities. Having been created, these entities contribute to the potentialities for the next generation of actual occasions. As they are created, this creative process of nature assigns a separate spacetime region to each actual entity. In this way, the process of nature fills up, step-by-step, the spacetime re-

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434 Ibid

435 Whitehead, Alfred North, 'Process and Reality', 1927/1979, Macmillan, p.21

436 Stapp, Henry, 'Mindful Universe', 2007, New York: Springer, loc:1054

gion lying behind, or in the past of, the advancing sequence of space-like surfaces which constitute ‘now’.

Quantum Ontology and Free Will

Henry Stapp first gives the conventional answer to this ‘discreteness’ problem of physical matter. It is, he says; “… resolved in orthodox quantum theory, and in actual scientific practice, by what Heisenberg and Bohr call ‘a choice on the part of the experimenter’.” Stapp points out that John von Neumann calls the manifestation of this choice in the physical world, ‘process 1’. Stapp then proposes another process, which he calls ‘process zero’. This is the process that; “… selects the particular partitioning specified by the physically described process 1.” Stapp is clear, however, that this partitioning cannot be caused by a physical action alone; “…continuous smears acting in accord with the smoothing Schrödinger equation cannot create a discrete partitioning in a finite time.” On the other hand, Stapp says; “… the experimenter feels that his consciousness is playing a role. Indeed, if the physically described aspects alone cannot do the job, and it feels like consciousness is helping, then why not try that idea out? Consciousness is, after all, the only other thing in our ontological arsenal.” Stapp concedes that; “… the classical intuitions of neuroscience about the brain are generally valid.”

However, he insists that there are two exceptions: “Firstly, at almost every instant the cloud of possibilities is growing and diffusing into a wider set of possibilities which, however, every once in a while (at a reduction event) gets reduced to a subset. Secondly, the diffusing action can be curtailed by the quantum Zeno effect which arises from the small, but nonzero, quantum smearing of each one of the almost-classical components." Consequently, says Stapp, the brain can be described in a strictly quantum mechanical way, and, "… yet it can be understood to be very similar to a classical statistical ensemble. Importantly, the relevance of the quantum aspects for consciousness is not due to some macroscopic quantum superposition effect, which would be extremely hard to realise. The pertinent non-classical feature is the occasional occurrence of a sudden reduction of the ensemble to a sub-ensemble that is compatible with the content of a co-occurring conscious experience." These reductions 'decompose' or 'partition' the expanding ensemble of almost classical states. Stapp claims that: "It is only by means of this partitioning that the theory is tied securely to human experiences, and to the empirically validated rules of quantum theory." He insists that; "… such reductions are logically necessary in order to decompose the continuous structure of the expanding ensemble of almost classical states, into a collection of discrete alternatives, each associated with a distinct kind of experience… The smear of almost-classical possibilities must be partitioned, prior to each experience, into a specified collection of components at least one of which corresponds to a distinctive experience, or lack thereof."[437]

In order to define what he calls a 'template for action', Stapp starts by quoting William James, who wrote that; "… no object can catch our attention except by the neural machinery. But the amount of attention that an object receives after it has caught our attention is another matter. It often takes effort to keep mind upon it. We feel we can make more or less of the effort as we choose. This feeling ... will

[437] Ibid, loc:1021 to 1317

deepen and prolong the stay in consciousness of innumerable ideas which else would fade away more quickly."[438] Stapp argues that such a conscious effort to act in an intended way will produce a neural correlate in the form of a specific pattern of brain activity, which may extend over a large portion of the brain. This pattern of neurological activity (which is produced by a process 1 action); "… if held in place for a sufficiently long period, will tend to produce a brain activity that will tend to produce an intended experienced feedback."

According to folk psychology, we all believe that conscious effort is; a) under our own control, and b) has the effect of intensifying whatever experience to which we apply it. Stapp claims that increasing effort increases the rate at which conscious events will occur, and that if the rate becomes sufficiently great, what he calls the quantum 'Zeno effect' will kick in. Via the repetitious interventions of probing actions, the Zeno effect will tend to hold templates for action in place: "That effect will, in turn, tend to make the intended action occur. By virtue of this dynamically explained causal effect of wilful conscious effort upon brain activity, trial-and-error learning should hone the correlation between the consciously experienced intention and an associated template for action that produces, via the physical laws, the intended feedback. This explains dynamically the capacity of an effortful intention to bring about its intended consequence."

Stapp points out that this account of conscious causation does not involve the action of; "… any forces, mental or

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[438] James, William, 'Text-Book of Psychology', 1892, Kessinger Publishing, p.227

otherwise, upon the parts of a material substrate: no pushing around of the atoms in a way that produces, in some totally miraculous and unaccountable way, the action that the person has in mind. No! The effect of the effort is on an entire macroscopic neural pattern of brain activity. This pattern has been singled out by von Neumann's process 1 action and is held in place by the quantum Zeno effect." This coupling of von Neumann's dynamical rules to learning, can account rationally for the observed correspondence between experienced intent and experienced feedback, both of which are, of course, essential for human life and survival. Stapp states baldly that: "There is no rational controversy about whether or not quantum effects occur in the brain - of course they do! The crucial question is the extent to which the quantum, as opposed to classical, precepts are essential for the dynamics of the brain; and to what extent a classical approximation is valid in a warm, wet, noisy brain?" To answer these questions, Stapp says, we must examine how well the possible quantum effects can survive in an environment that is potentially lethal to many of them: "Careful analysis shows that one particular quantum effect, the 'quantum Zeno effect' can survive, and indeed can play an essential role in the causal relationship between a mind and its brain."[439]

Two Modes of Perception

As we saw in the last chapter, one of the great innovations in Whitehead's ontology is his distinction between two separate and distinct modes of human perception: he calls one 'perception in the mode of presentational immediacy' and the other 'perception in the mode of causal efficacy' (for

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[439] Stapp, Henry, 'Mindful Universe', 2007, New York: Springer, loc:1153-1328

which he also uses the term ‘Prehension’). In this chapter (as part of the synthesis of Whit-Tum world), I’m going to argue that this distinction is a very close analogy with Nicholas Humphrey’s distinction between ‘Perception’ and ‘Sensation’ (respectively). So, from now on, I shall employ the simplified terminology ‘Perception’ and ‘Prehension’ to represent these two distinct forms of perception, as formulated by Whitehead and Humphrey. Humphrey claims that Sensation is characterised by the following qualities: Sensations always belong to the subject; they are owned in a direct and personal way. Sensations are always tied to a specific body site. In other words, they’re anchored in time and space and firmly located in the brain’s ‘map’ of the body. Sensations are ‘modality specific’, meaning that they are always experienced as a; sight, sound, touch, taste or smell. Sensations exist always and only in the present tense. And finally, taken all together, these characteristics mean that Sensation marks a boundary between ‘me’ and ‘not me’; it tells us ‘what’s happening to me?’ rather than ‘what’s happening in the environment?’ This distinction between Perception and Sensation can be characterised as the difference between our constructed, conceptual model of the world and the experiential feelings which we ***receive*** from the world; the difference between how the world ‘looks’ (in the sense of mental understanding) and how it ***feels*** and how we ***react*** to it.

As above, Humphrey’s characterisation of Sensation as ‘what’s happening to me?’ is remarkably close to a description of Whitehead’s ‘perception in the mode of causal efficacy’ (as described in the previous chapter): “I push and the world pushes back. If I am struck, I feel the presentational immediacy of pain constructed by my nerves and brain, but

I experience that pain with and arising out of the physical causal energy of what strikes me." The suggestion here is that a flying rock, for example, carries a physical force, and that it is this force or energy which causes the sensory experience of the impact. "I experience the pain with and because of that causal energy."[440] This (it seems to me) is a very profound break with the Cart-Ton world's model of perception, which (as per chapter six) is based exclusively on information processing. In that model we may; "… feel the presentational immediacy of pain constructed by my nerves and brain …" but fail to, "… experience that pain with and arising out of the physical causal energy of what strikes me." I think that although Humphrey got very close to Whitehead's view, he failed to realise the implications and/or draw the conclusions which Whitehead did. These implications and conclusions are vitally important for issues such as; a) the philosophical concept of intentionality and, b) the phenomena of sensation in single-celled organisms.

The philosophical concept of intentionality is defined (by the Stanford Encyclopedia of Philosophy) as; '… the power of minds to be about, to represent, or to stand for, things, properties and states of affairs.' 'Intentionality' (in this philosophical sense) is the basis of Cart-Ton world's theory of representation; i.e., that a particular 'symbol' (embodied in a physiochemical brain state) 'stands for' or represents, for example, an object in the environment. Let me say immediately that I don't doubt that such processes occur in the brain in a very similar way as they do in a computer (as Dennett is wont to point out). What I don't accept is the

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[440] Mesle, C. Robert, 'Process-relational Philosophy', 2008, Templeton Foundation Press, loc:1112

'Cart-Ton' claim that these processes account for the entirety of human perception. What this 'Cart-Ton' model leaves out is ***qualia***: everything from pain to the colour red. I do not believe that these qualic experiences are the result of information processing and/or representation in the brain. (Dennett is at least a consistent inhabitant of Cart-Ton world in the sense that he denies that qualia exist.) Rather qualia are, as above, experiential feelings which we ***receive*** from the world and the way in which we receive them is via what Whitehead calls 'perception in the mode of causal efficacy', or (more conveniently) 'Prehension'.

The Watt Governor and Non-Representational Prehension

In order to illustrate Whitehead concept of 'non-representational Prehension', we can return to the discussion around the metaphor of the 'Watt governor', which emerged from the literature on the Embodied Mind: the software engineer, Tim van Gelder uses the Watt governor (or centrifugal governor) as a metaphor for the Embodied Mind. (For our purposes, the very phrase, 'Embodied Mind' can be taken as an affirmation of the Whiteheadian idea that the basis of mind is inherent in all things and can be manifested in living organisms, especially the most complex.) The Watt governor was the device invented to keep the speed of the flywheel on a steam engine constant: this speed can fluctuate because of variations in; steam pressure, the magnitude of the workload, the number of machines being driven, etc. The amount of steam entering the pistons is controlled by a throttle valve: the more steam that enters, the faster the wheel spins. Conversely, the less steam, the less speed. Originally, this speed had to be controlled via constant manual corrections made by a human engineer. Given the difficulty and danger involved in this, the question arose as to how this process might be automated.[441] The answer was the Watt governor. It connected to the throttle valve and regulated the flow of steam to the engine: as the speed of engine increases, the central spindle of the governor rotates faster, making the two balls attached to it fly outwards and upwards against gravity. This motion causes the lever arms to reduce the opening of the throttle valve, thus decreasing the flow of steam and preventing over-speeding of the engine. In this way, the governor keeps speed smooth and constant.

Could the Watt governor be computerised? The philosopher, Lawrence Shapiro suggests a computer solution: it would require an algorithm, which, in turn, would need symbolic representations, in other words ‘stand-ins’, for both the current speed of flywheel and the desired speed. The algorithm would use these stand-ins to compute the difference between how fast the flywheel is actually spinning and how fast it should spin. Having calculated the difference, the algorithm would then trigger the necessary adjustments to the throttle valve in order to reduce this difference. So, the algorithm would use stand-ins in order to regulate the fly-wheel’s speed.[442] Van Gelder points out that this use of representations is the most important feature of a computational solution: it requires a sequence of operations which can be described as the perception-measurement-computation-action cycle. The environment is measured (or ‘perceived’), internal representations are created, computations are performed, and actions are chosen. The distinctive

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[441] Clark, Andy, ‘Mindware’, 2001, Oxford U.P., p.125/126

[442] Shapiro, Lawrence, ‘Embodied Cognition’, 2011, Routledge, p.143

features of this ‘computational governor’ are, according to the philosopher, Andy Clark; “(1) the use of internal representations and symbols, (2) the use of computational operations that alter and transform those representations, (3) the presence of a well-defined perception-computation-action cycle (what van Gelder calls ‘sequential and cyclic operation’), and (4) the susceptibility to step-wise information-processing decomposition (what van Gelder calls ‘homuncularity’).”[443]

The Watt governor, van Gelder claims, is a non-computational, non-representational control system. As an analogue, ‘energy-exchange’ system it qualifies perfectly as an example of Whiteheadian Prehension, plus of course, its experiential ‘feeling’ dimension. The issue here is that Cart-Ton world tends to ignore (or denies) any sensory channel between the environment and the organism that isn’t; a) digitally computational and b) as a consequence, representational. Given this, a vigorous discussion was generated as to whether or not the Watt governor is or is not representational: a fanatical representationalist might, according to Clark, claim that the arm angle is a ‘representation’ of the engine speed. But, van Gelder insists that the real relationship is; “… much more subtle and complex than the standard notion of representation can handle.”[444] Clark explains that; “… the arm angle is continuously modulating the engine speed at the same time as the engine speed is modulating the arm angle. The two quantities are best seen as being codetermined and codetermining.” Clark says that the gov-

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[443] Clark, Andy, ‘Mindware’, 2001, Oxford U.P., p.125/126

[444] Van Gelder, Tim, ‘What Might Cognition Be, If Not Computation?’, The Journal of Philosophy, Vol. 92, No. 7 (Jul., 1995), pp. 345-381, p.353

ernor is not computational for two reasons: firstly, computation requires manipulation of 'token-like' representations, which is absent from the governor. Second, there are no discrete operations and, hence, no distinct sequence of manipulations, so, consequently, no algorithm. Therefore, the governor is not computational for a 'single deep reason': because, Clark says; "… the continuous and simultaneous relations of causal influence that obtain among the various factors involved. It is this distinctive kind of causal profile that both invites treatment in terms of an alternative dynamic analysis and that causes problems for the traditional (computational and representational) approach."[445] Lawrence Shapiro provides a list of 'dynamicist' theorists who question and/or reject representation as an important element in human cognition: he quotes one of them; a robot-builder called Brooks. His article 'Intelligence Without Representation', claims that "... representation is the wrong unit of abstraction in building the bulkiest parts of intelligent systems"[446], and; "… there need be no explicit representation of either the world or the intentions of the system to generate intelligent behaviours for a creature."[447] These anti-representational views represent a very serious challenge to standard, Cart-Tonist cognitive science, since the computational theory of mind depends on representation. Van Gelder has, indeed, described the Watt governor as a better metaphor for the mind than the digital computer. The reason I've devoted so much space to this discussion is that the governor illustrates a major theme of this book: namely,

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445 Clark, Andy, 'Mindware', 2001, Oxford U.P., p.127

446 Brooks, R., 'Intelligence Without Representation', 1991, Artificial Intelligence 47: 139-59, p.139

447 Ibid, p.144

that Whitehead's ontology (which, superficially, sounds so abstract and 'other-worldly') can in fact be 'integrated' into our everyday world via such practical and comprehensible mechanisms.

Sensation in Single-Celled Creatures

Despite their obvious lack of a nervous system, let alone a brain or 'mind', it's well known that unicellular organisms can to respond to stimuli such as, temperature, pressure and chemical changes, which act directly on their membrane boundary. They also have the ability to evaluate these stimuli as toxic or beneficial. There's also a lot of evidence that unicellular organisms are capable of exercising surprisingly high levels of intelligence.[448] In an effort to explain this, Humphrey suggests that these single-celled organisms can react with what he calls, 'a wriggle of acceptance or rejection',[449] though he doesn't go much beyond this description by way of explanation. The neurologist, Antonio Damasio, does however, goes much further in a Whiteheadian direction: in attempting to explain the origin of subjective feelings in large multi-celled creatures like us, he appeals to the sensory capacities of single-cell organisms. (We'll look in more detail at Damasio's ideas as to how affects may arise from single-celled organisms in chapter fifteen.)

In considering sensation in single-celled organisms for its congruence with the ontology of Whit-Tum world, we can also look at a further relevant theoretical development; the concept of 'self-organisation'. Wikipedia defines it as fol-

[448] See, for example, the work of Prof Brian J.Ford, 'The Secrets Of Intelligence Lie Within A Single Cell', New Scientist, 21 April 2010

[449] Humphrey, Nicholas, 'A History of the Mind', 1992, Simon and Schuster, p.146

lows: ‘Self-organisation, also called (in the social sciences) spontaneous order, is a process where some form of overall order arises from local interactions between parts of an initially disordered system. The process is spontaneous, not needing control by any external agent.’ This spontaneous, ‘bottom-up’ emergence of order seems to me highly compatible with Whitehead’s ontology: his conception of the basic building blocks of reality as feeling entities which spontaneously interact with each other can provide a basis from which an understanding as to how self-organisation emerges could begin to emerge. Stuart Kauffman (one of the leading spokespersons on self-organisation) says; “… the tapestry of life is richer than we have imagined. It is a tapestry with threads of accidental gold, mined quixotically by the random whimsy of quantum events acting on bits of nucleotides and crafted by selection sifting. But the tapestry has an overall design, an architecture, a woven cadence and rhythm that reflect underlying law - principles of self-organisation.” He argues that biological evolution is driven by a combination of self-organisation and natural selection. However, he identifies two problems in unfolding this theory; “… first, we do not yet understand the wealth of sources of such spontaneous order; second, we have the gravest difficulties understanding how self-organisation might interact with selection.”

Kauffman asserts that not all complex systems can have been assembled by evolutionary processes alone and he also stresses a role for the inevitability of historical accident, but he’s mainly concerned with what he calls a ‘tantalising possibility’, namely; “… that self-organisation is a prerequisite for evolvability, that it generates the kinds of structures that can benefit from natural selection. It generates structures that can evolve gradually, that are robust… If this view is roughly correct, then precisely that which is self-organised and robust is what we are likely to see preeminently utilised by selection. Then there is no necessary and fundamental conflict between self-organisation and selection. These two sources of order are natural partners." According to Kauffman, this addition of self-organisation as a force driving evolution reveals a 'spontaneous order' in the universe, which is reflected in the creatures it generates: contrary to Cart-Tonist imaginings, organism are not the random serendipitous structures of natural selection acting alone. They are manifestations of a meaningful order inherent in the fabric of reality. As Kauffman says; "… if selection has built organisms utilising the properties that are self-organised and robust - both because those features lie to hand in evolution, and because the same self-organised features are just those which are readily crafted - then we are not merely tinkered-together contraptions, ad hoc molecular machines. The building blocks of life at a variety of levels from molecules to cells to tissues to organisms are precisely the robust, self-organised, and emergent properties of the way the world works. If selection merely moulds further the stable properties of its building blocks, the emergent lawful order exhibited by such systems will persist in organisms. The spontaneous order will shine through, whatever selection's further siftings."[450]

The Nature of Emotion in Whit-Tum World

We have previously made many criticisms of Cart-Ton world's conception of emotion. It's timely, therefore, in this chapter to say something positive about the Whit-Tumist

[450] Kauffman, Stuart, 'At Home in the Universe' 1995, Oxford U.P., p.185-189

view of emotion. In addition to the neurophysiological theories of Panksepp (presented below), the origin of the approach promoted in this book lies mainly in the psychodynamic tradition of psychology and psychotherapy. The two clinicians and researchers, Greenspan and Shanker (2004) describe this as a challenge to the Cartesian tradition: "During the 1940s, '50s and '60s some of the great theorists of early child development, such Erik Erikson, Anna Freud, Rene Spitz, and John Bowlby, looked at the importance of early emotional experiences for subsequent personality functioning. The 1960s, '70s, and '80s saw fruitful research on emotional development by Mary Ainsworth, Jerome Bruner, Berry Brazalton, Myron Hofer, Louis Sander, Allen Sroufe, and Dan Stern, all of whom made important discoveries about the types of interactive experiences that promote strong attachment and healthy emotional functioning and encourage the child's emerging sense of self." They refer also to the work of Robert Emde, Mary Klinert and Joseph Campos, who; "… showed that a caregiver's facial expressions of affect could have a powerful effect on the infant's emotional responses to strangers and to physical situations." A telling experiment showed that when the facial expression of caregivers is unresponsive; "… the infant typically responds by trying to re-engage her caregiver with animated facial expressions, vocalisations, and body movements. When her strategy fails, the infant turns away, frowns, and cries." Greenspan and Shanker point out that, important as such research is for our understanding of the development of emotional experience; "it does not explain how the basic emotions arise from early physiological experience, how they then develop and lead to symbols and intelligence, and whether intelligence is separate from the ongoing pathway of emotional development or an intrinsic landmark of it." They then quote the conclusion of Campos and his colleagues that emotions can best be understood as adaptive social interactions between an individual and her environment.[451]

Greenspan and Shanker go on to cite the more recent work of, dynamic systems theorists, such as Dan Messinger, Alan Fogel, and Laurie Dickson, they; "… have found that different smiles become associated with different kinds of pleasurable activities, and indeed, with different kinds of pleasure. There is the pleasure of anticipation; the pleasure of engagement; the excitement of a particular activity; the release from built-up tension (as in tickling) or suspense (as in peek-a-boo) and, of course, the pleasure of enjoyable sensations. Furthermore, the infant experiences the pleasure of observing her caregiver's pleasure and of seeing the effects of her own behaviour on her caregiver, including the effects of her facial expressions on her caregiver's facial expressions. And finally, there are the physical sensations that the infant experiences concerning the caregiver's own physical state (relaxed, tense, anxious)." Of their own research they say: "We have observed that infants initially experience a limited number of global states, for example, calmness, excitement, and distress. A caregiver's nurturing pleasurable and calming interactions enable the infant to experience soothing pleasure and interest in the caregiver's sounds and sights and in movements such as turning to look at the caregiver."

Greenspan and Shanker then explain how these 'global emotional states' become differentiated into individual

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[451] Greenspan, Stanley, and Shanker, Stuart, 'The First Idea', 2004, Da Capo Press, p.45-47

temperaments; "… certain emotional proclivities, such as pleasurable interest in soothing sounds, begin to differentiate from these global states. As their nervous systems develop, in part because of nurturing interactions, and the capacity to discriminate differences and organise patterns develops further, infants begin to further differentiate and elaborate these global states. They do this through continuing interactive experiences with their caregivers if the interactions provide enough subtlety rather than global reactions. For example, as caregivers respond to their infants' interests with their voices and faces using a range of emotional expressions (different types of smiles and joyful sounds), we often observe the infant expressing a range of pleasurable smiles and a deepening sense of joy and security."[452]

Panksepp, Homeostasis and Emotional 'Tools for Living'

An example of 'Cart-Ton world's' 'top-down' computational theory of mind is identified by Jaak Panksepp: he points out that (as described in the previous chapter) mainstream emotion theories claim that raw, basic emotions, in order to be experienced, need to be 'read out' by 'higher' areas of the brain. In contrast, Panksepp insists that our experience of emotions happens, immediately and directly in the deep brain: it doesn't need to be 'moved up' to the higher brain for processing and analysis before it can enter our consciousness. Panksepp says: "Of course, higher cortical functions may add other types of feeling, especially by allowing raw feelings to penetrate and intermingle with cognitions - higher brain functions may 'listen' to the lower

[452] Ibid, p.47-51

ones and add additional cognition-parsed affective colouring to experience. In this way, a variety of more subtle, higher-order feelings may be created by secondary and tertiary psycho-affective processes - such as courage, envy, guilt, jealousy, pride, shame, and social disgust/disdain, to name just a few ...”[453] Again, as per last chapter, Panksepp coined the term ‘affective neuroscience’, as the name for the field that studies the neural mechanisms of emotional affect. He worked mainly as an animal experimentalist but later became interested in psychotherapy. As a neuroscientist, Panksepp holds two extremely unorthodox positions; firstly, he believes that all mammals (and possibly other species) experience conscious, subjective emotions (‘affect’), just as we do. Secondly, he believes that our subjective experience of emotion is directly generated by the evolutionarily primitive, deep structures in the brain (sometimes called the limbic system), which we share with other mammals.

My claim here is that Panksepp’s theory of emotion (which is based on his neurophysiological experiments) ‘fits with’ and supports Whit-Tum world’s ontology, while it challenges and undermines that of Cart-Ton world. Panksepp claims to have discovered seven basic emotional systems in the mammalian brain: these are; SEEKING, RAGE, FEAR, LUST, CARE, PANIC and PLAY (capitalisation taken from Panksepp). The human neocortex, with all its cognitive complexity, processes these primary affects into more elaborate emotions, such as love, shame and empathy. Panksepp’s basic evidence for these core emotional systems is as follows: 1) Opiates, and other drugs of abuse, are also at-

[453] Panksepp, Jaak,‘The Archaeology of the Mind’, 2012, New York, W.W. Norton and Company, p.400

tractive to other mammals. 2) Brain scanning shows remarkable similarities in basic emotions in humans and other mammals. 3) The anatomy and neurochemistry of these subcortical areas is remarkably similar in all mammals and is clearly evolutionarily homologous. 4) The areas of the brain that evoke consistent behavioural indicators of positive and negative affective states in humans and mammals are remarkably similar and when electrically stimulated produce the most powerful 'feelings' in deep, subcortical areas. 5) Evolved common sense suggests that emotion is an evolutionary extension of homeostasis, and that cognition is an extension of emotion. The mammalian brain has evolved to seamlessly integrate these three levels as HOMEOSTASIS – EMOTION – COGNITION. The homeostatic mechanisms are largely unconscious, but the two others evolved into conscious, emotional feedback systems to let the animal know how things are going (well, or badly). It is likely that affects, or feelings are the only true reinforcers, a view which contrasts with the Behaviouristic assertion that outside events can reinforce behaviour with no associated feelings.

Panksepp also believes that the affective, evolutionary 'tools for living' are quite similar in all mammals. We (and possibly other mammals) use an embodied 'core SELF' to engender organismic coherence. He also suggests that an understanding of this 'embodied self', grounded in the body and its neural representations, may provide an understanding as to how experience first emerged in mind-brain evolution. Early in brain evolution, a primordial, neural map of the body emerged in order to facilitate the overall coherence of many different functions, from action tendencies to the autonomic changes that accompany actions.

Panksepp, along with Antonio Damasio, calls this body map a primitive 'proto-self'. According to Panksepp, this evolved, with the emergence of primary-process emotional and motivational systems, into a more complex organ of mind, the 'core SELF', which integrates primal experiences such as raw sensory, homeostatic, and emotional affects. "The coherence of the core SELF may allow people and animals to have a fundamental sense of owning their affective experiences: The affects are an integral part of who they are, psychologically." Panksepp points out that these brain-mind substrates are, in fact, what the Behaviourists decided to call the 'rewards' and 'punishments' that 'reinforced' behavioural change, though for doctrinaire reasons they denied that they comprised any subjective 'feeling' dimension. Ironically, as Panksepp argues, it's precisely these affective aspects which enable emotions to act as rewards and punishments and, consequently, have the effects that they do.[454]

Panksepp's suggests that, with a bit of poetic license, the core-SELF might even be referred to as our animal 'soul'. He also describes the core-SELF as a primary process of the mind: a coherent centre of gravity for internal, organismic visceral-affective and external sensory-motor representations. (I'll later call Panksepp's core-SELF, the 'Centre of Affective Reaction'.) Panksepp is insistent that, in evolutionary terms, the emotional self, based on body maps linked to the seven basic emotional systems, came first - before the 'cognitive self', which could deal with the distance perceptions of hearing and seeing: "During early phases of MindBrain evolution, fairly simple sensory con-

[454] Ibid, p.390-400

nections between the affective core-SELF networks and the external world may have sufficed (e.g., the 'low road' of fear conditioning). However, the utility of ever-more sophisticated distance receptors such as those for cortical hearing and vision, and the capacity to strategise with that information, paid off handsomely in later BrainMind evolution." What Panksepp is suggesting here is that the affective core-SELF (a 'neurosymbolic matrix of the primordial body') evolved earlier than sophisticated distance receptors and their neocortical analysers. This was the basis in the brain for the division between primary affective and higher cognitive mechanisms. In addition, from an evolutionary perspective, it's possible that affects may have guided the construction of many sensory-perceptual abilities: "If this scenario is on the right track, we will never fully understand higher forms of consciousness without first deciphering the more primal affective forms." Note that, in addition to coming first, the emotional self is the basis for a spontaneously active and emotionally responsive organism.[455]

Panksepp argues that the core-SELF has a fundamentally emotional form of consciousness, without any propositional content: "The arousal of each of the seven basic emotional systems may result in characteristic large-scale patterns of neural firing for each emotion." He claims that the evidence suggests these neural oscillations may generate the different affective arousals, which can provide a large variety of positive ('rewarding') and negative ('punishing') states of the nervous system.[456] Clearly, Panksepp (who died in 2017) never heard of either Cart-Ton or Whit-Tum worlds

[455] Ibid, p.389-398

[456] Ibid, p.404

(terms which I have coined in the writing of this book) and his ‘explanations’ of affect, Prehension and consciousness were all couched in terms of neurophysiological processes which made no appeals to ontological concepts. However, he did (against the mainstream of his discipline) promote; a) the universalistic presence and importance of ‘affect’ (the subjective experience of emotion), and b) the idea that affect ‘emerges’ structurally much ‘deeper down’ and evolutionarily much earlier than the prevailing ‘Cart-Ton’ versions of science would concede. The thesis of this book is, of course, that affect, Prehension and consciousness (or at least the ‘raw materials’ out of which they are constructed) go ‘all the way down’ to the very building blocks out of which the entire universe and everything in it are constructed. So, it is no disrespect to Panksepp to note that, while his work (as I’ve claimed here) clearly pointed in the direction of Whit-Tum world, it failed to solve the ‘Hard Problem’ of explaining qualic sensation. The claim of this book is that the ontology of ‘Whit-Tum world’ does achieve exactly this.

How ‘Whit-Tum’ Can Overcome the Shortcomings of ‘Cart-Ton’ World

I want to make some bold claims about how the concept of ‘Prehension’ (as defined in the Whiteheadian sense above) challenges the conventional views of Cart-Ton world as to how the human organism interacts with its environment: as we saw in chapters two and three, Cart-Ton world’s first major, post-dualist attempt at this was the doctrine of Behaviourism, which specifically banished any notions of mind and consciousness and reduced the origin of all behaviour to simple ‘stimulus and response’ mechanisms. leading to the ‘reinforcement’ of successful behaviours otherwise called learning. The advent of the computer was mainly responsible for Cart-Ton world's second effort, namely Cognitivism. This, however, necessitated a return to all the traditional philosophical problems of intentionality: for example, how can 'dead' matter and its mechanistic processes ever be 'about' something else? This can be described as the problem of representation. In a nutshell, I want to argue that the Whiteheadian concept of Prehension, as presented in this book, can overcome the shortcomings of both these 'Cart-Ton' approaches: firstly, as Panksepp points out (and as we'll look at in detail later), the problem with Behaviourism's reliance on simple 'stimulus and response' mechanisms was their insistence on excluding subjective experience from such mechanisms. Whereas in Whiteheadian Prehension, subjective experience (and especially affect) is built into all the components of the Prehension mechanisms and 'goes all the way down' to the most basic level of their, and all reality. As (again) we'll see later from Panksepp, the involvement of affect makes these mechanisms much more plausible as a basis for learning, and, consequently for flexibility of behaviour. Secondly, as to the problems of intentionality and representation, Whitehead's conception of Prehension, incorporating (as it does) experience into the very fabric of reality, has no problem as to how one part of reality can 'be about' another, i.e., can have experience of another part. In other words, Whit-Tum world can provide a non-representational version of intentionality via Prehension.

To end this chapter on synthesising Whit-Tum world I'd like to make two points about ontologies: firstly, ontologies, just like scientific theories, are simply products of human imagination. And, similarly ontologies, just like scientific theories, are never directly tested: hypotheses generated from a theory may be subjected to empirical testing, but never the theory as a whole. If enough hypotheses fail, the theory may have to be re-imagined and so might any ontology associated with them. In other words, scientific theories and ontologies have a lot in common: both products of imagination and both subject to revision in the face of empirical findings. Admittedly, ontologies may be less closely coupled to hypotheses than theories, but ontologies which are formulated within scientific culture are affected by empirical findings. For example, it's clear that Whitehead would not have developed his very complex and innovative ontology if the dramatic findings of the 'new physics' had not emerged. Secondly, I revert to my earlier claim that both Whit-Tum and Cart-Ton worlds qualify as the sort of thought systems which Thomas Kuhn defined as 'paradigms'.[457] These, in Kuhn's view, are not simply a summary of the current theories in the relevant sciences (or other areas of research), but rather can constitute entire worldviews, with regard to the particular areas of study in which they are applied. One claim for the importance of paradigms is the proposition that they constrain the exercise of imagination and in particular 'thought experiments', and here I want to emphasise that thought experiments are not the exclusive province of intellectual giants, such as Albert Einstein and Bertrand Russell; they are also a mass-level phenomenon. 'Ordinary people', when they think about mind and consciousness or physics and philosophy, also have recourse to imagination and thought experiments, and, therefore, those who've been brought up under the intellectual hegemony of Cart-Ton world will be limited in their

[457] Kuhn, Thomas, 'The Structure of Scientific Revolutions', 1962, Chicago U.P.

imaginings to what is regarded as possible within that particular worldview. Overcoming these limitations is certainly one of the major ambitions of this book.

Let me end part three, which has mainly been about how the advent of quantum mechanics has challenged the ontological hegemony of Cart-Ton world, by noting a comment from a peer-reviewer to an earlier version of my theory: in a report on a paper I had submitted to an academic journal, he (apparently seriously) invoked the old Cart-Tonist chestnut of the ‘two mysteries’; i.e. the simplistic notion that because both consciousness and quantum mechanics are mysteries, they must be related to each other. This tired old cliche is used as an excuse to dismiss any suggestion that quantum theory may have a role to play in explaining the nature of consciousness. Let me suggest that the combined contents of the ten chapters in parts three and four of this book bear witness to the fact that there is vastly more to say about the relationship between quantum and consciousness than the observation that they are both currently mysteries.

Part Four: Consciousness in Whit-Tum World

In the fourth and last part of the book I revisit a number of previous themes, mainly qualia, the self and free will, but this time from the perspective of Whit-Tum world, as constructed in part three. I start part four, however, with a chapter on the best known and most developed theory of 'quantum' consciousness, that of Roger Penrose and Stuart Hameroff, presenting both it and my various criticisms. The last chapter serves as a summary of my theory as to the nature and function of consciousness.

Chapter Fourteen: 'PenOff' - Consciousness via Physics?

As per the last chapter, the ontology I'm advocating in this book, 'Whit-Tum world' (as its abbreviated name implies) is an amalgam of Whitehead's philosophy and quantum mechanics. So, in this chapter, I'm moving on to take a detailed look at the best known 'quantum' theory of consciousness. Arguably the most developed quantum theory of consciousness is that of the Oxford theoretical physicist Roger Penrose and the American anaesthesiologist Stuart Hameroff. (Their theory is often abbreviated as 'PenOff'.) PenOff's basic thesis is that consciousness arises from the orchestrated objective reduction of quantum super-positions. (The word 'orchestration' in this phrase refers to a process through which, according to PenOff, connective proteins, associated with microtubules, influence or orchestrate the quantum state reduction. This speculative idea is based on Penrose's particular interpretation of quantum mechanics.) They posit that these reductions occur within the microtubules of neurones. Microtubules are part of the structure of all cells, but according to PenOff, in neurones, their tiny inner spaces provide the shelter, from high temperature and other disturbances, necessary for quantum coherence to take place (further explanation of PenOff, below).

There's a definite, if tenuous, connection between PenOff and Whitehead's ontology: for example, in a personal correspondence with the British psychologist, Jeffrey Gray, Hameroff claimed an inheritance from Whitehead: "We address The Hard Problem through a philosophical approach known as pan-experientialism, dating to Whitehead, who saw consciousness as 'occasions of experience' in a wider, basic field of proto-conscious experience. In our view the 'wider field' is fundamental space-time geometry - the fabric of the universe which is everywhere at the Planck scale. Consciousness is a series of events - quantum state reductions - in quantum space-time."[458] As we shall see below, this theory has attracted an avalanche of critical attack from Cart-Tonist in particular and the scientific establishment in general (though Jeffrey Gray apparently holds out modest hopes for it). While clearly falling within my theoretical 'ballpark', I criticise it on two grounds: firstly, for the 'failure of ontological nerve', of which I earlier accused the founders of quantum mechanics - to my knowledge, neither Penrose nor Hameroff has produced a clear and coherent quantum ontology. (Nothing, for example, that could compare to Whitehead's.) Consequently, whatever empirical evidence they appeal to is immediately exposed to the withering fire of the Cart-Tonist, whose ontology forbids anything close to what they're suggesting. Secondly, the theory doesn't avail itself of Whitehead's profound insight that 'experience' goes all the way down to the ultimate building blocks of the universe. Consequently, they introduce unnecessary 'moving parts', such as the curvature of space/time and quantum gravity, to explain the 'raw material' of consciousness, which for Whitehead is simply a 'brute' fact of reality. (I'll expand these two points at the end of the chapter.)

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[458] Gray, Jeffrey, 'Consciousness: Creeping up on the Hard Problem', 2004, Oxford U.P., p241

Having made all these rather dismissive comments, let me say something by way of justification for including a chapter on PenOff. As will be clear from the beliefs I've espoused thus far, I'm deeply committed to the basic principles of Whitehead's ontology. As per chapter twelve, David Ray Griffin (2007) characterises these as, 'Pan-Experientialism with Organisational Dualism'. The implications of this term are that Whitehead is ***not*** advocating panpsychism, i.e. the doctrine that consciousness itself is implicit in all matter. Rather his claim is that 'experience' is inherent in the fabric of reality. I've commented previously that I'm not particularly happy with this term. I prefer 'sentience' or 'feeling'. PenOff uses the term 'proto-consciousness'. I'm not really comfortable with this either: as with 'experience', it implies a complex, constructed entity rather than a brute fact of actuality, which reinforces my suspicion that the PenOff partners, while paying homage to Whitehead, don't really subscribe to his conviction than sentience is inherent in reality. So (using my terms), the second half of Griffin's description, 'Organisational Dualism' entails that some process or mechanism is required to 'convert' the inherent sentience into, for example, mammalian consciousness.

It is here, I believe, that PenOff can act as an 'intermediate' theory, namely an attempt to describe and explain what these 'conversion' processes or mechanisms might be. In other words, I believe that solving the problem of consciousness requires first and foremost the making of an ontological leap of faith; accepting (as William James and Whitehead did) that sentience and feeling are inherent in the fabric of reality. (I don't believe that anything short of this can solve the 'Hard Problem' of consciousness, i.e.

how mechanical movement by 'dead' matter can produce sentience.) The second part of the problem then becomes; how does the sentience of, for example an electron, contribute to the generation of what we experience as human consciousness? It's here in the second half of the problem that PenOff can make a speculative contribution.

Consciousness: An Explanation from Physics?

Penrose and Hameroff initially developed their ideas separately and later collaborated to produce PenOff in the early 1990s. Penrose's argument stemmed from Gödel's incompleteness theorems. In Penrose's first book on consciousness, 'The Emperor's New Mind' (1989), he argued that while a formal system cannot prove its own inconsistency, Gödel's unprovable results are provable by human mathematicians. He took this disparity to mean that human mathematicians are not formal proof systems and are not running a computable algorithm. (According to a number of theorists, this line of reasoning is based on a fallacious equivocation on the meaning of computation.) Penrose concluded that wave function collapse was the only possible physical basis for a non-computable process. Dissatisfied with its randomness, Penrose proposed a new form of wave function collapse, which occurs in isolation. He called it 'objective reduction'. He suggested each quantum superposition has its own piece of spacetime curvature and that when these become separated by more than one Planck length they become unstable and collapse. This process creates 'proto-consciousness'. Penrose suggested that objective reduction represented neither randomness nor algorithmic processing but instead a non-computable influence in spacetime geometry from which mathematical understanding and, by later extension, consciousness derived.

Penrose's proposal that non-computable processes are important in higher mathematics, and other conscious activities, represents a radical rejection of the computational theory of mind and consciousness. As psychologist, David Rose says, Penrose; "… argues against our ability to simulate consciousness on computers. There are mathematical theories which state that certain problems are 'undecidable': some puzzles cannot be solved ever, in principle. Penrose (1989) suggests that we cannot even write, let alone solve, a mathematical description of consciousness, because this is one of those problems. You couldn't even simulate consciousness on a computer, because the mathematical problems at the quantum level are undecidable. Thus the idea of functionalism, that you can simulate consciousness on a computer … is excluded."[459]

Hameroff provided the suggestion that microtubules would be suitable hosts for quantum processes. Microtubules are long hollow tubes of protein running across the inside of cells. One traditional theory about microtubules is that they hold the structures of cells in position and maintain its integrity and motility (together with microfilaments and intermediate filaments). There is evidence to suggest that they also transport proteins and other materials within the cell: synaptic vesicles, for example, thought to move along microtubules towards the synapse. Microtubules are composed of tubulin protein dimer subunits. (Dimers consist of two identical molecules linked together.) The dimers each have hydrophobic pockets that are 8 nanometres apart and that may contain delocalised electrons. (These are electrons in a molecule which are not associated with a single atom.)

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[459] Rose, David, 'Consciousness; Philosophical, Psychological and Neural Theories', 2006, Oxford U.P., p.155

Hameroff proposed that these delocalised electrons are close enough to become entangled. He also suggested that the tubulin-subunit electrons would form a Bose-Einstein condensate. Such condensates are the most ordered form of condensed matter possible. The crucial distinguishing feature of Bose-Einstein condensates is that the many parts which constitute this ordered system. Bose-Einstein condensates, as Zohar explains; "… not only behave as a whole, they become a whole - their identities merge or overlap in such a way that they lose their individualities entirely."[460]

Hameroff also proposed that the condensates in one neurone could extend to many others via 'gap junctions' between neurones, forming a macroscopic quantum feature across an extended area of the brain. The idea was that when the wave function of this extended condensate collapsed, it would generate consciousness via proto-experience, which the theory believes is embedded in the geometry of spacetime. This process is also the proposed source of the non-computational access to mathematical understanding, required in Penrose's theory. David Rose expresses these ideas as follows: "Penrose points out that there is an unusual mathematical structure to the microtubule molecules. Penrose's suggestion is that they can undergo a kind of resonance, such that quantum wave functions are generated within the microtubules."[461] In other words, PenOff claims that when you make a decision or have an experience, this involves collapsing of wave func-

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[460] Zohar, Danah,'The Quantum Self', 1990, Harper Collins, p.65/66

[461] Rose, David, 'Consciousness; Philosophical, Psychological and Neural Theories', 2006, Oxford U.P., p.155

tions and their resolution into some particular state of microtubule proteins.

A Psychologist's Account of PenOff

As the psychologist Jeffrey Gray puts it, PenOff claims that microtubules in neurones are the only locations which are likely to provide the conditions for objective reduction of quantum super-positions: "In this way, the theory manages neatly to find proto-consciousness in the very fabric of space/time, while yet limiting full-blown qualia to just those systems - brains - where we know them to be housed." (A theoretical feat also achieved by Whitehead's ontology.) In other words, PenOff claims that 'proto-conscious' qualia are embedded as quantum superpositions in the fundamental geometry of space/time at the Planck scale: when a superposition of quantum states self-collapses (i.e. objectively collapses) into just one of many possible states, that particular state becomes fully conscious. The other states (into which the quantum function did not collapse) had the capacity to become conscious, but they did not; they were merely 'proto-conscious'.

Gray comments that consequently; "… we should find proto-conscious qualia wherever there are quantum superpositions. It turns out, however, that this prospect is a lot less pan-psychic than it seems. Proto-consciousness may be everywhere you look, but not consciousness itself." And why should this be the case? "Because you need a superposition large enough to reach threshold in a reasonably short time (to avoid de-coherence). An isolated electron in superposition wouldn't reach threshold for l0 million years." But, as Gray points out, a large superposition is difficult to isolate. Providing a solution to this difficulty is the ingenious part of the PenOff theory: it postulates that large superpositions are protected inside the protein structures of microtubules such that they reach the threshold of collapse in a time short enough to preserve quantum coherence.

As Gray explains; “Proteins are fairly large mass-wise (compared to electrons) and have the unique property of having their mechanical conformational state sensitive to quantum level events like location of electrons, so they are the ‘levers’, or amplifiers. They are large enough to exert action in our macroscopic physical world, but small enough to be in superposition and sensitive to quantum level events.” In other words, the protein in microtubules acts as a ‘converter’ - turning quantum states, which ‘contain’ proto-qualia, into truly conscious qualia which can be experienced at the macro-level. One of Gray’s major criticisms of the quantum-mechanical model of qualia generation, is that it fails to explain how the different types of qualia (shape, colour, sound, sell, taste, touch, etc.) are produced.

The theory proposes that qualia enter into consciousness when a quantum wave function collapses. It then postulates that a reduction in a given region gives rise to the corresponding type of qualia. But, as Gray points out, there’s no reason within the quantum mechanical model to link a given type of qualia with a given region: “The model gives an account of the event (orchestrated objective reduction of the wave function) that causes something or other to enter consciousness, but not of what.” The explanation of what kind of qualia is generated is, as Gray says; “… smuggled into the model by way of knowledge stolen from elsewhere.” By this reference to stolen knowledge, Gray is pointing to the already well-established correlation between certain kinds of qualia and certain areas of the brain, for example, area V4 gives rise to the experience of colour. But, PenOff's quantum explanation fails to identify any mechanism which could account for this fact. As Gray puts it: "All we do have is a series of brute correlations between, on the one hand, activity in this or that part of the brain and, on the other, the occurrence of this or that kind of qualia."[462]

Given this, it seems to be the case that this quantum-mechanical correlation with qualia merely shadows the other two kinds of non-explanatory correlation in mainstream, Cart-Tonist theories, i.e., that between qualia and functions and that between qualia and neurophysiology: for example, the correlation between colour qualia and area V4 of the brain. Gray complains that all we end up with is the idea that qualia has three sets of non-explanatory relationships, with, respectively; functions, neurophysiology and quantum mechanics. As Gray insists; "… the presence of a systematic relationship, on its own, is no more than a 'brute correlation'. To advance to the status of a scientific theory, one needs an account of just why the systematic relationship takes the form that it does. No-one has yet achieved this for the brute correlations of either function or neurophysiology with qualia, whether these are considered separately or jointly. Is there any reason to think that a brute correlation between quantum-mechanical processes and qualia would fare any better?"

Gray speculates, however, that there might indeed be something more to be hoped for from the PenOff theory. He

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[462] Gray, Jeffrey, ''Consciousness: Creeping up on the Hard Problem', 2004, Oxford U.P., p.255/256

says: “Both functionalists and physiologists have so far been content to rest with their correlations as indeed brute. Neither have anything at all to say about the nature of qualia. These just are - either identified with function or, in Sechenov's graphic phrase, ‘secreted’ by the brain. The Penrose-Hameroff theory, in contrast, does say something about the nature of qualia. They are ‘super-positioned patterns embedded in fundamental space/time (Planck scale) geometry,. To be more accurate, a quale is the particular one among these proto-conscious patterns chosen at any given moment to achieve quale-hood due to orchestrated objective reduction in a microtubule system located in a sufficiently highly organised brain.” Gray comments that this does indeed represent progress, albeit modest, over the other two forms of brute correlation: “To say something about the nature of qualia is already an advance - it at least recognises that something needs to be said.”[463]

Qualia Determined by Space/Time Curvature

Gray asks what advantage does the PenOff theory derive from linking ‘proto-qualia’ to the fundamental fabric of space/time? The answer, he suggests, is that a particular quale can be characterised by a particular proto-conscious pattern in fundamental space/time. This provides an explanation for the differentiation of qualia across, for example, different sense modalities. Gray produces an extended, practical illustration in an attempt to describe exactly how PenOff achieves this advance of being able to explain the origin of individual quale. He imagines that he and another person are looking at a red kite flying in a blue sky: “Let’s also assume that our brains are constructed in a suf-

[463] Ibid, p.257

ficiently similar manner (due to evolution) that we experience the red flying kite in much the same way; that is, we experience the same qualia". The PenOff theory explains this congruence of perception as follows: in my brain, a set of quantum superpositions have self-collapsed inside a set of microtubules, which are, in turn, inside a set of neurones in the visual system in my brain. These quantum collapses have accessed a 'chosen' state in fundamental space/time. If we both have the same qualia, then these same processes must also have happened in your brain: "Since the theory states that qualia are embedded in space/time then, if you and I experience the same qualia, our brains must have both accessed the same state in fundamental space/time." My comment here is that the idea that different types of qualia (shape, colour, sound, smell, taste, touch, etc. arise from different states of 'curvature in space/time', is, in essence, quite simple. The big question is rather how do microtubules in different areas of modality in the brain 'know' which curvatures of space/time to access to get the 'right' qualia?[464]

Neither Penrose and Hameroff, nor Gray provide any clear, or at least comprehensible response to this question. I think, however, that two, highly speculative answers can be found; one from Gray and one from PenOff. They both indicate that what Gray calls the 'conformational arrangement of the microtubules', in effect decide which 'qualic quantum states' get accessed. Gray's explanation as to why microtubules should adopt one shape or another, seems to depend on neurophysiology: he starts by simply saying that: "Specific patterns in space/time give rise to specific

[464] Ibid, p.256/257

qualia. So the qualia accessed by V4 (colour) must differ from those accessed by V5 (motion) because the corresponding patterns of space/time superposition differ." [465]These patterns are determined by different conformational arrangement of the microtubules which might be super-positioned in each region. These, in turn, depend on at least two factors: first, there are local differences in the neuronal organisation in V4 and V5; second, there are differences in the neuronal connections to V4 and V5 from other regions. The PenOff answer identifies connective proteins, associated with microtubules, which it claims, influence or orchestrate the quantum state reduction, based on Penrose's particular interpretation quantum mechanics.

Two Brains Accessing the Same Space/Time Curvature!

Back at his 'kite-flying' example, Gray explains that all the relevant quantum-qualic events are taking place in two separate brains, yours and mine. Within each brain the only way to access fundamental space/time is via that particular brain. Gray then revisits Penrose's initial description of the nature of super-positioned quantum states; "… they are multiple curvatures in space/time which exist until self-collapse, whereupon space/time takes up one final state of curvature". This means that; "… when you experience a red flying kite, somehow space/time in your brain adopts a state of curvature that it didn't have before." And, Gray insists, if both people are experiencing the same qualia, the microtubules in the appropriate areas of each brain must be accessing the same final state of space/time curvature, in order to produce the same qualia in two different individu-

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[465] Ibid, p.256/257

als. Gray explains how PenOff's linkage between qualia and curvatures in space/time can provide solutions for some of the traditional problems associated with the concept of qualia: firstly, the difficulty of the vastness of qualic experience - how can this be encompassed within the physical universe? Gray starts by pointing out that there are roughly 10^{107} Planck volumes in a human brain and that each of them can; "… theoretically, be in one of a very large number of states, depending upon such factors as the edge length and the 'spins' of the edges." If then, according to PenOff, one quale might be one pattern and another quale, a different such pattern, then, in principle, the theory allows for the physical production and storage of an infinite number of quale. Gray next looks at the traditional problem of whether qualia should be conceived of only as single, isolated sensory 'atoms' or whether, for example, very complex multi-modal scenes can also be accepted as qualic experiences: Gray says that, according to PenOff; "… when self-collapse occurs, only one pattern is chosen, but that pattern is a very complex entity. In this way, the theory attempts to provide a physical basis for both the simplicity of relatively isolated qualia (the sound of a high C played on a flute) and the complexity of a total conscious multi-modal 'scene'."[466] In other words, the pattern of curvatures in space/time can be relatively simple or very complicated according to whether the quale they are generating is simple or complex.

David Rose, also, questions the traditional idea that qualia; "… are actually atoms - isolated, individualisable elements of experience." He asks whether the feeling of 'wanting to go on holiday' is a pure experience - can it be treated as

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[466] Ibid, p.258/259

such independently of other qualia? The traditional ideas of Locke and Hume would deny this. For them qualia are basic elements which can, through association, be linked together to form complex concepts, but such concepts would not then count as qualia. However, Rose argues that our experiences are generally more ‘Gestalt-holistic’ and that we never experience, or perhaps cannot (either in principle or in practice) experience, isolated sensations or raw feelings. Rose concludes that: “Experience is always a very complex whole and is based on a mass of information coming in all the time.”[467] However, Rose makes no attempt to explain how this mass of incoming information produces qualia. Whereas, as Gray describes above, PenOff can provide a physical basis for both isolated qualia (high C played on a flute) and the complex multi-modal ‘scene’, Rose is describing here.

So despite being mildly enthusiastic about PenOff, Jeffrey Gray does have serious reservations: he points out that in contrast to functional and neurophysiological theories of qualia, quantum-mechanical theories lag far behind in terms of empirical research: “No-one has yet even measured any quantum-mechanical process in a manner that would allow it to be correlated with sensation. The processes pointed to by Hameroff and Penrose are, in their application to brain tissue, almost entirely theoretical; and their relationship to any kind of sensation is asserted merely by proxy.” On the other hand, he’s fairly confident that, as science progresses, such measurements will be achieved. Then we may find that quantum super-positions of the right kind, and their self-collapses at the right time,

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[467] Rose, David, ‘Consciousness; Philosophical, Psychological and Neural Theories’, 2006, Oxford U.P., p.49

take place just as the theory says they should. At that point says Gray: “We would now have the systematic relationship with sensation needed to lend plausibility to a quantum mechanical starting point.” Gray concludes that: “Despite its magisterial complexity, then, we see that, in the end, the Hameroff-Penrose theory of how different quantum superpositions in microtubules in different brain areas give rise to different qualia must rely for the origin of these differences on arguments taken from neuroanatomy and neurophysiology.” Gray also argues that the theory is incomplete: “It offers no account of how differences at the Planck scale might relate to differences between qualia; nor of how differences in space/time in one brain might relate to differences in another brain observing the same scene at the same time.” I find these judgements a little harsh, especially the second one (see below). But Gray does add some redeeming comments in PenOff’s favour: “Nonetheless, the theory does offer an account in principle of the origin of differences in qualia. Whether even this is testable in practice is another matter. But quantum mechanics has a habit of taking the absurd, putting it into a laboratory experiment and showing the absurd to be reality. So we should not write the Penrose-Hameroff position off too lightly. And even an account in principle of how qualia might arise is better than no account at all.”[468]

Cart-Tonists Condemn PenOff

As part of a harsh critique of PenOff, the philosophers, Rick Grush and Patricia Churchland identify a group of people who are emotionally upset by reductive-materialist theories of mind and consciousness: such people, they say;

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[468] Gray, Jeffrey, ‘Consciousness: Creeping up on the Hard Problem’, 2004, Oxford U.P., p.256-259

"… have a negative 'gut' reaction to the idea that neurones - cells that you can see under a microscope and probe with electrodes, brains you can hold in one hand and that rapidly rot without oxygen supply - are the source of subjectivity and the 'me-ness of me'." Neurones process and store information simply by ions passing back and forth across neuronal membranes through protein channels. Compared to the 'me-ness of me' this seems to be; "… disappointingly humdrum - even if there are lots of ions and lots of neurones and lots of really complicated protein channels."[469] Grush and Churchland claim that the PenOff theory is using the gullibility of such people to promote itself. Penrose and Hameroff respond to this by referring to the work of Antonio Damasio (1994). This suggests that people's emotional sub-conscious, mediated by the brain, via the autonomic nervous system in their 'gut', can provide them with useful information. Penrose and Hameroff then say that: "Our model suggests the emotional sub-conscious may derive from 'Platonic' quantum computing (Shadows, p. 414). Perhaps the 'explanation' is that some people are capable of perceiving subconscious 'gut' feelings, and others are not!"[470]

Another line of attack that Grush and Churchland pursue concerns reductionism: they ask: "Why should it be less scary, reductionist or counter-intuitive that 'me-ness' emerges from the collapse of a wave function than from

[469] Grush, Rick, and Churchland, Patricia, The Journal of Consciousness Studies [JCS], article, No.1, 1995, p.27/28

[470] Penrose, Roger, and Hameroff, Stuart, The Journal of Consciousness Studies [JCS], article, No.2, 1995, p.110

neuronal activity?"[471] In other words, their suggestion is that the explanation of consciousness offered by the PenOff theory, even if true, would still be just as reductive (and, indeed, materialist) as the neural-cognitive theories which PenOff opposes. (This was also my point in the introduction to this chapter: PenOff tends towards ontological failure of nerve and a consequent scrabbling for mechanical explanations for the existence of consciousness.) Penrose and Hameroff respond to this as follows: yes, they concede, microtubule functions are neuronal activities. "However, it is somewhat appealing to see how the phenomenon of consciousness could tie in with the behaviour of the universe at its deepest levels, and be relevant even to the very geometrical structure of space-time."[472] I think that what they're arguing here is that there are different types of reduction: the neural-cognitive theories reduce consciousness to local, isolated physical events. PenOff, on the other hand, links consciousness with the most profound and fundamental processes in the universe. As to the implication that PenOff is just as materialist as Cart-Tonist theories, hopefully, the arguments in part three of this book have dismissed the notion that any quantum theory of consciousness can ever be regarded as simply 'materialist'. I'm referring here to Whitehead's ontology, which, following Stapp, I believe is an indispensable underpinning of quantum mechanical theory.

The most eminent of the Cart-Tonist philosophers of consciousness, Daniel Dennett, has, of course, waded in to cri-

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[471] Grush, Rick, and Churchland, Patricia, The Journal of Consciousness Studies [JCS], article, No.1, 1995, p.28

[472] Penrose, Roger, and Hameroff, Stuart, The Journal of Consciousness Studies [JCS], article, No.2, 1995, p.110

ticise PenOff. Though, perhaps surprisingly, his critique is not wholly dismissive: Dennett first concedes that some basic enlargement of the ontology of the physical sciences may be called for in order to account for the phenomena of consciousness, and he acknowledges that this is just what Penrose was trying to achieve in ‘The Emperor’s New Mind’ (1989). While Dennett doesn’t believe that he succeeded in making the case for such a revolution, he adds that; “… it is important to notice that he has been careful not to fall into the trap of dualism. What is the difference? Penrose makes it clear that he intends his proposed revolution to make the conscious mind more accessible to scientific investigation, not less. It is surely no accident that the few dualists to avow their views openly have all candidly and comfortably announced that they have no theory whatever of how the mind works - something, they insist, that is quite beyond human ken. There is the lurking suspicion that the most attractive feature of mind stuff is its promise of being so mysterious that it keeps science at bay forever.”[473] Grush and Churchland, however, are not so convinced that PenOff disavows dualism: once again, they first identify a group of people who, though; “… intellectually, are materialists, nevertheless have strong dualist hankerings - especially hankerings about life after death.” They then suggest that quantum physics, as served up in the PenOff theory; “… seems more resonant with those residual dualist hankerings, perhaps by holding out the possibility that scientific realism and objectivity melt away in that domain, or even that thoughts and feelings are, in the end, the fundamental properties of the universe.” Explanations of something so important ‘as what makes me me?’ should,

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473 Dennett, Daniel,‘Consciousness Explained’, 1991, Boston, MA: Little, Brown, p.36/37

according to the intuitions of these tender-minded people, involve something more ‘deep’, mysterious and ‘other worldly’ than mere neurones: “Perhaps what is comforting about quantum physics is that it can be invoked to ‘explain’ a mysterious phenomenon without removing much of the mystery, quantum-physical explanations being highly mysterious themselves.”[474]

A Skyhook, Not a Crane!

And, of course, Dennett also has some serious objections to the PenOff theory. Dennett uses the term ‘skyhook’ to describe a theory that does not build on lower, simpler layers, but lazily relies on an unscientific and ‘miraculous’ cause. He contrasts such ‘skyhook’ theories, that require such miracles, with those based on ‘cranes’, i.e. structures that permit the construction of entities of greater complexity but are themselves founded solidly ‘on the ground’ of physical science. Dennett suspects that Penrose’s belief that consciousness will ultimately be explained by quantum gravity is, in fact, a skyhook theory: “Penrose proposes a revolution in physics, centred on a new - and still unformulated theory of ‘quantum gravity’, which he hopes will explain how the human brain transcends the limitations of algorithms. Does Penrose envisage the human brain, with its special quantum-physics powers, to be a skyhook or a crane? … He has definitely been looking for a skyhook. I think he'd settle for a new crane - but I doubt that he's found one.” Penrose’s faith in a quantum gravity explanation is in fact nothing but a clear and heartfelt hope for a skyhook. Dennett adds that; “… though we cannot yet rule out ‘in principle’ the existence of a quantum-gravity sky-

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[474] Grush, Rick, and Churchland, Patricia, The Journal of Consciousness Studies [JCS], article, No.1, 1995, p.27/28

hook, Penrose has not yet given us any reason to believe in one. If his theory of quantum gravity were already a reality, it could well turn out to be a crane, but he hasn't got that far yet, and I doubt that he ever will." However, Dennett does, once again, concede that Penrose wants his theory to provide a unified, scientific picture of how the mind works, rather than an excuse for declaring the mind to be an 'impenetrable Ultimate Source of Meaning'.[475]

Grush and Churchland contrast Penrose's Platonist mathematical ideas with evolutionary theory, pointing out that the latter works via 'Satisficing' rather than optimising. They ask whether there are any alternatives to a; "… Platonist ontology of mathematical objects (abstract, immutable objects - truths, numbers etc.) and its usual companion, an a priori epistemology of mathematics (grasping with the intellect the absolute and immutable truths in Plato's heaven)?" Their answer is yes; Evolutionary Biology. They argue that evolution is a Satisficer, not an optimizer. In other words, when 'designing' organisms, evolution is happy with 'approximately accurate' or 'accurate for most of the likely cases', rather than aiming for some abstract Platonic perfection. Grush and Churchland then say: "How humans come to have the conceptual and cognitive resources to develop formal systems, proof theory and mathematical certainty is a puzzle - though not, perhaps, more intractable than how we have the resources to read and write, to compose and play music, to skate, hang glide and perform eye surgery. The idea, therefore, that mathematical capacity is an independent faculty of pure reason, whose exercise yields mathematical (or any other absolutely certain) know-

[475] Dennett, Daniel,'Consciousness Explained', 1991, Boston, MA: Little, Brown, p.445-448

ledge by virtue of intuitive grasping of propositions and objects in Plato's realm, is wanting in biological plausibility."[476]

David Rose highlights the temperature problem for a quantum theory of consciousness: he raises; "… important doubts about whether the relevant quantum states can be created at normal body temperatures. Such States normally require very low temperature conditions and isolation from other systems."[477] In response the PenOff partners quote the work of the physicist, Herbert Fröhlich (1968, 1970, and 1975), who found that in; "… dipole biomolecules structurally confined in membranes, MTs (and ordered water on their surfaces) become excited coherently by biochemical and thermal energy. The excitations reduce to a common frequency mode …, somewhat like the quantum phenomenon of a Bose-Einstein condensate (Anderson et al., 1995). In Bose-Einstein condensates like superconductors, coherence is attained by extreme cooling to remove thermal vibrations; in lasers, and in the Fröhlich model, the coherence derives from energy pumping." At face value, this seems to contradict the objections about temperature and isolation. They also specifically link 'bio-quantum' processes to information processing: "Fröhlich coherence among (hydrophobic pockets within) MT subunits has been proposed as a basis for information processing via neighbour tubulin dipole interactions (e.g. as in a 'cellular automaton': Rasmussen et al.,1990). The coherent dynamics are viewed also to order water at MT outer and inner surfaces;

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[476] Grush, Rick, and Churchland, Patricia, The Journal of Consciousness Studies [JCS], article, No.1, 1995, p.20

[477] Rose, David, 'Consciousness; Philosophical, Psychological and Neural Theories', 2006, Oxford U.P., p.155-158

the cytoplasm can transiently assume a quantum coherent state."[478]

If Consciousness is Quantum, Why Have Intermediate Levels?

David Rose worries about the validity of PenOff theory making such a big leap between a very low level of description and a very high level of description such as consciousness. If nature does, in fact, make such a big leap, then what are all the intermediate levels for? For example, why do you need nerve cells and neural networks? Why are nerve cells the shapes they are? Why is the cortex anatomically different from the basal ganglia, and so on? Rose says that according to PenOff theory: "The process of cause and effect seems to leap over these intermediate levels." He also asks why interfering with these intermediate levels should affect consciousness: "Why does losing blood supply to the brain or giving someone a hallucinogenic drug affect their consciousness? There must be some relevant processes at the intermediate levels of synaptic neurotransmitters and anatomical structure." But, as Rose points out, PenOff does not specify what these processes are.[479] Woolf and Hameroff have, however, attempted to answer such questions. They suggest that neurophysiological processes, as revealed by conventional research, are all preconscious. These processes are what Rose, above, called 'intermediate' levels, and according to the neuroscientist, Nancy Woolf and Hameroff, they affect which neurones are involved in creating any given quantum wave function. The

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[478] Penrose, Roger, and Hameroff, Stuart, The Journal of Consciousness Studies [JCS], article, No.2, 1995, p.107/108

[479] Rose, David, 'Consciousness; Philosophical, Psychological and Neural Theories', 2006, Oxford U.P., p.158

proposal as to how this works is as follows: during the activation of a synapse, a chemical cascade is initiated within the dendrite. This turns on or off the ability of the microtubules to host quantum states, and thus determines whether or not that particular cell will generate consciousness. "Woolf and Hameroff further posit that the quantum wave function relevant to consciousness is not (usually) restricted to the microtubules within a single neurone, but is normally spread throughout the brain, or at least a region of brain. By opening and closing 'gap' junctions between dendrites, Woolf and Hameroff speculate, the spread of quantum waves between neurones is initiated and controlled. Once created, it is the collapse of a wave function that constitutes a conscious experience or a conscious decision. Thus, to explain consciousness fully, we still need to know about all the neuroanatomy, physiology and pharmacology."[480] Yet, as Rose insists the 'Hard Problem' remains: how does a collapsing a wave function lead to phenomenal experience, i.e. qualia?[481]

Raymond Tallis also criticises the whole idea that appealing to the strange properties of matter, as observed by quantum physicists, can make it seem more likely to accommodate mind. His major point is that the bizarre qualities of quantum mechanics are present in all things - both conscious and not. Tallis further criticises PenOff's suggestion that the unity of consciousness can be explained by 'quantum coherence' that would bind together activity across different parts of the brain: he says: "According to

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[480] Woolf, Nancy and Hameroff, Stuart, 'A quantum approach to visual consciousness', 'Trends in Cognitive Sciences' (journal), 2001, p.472-478

[481] Rose, David, 'Consciousness; Philosophical, Psychological and Neural Theories', 2006, Oxford U.P., p.155-158

them, quantum coherence is due to a particular structure in the neurones; namely, a folded membrane called the endoplasmic reticulum. Unfortunately, this membrane is seen in all neurones (including the vast majority of them that no one would accuse of being conscious) and in many tissues outside the nervous system and in the cells of organisms that are not conscious. There is also the little problem that macroscopic coherence in a warm, wet brain is somewhat short-lived: approximately 10-13 seconds, a rather thin sliver of time. This is not the kind of interval out of which you could get much sense of unity, or indeed coherence, never mind a biography."[482] (All these critics may founder on the Hard Problem, but, as claimed above, Whiteheadian Pan-Experientialism does not, see chapter twelve.)

Amoeba and Cockroaches Also Have Microtubules!

Rose also criticises the specificity of the PenOff theory in selecting microtubules as the location for the generation of consciousness: he points out that microtubules are, in fact, a component of all cells, from amoebae upwards; certainly small single-celled organisms have microtubules in them: "So does this mean that every organism that contains microtubules is conscious? Or is there something special about the microtubules in nerve cells, and if so, only in human brains or in animal brains as well?" And he complains that PenOff comes close to panpsychism.[483] (This appears to ignore the Whiteheadian distinction between Panpsychism and Pan-Experientialism.) Dennett expresses

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[482] Tallis, Raymond, 'Aping Mankind: Neuromania, Darwinitis and the Misrepresentation of Humanity', 2011, Routledge, loc:2570

[483] Rose, David, 'Consciousness; Philosophical, Psychological and Neural Theories', 2006, Oxford U.P., p.155-158

a very similar criticism. Having mentioned PenOff's speculation about possible quantum effects occurring in the microtubules of the cytoskeleton of neurones, he casually dismisses it as a 'nonstarter'. But, adds that he; "… can't resist raising one question for Penrose to ponder: if the magnificent quantum property lurks in the microtubules, does that mean that cockroaches have non-computable minds, too? They have the same kind of microtubules we have."[484]

Raymond Tallis also comments critically on the PenOff claim that the unity of consciousness may be underpinned by quantum coherence, generated within microtubules in the brain. He has many objections, but the most obvious is that; "… the kind of structures that are supposed to house quantum coherence are widely distributed throughout the nervous system, and are not confined to those areas that are associated with consciousness." In addition, he claims that; "… there is no reason why the unification that quantum coherence supposedly imposes should translate into subjective or experienced unity, even less into a unity in which multiplicity is retained."[485] Penrose and Hameroff attempt to rebuff this sort of criticism as follows: "Microtubules in neurones are quite distinct from those in other cells: 1) They are arrayed in parallel (rather than radially) because, unlike other cells, neurones lack centrioles. 2) They are quite stable. 3) They are far more abundant in neurones

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[484] Dennett, Daniel,'Consciousness Explained', 1991, Boston, MA: Little, Brown, p.448

[485] Tallis, Raymond, 'Aping Mankind: Neuromania, Darwinitis and the Misrepresentation of Humanity', 2011, Routledge, loc:2570

than other cells, form larger and complex networks, and have a greater genetic variability than other tissues."[486]

Stapp's Critique of PenOff

Henry Stapp, also has a number of objections to the PenOff theory: firstly, he disputes PenOff's assumption that quantum coherence should extend over large portions of the brain. Stapp's own theory of quantum consciousness (which follows Whitehead) does not require this.[487] This lack of long-range quantum coherence in a living brain is, in fact, (claims Stapp) a great asset for von Neumann's approach. It means, he says; "… that the quantum brain can be conceived to be, to a very good approximation, simply a collection of classically conceived alternative possible states of the brain." Stapp explains that interactions with the environment effectively wash out all possible effects of interference between parts of the brain that are distantly separated. Thus, the only quantum effects that survive decoherence are those associated with very close neighbours. This is what enables the quantum state of the brain to be seen as simply a collection of alternative possible classically described brains. These; "… all exist together as 'parallel' parts of a potentiality for future additions to a stream of consciousness. The residual quantum effects arise from the fact that these quasi-classical 'parallel' brain states are allowed to interact with their very close neighbours. Still, these surviving linkages to close neighbours make the quantum model significantly different in principle from a purely classical model: no classical possibility can interact

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[486] Penrose, Roger, and Hameroff, Stuart, The Journal of Consciousness Studies [JCS], article, No.2, 1995, p.109

[487] Stapp, Henry, 'Mindful Universe', 2007, New York: Springer, loc:620

with an alternative classical possibility, no matter how close together they are."[488]

Stapp claims that the only macroscopic quantum effect that can survive the decoherence effects is the quantum Zeno effect (which we looked at in chapter thirteen). Stapp says that: "This permits neuroscientists unfamiliar with quantum theory to have a very accurate, simple, intuitive idea of the quantum state of a brain. It can be imagined to be an evolving set of nearly classical brains." But, however, he explains that this model has the following four non-classical properties: "1) Each almost-classical possibility is slightly smeared out in space relative to a strictly classical idealisation, and it fans out in accordance with the uncertainty principle. 2) At each occurrence of a conscious thought, the set of possibilities is reduced to the subset compatible with the occurring increment of knowledge. 3) Microscopic chemical interactions are treated quantum mechanically. 4) In the presence of effortful intent, the quantum Zeno effect acts to keep the associated template for action in place for longer than classical mechanics would allow." A second difference between PenOff and Stapp's theory concerns the nature of quantum gravity. Stapp points out that: "Penrose's proposal strongly links consciousness to the gravitational interactions of parts of the brain with other parts of the same brain." Stapp, however, supposes gravitational interactions between parts of the same brain to be negligible. In any case, Stapp points out that the nature of quantum gravity; "… is currently not under good theoretical control, whereas the present approach is based only on the fundamental principles of orthodox quantum theory, which,

488 Ibid, loc:626

thanks to the efforts of John von Neumann, are under good control."[489]

A third difference between the approaches of PenOff and Stapp concerns the famous mathematical theorem of Kurt Gödel. Penrose deduces that brain processes must involve a non-algorithmic (i.e., not discretely describable) process. Penrose bases this on the following two arguments: 1) the fact that mathematicians construct proofs that they believe to be valid, and 2) some deep mathematical conclusions arising from Gödel's theorem: Gödel produced two theorems of mathematical logic that demonstrate the inherent limitations of every formal axiomatic system containing basic arithmetic. These theorems are widely, but not universally, interpreted as showing that the mathematician, Hilbert's program to find a complete and consistent set of axioms for all mathematics is impossible. Stapp responds to this by saying that, according his approach; "… contemporary orthodox quantum theory already requires the physically described process 2 aspects of brain processes to be influenced by process 1 interventions coming from streams of consciousness. The theory leaves open the important question of how these interventions, which are treated pragmatically simply as experimenter-selected choices of boundary conditions, come to be what they turn out to be: this is the causal gap! These interventions are not required by present understanding to be governed by algorithmic processes."[490]

PenOff: Reversing Causality But Not Switching Ontologies

[489] Ibid, loc:633-640

[490] Ibid, loc:640

Another major difference between the PenOff theory and the Copenhagen interpretation (including all its legacy theories, such as von Neumann's and Stapp's) concerns the direction of causality between consciousness and the collapse of the wave function: for the Copenhagen school, it's the intervention of consciousness that causes the collapse of the wave function. In PenOff, however, it's the other way around, i.e. the objective collapse of the wave function causes consciousness. This is actually a profound difference: in the first case consciousness is seen as part of the structure and process of the universe. In PenOff, however, the quantum process of wave function collapse is what brings consciousness into being. In this sense, PenOff resembles conventional, Cart-Tonist theories of consciousness because it sees consciousness as being generated by physical processes. For the Copenhagen school, however, consciousness is an unexplained intrusion. In other words, PenOff shares at least the direction of causality with Cart-Tonist theories regarding the origin of consciousness. On the other hand, the Stapp-von-Neumann theory would require a 'paradigm shift' within contemporary science before it could be empirically investigated. A very different way of seeing this issue of the direction of causality, however, is provided by David Rose. He suggests that; "… equating consciousness with collapsing wave functions at the quantum level is a kind of Identity Theory. Do mental thoughts cause the wave functions to collapse or is it the collapse of the wave functions that causes the thoughts? Neither: they are the same."[491] My own preferred solution to the causality issue is to turn to Whitehead's ontology (as presented in chapter twelve): for Whitehead, the ultimate building

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[491] Rose, David, 'Consciousness; Philosophical, Psychological and Neural Theories', 2006, Oxford U.P., p.155-158

blocks of actuality are composed of experience, thus the question of what 'causes' experience doesn't arise and the collapse of the wave function can be seen as part of the process of transforming the 'raw material' of primordial experience into 'consciousness'.

As a final criticism, I would describe PenOff's approach as 'pre-paradigmatic'. What I mean by this is that, especially from Hameroff, there's an ambition to empirically validate the PenOff theory within the present, Cart-Tonist scientific paradigm. From a Whiteheadian perspective, this clearly makes the theory vulnerable to the sort of harsh critiques illustrated by these dismissals of Hameroff's work taken from Wikipedia: 'Hameroff originally suggested the tubulin-subunit electrons would form a Bose–Einstein condensate, but this was discredited. He then proposed a Fröhlich condensate, a hypothetical coherent oscillation of dipolar molecules. However, this too was experimentally discredited. Furthermore, he proposed that condensates in one neurone could extend to many others via gap junctions between neurones, forming a macroscopic quantum feature across an extended area of the brain. … However, Orch-OR made numerous false biological predictions, and is not an accepted model of brain physiology. The proposed predominance of 'A' lattice microtubules, more suitable for information processing, was falsified by Kikkawa et al., who showed all in vivo microtubules have a 'B' lattice and a seam. The proposed existence of gap junctions between neurones and glial cells was also falsified. Orch-OR predicted that microtubule coherence reaches the synapses via dendritic lamellar bodies (DLBs), however De Zeeuw et al. proved this impossible, by showing that DLBs are located micrometers away from gap junctions.' Rowlatt also cites a fairly damning Cart-Tonist critique of PenOff: their suggestions regarding quantum mechanical process underlying consciousness; "… have been criticised by Tegmark et al. (2000); they argue that the time scale of neurone firing, and of excitations in microtubules, is out by more than one order of magnitude from what it would need to be in order for Penrose's theory to be plausible."[492]

In my opinion, an adequate theory of quantum consciousness needs a philosophically robust supporting ontology to protect it from such mechanistic, empirical critique generated from within the existing scientific paradigm. In my view, qualia (which are the essence of consciousness) always consist of input from both of Whitehead's sensory modalities, which I'm calling Prehension and Perception. This input merges with an internal emotion evaluation, ranging from positive to negative, but generally neutral. A positive aspect of the PenOff theory is its appeal to space/time curvature to explain qualia. This is a form of 'extended mind' thesis. In other words, it locates the complexity of qualia out in the world and not in the brain. Thus, even lower mammals, lacking higher brain areas, can experience complex qualia, and humans can have qualic experiences directly and immediately without sensory input having to be processed by higher brain areas. All this provides a much sounder and more believable basis for the 'rewards' and 'punishments' required for learning from experience than that of the Behaviourists, who left qualia and affect entirely out of their model. Seen via Whitehead's ontology, PenOff's appeal to space/time curvature to explain qualia is a useful 'intermediary' theory: if the ultimate building blocks of reality are indeed composed of ***sentience***, they

[492] Rowlatt, Penelope, 'Mind: A Property of Matter', 2017, Ionides Publishing, p.33

require a ‘conversion’ mechanism or process to turn them into perceived qualia. Perhaps the pattern of curvature of space/time can provide this.

Chapter Fifteen:
The Reality and Function of Qualia

In this chapter we going to take a third look at qualia, this time from a 'Whit-Tum' perspective. We'll start by comparing the two sensory modes posited by Nicholas Humphrey with Whitehead's dual sensory modes and arrive at the conclusion that the interactive sensory mode that Whitehead calls Prehension enables us to experience the qualia which are implicit in the ultimate components of the fabric of the universe. We then look at the theory of qualia developed by the neurologist, Antonio Damasio. I adapt or extend this theory to claim that qualia are always a composite of neurophysiological sensory input and an affective response. We also look at how Damasio links qualia to homeostasis (as Panksepp also does), especially in relation to how pleasurable and/or painful qualic states guide behaviour. At the end of the chapter we consider Jeffrey Gray's speculation as to how, and where, the brain produces qualia, before concluding with the 'Whit-Tum' solution; namely that Whitehead's Prehension enables us to experience how the world feels.

Comparing Humphrey and Whitehead's Two Sensory Modes

As we saw in chapter twelve, Whitehead saw sensory perception as a hybrid composed of two pure modes of perception. The psychologist, Nicholas Humphrey has also suggested that we have two separate sensory channels, which he labels 'Sensation' and 'Perception'. He speculates that rather than a hierarchy, with primitive, 'bodily' sensations being systematically processed into sophisticated mental perceptions, Humphrey sees Sensation and Perception as two completely separate and independent channels between the organism and the environment. He sees Sensation as evolutionarily earlier; arising in unicellular organisms, which are capable (after all) of responding to direct stimulation of their membrane boundaries by, for example, temperature, pressure and chemical changes. Unicellular organisms avoid toxins and damagingly high temperatures and pressures, while moving toward nutrients. They are also making evaluations of these Sensation; positive or negative. They then react, according to Humphrey, with "a wriggle of acceptance or rejection". Clearly these simple organisms can 'sense' or 'feel' their environments, though in the absence of brains and nervous systems, we currently have (in scientific terms) no idea how they do this! Humphrey's answer is 'Sensation', while Whitehead would say 'Prehension'.

Humphrey gives a fairly detailed description of Sensation, but does not provide an explanation as to what it is or how it works. Whitehead does provide this for Prehension (see below). As we saw in chapter thirteen, Humphrey says that Sensation has the following qualities: it's owned by the organism in a direct and/or personal way. Sensation is 'modality specific'; i.e. its content always consists of a sight, sound, touch, taste or smell. Consequently, Sensation only ever takes place in the present tense, so it's always tied to specific body sites, anchored in time and space, and firmly located in the brain's 'body map'. Perception, on the other hand can be built up over time, starting with information input and processed over time, via analysis, reflection, memory, etc. Sensation marks the boundary between 'me' and ‘not me’. Perception, on the other hand, is concerned with accumulating generally objective and impersonal knowledge about the ‘more distant’ environment. Humphrey sums all this up by saying that Sensation is all about, ‘what’s happening to me?’, while Perception is about, ‘what’s happening out there?’ Perception, therefore, is an ‘information-only’ channel.

But why do we need two channels for information to pass from the environment into the organism? Why shouldn’t we just have one, with bottom and top levels, as more conventional theorists believe. The answer, according to Humphrey, is that Perception enables us to carry out all the functions necessary for survival and reproduction, the functions which many modern philosophers and scientists are keen to tell us can be carried out without consciousness. Sensation, on the other hand, is the basis for consciousness itself - which Humphrey believes has important evolutionary benefits in terms of motivation. The heart of Humphrey’s theory is that a sensation (such as the visual sensation of red), is a kind of action, something we do, not something that just happens to us. So, seeing red is not a process of passively receiving impressions, or building up internal images, but is something we do. He adds that sensations originated in our primordial ancestors’ expressions of liking or disgust, which, in turn, evolved from the bodily responses to noxious and beneficial impingements on these simpler organisms. In other words, sensations are about evaluating inputs: consequently, sensations are the most basic form of emotion.

Humphrey illustrates his theory with the example of seeing red: he invents the intransitive verb, ‘redding’, as the name for this ‘active first-person response’. This lets him draw attention to the important fact that when we experience something red we do not just learn something about it; we learn something about ourselves (roughly, this thing provokes redding in me). Putting sensation on the production side of the mind rather than the reception side, has (Humphrey argues) some quite unexpected and exciting implications. Sensation ought to be especially susceptible to top-down influences, to control by the person, or to being altered by drugs, which helps make sense of imagery and hallucinations. As earlier, I’m going to argue that when describing our two separate sensory modes, Whitehead and Humphrey are (more or less) talking about exactly the same phenomena: one of Whitehead’s modes consists of what we can call the ‘ordinary’ conception of perception in which the external world is represented in the brain via our sense organs. This, therefore, corresponds to what Humphrey calls ‘Perception’ (‘what’s happening out there?’). Whitehead calls his second and more profound mode of sensory perception ‘Prehension’. In this mode we directly perceive other actualities and sense them to be capable of exerting causal efficacy on us. Prehension is all about interacting with the world. I’m equating Whitehead’s ‘Prehension mode’ with Humphrey’s ‘Sensation’ (‘what’s happening to me?’)

Prehension Explains the Reality and Function of Qualia

The philosophical concept of ‘qualia’ includes the notion of ‘raw feels’, which are private, personal and impossible to communicate directly to others. The fact that both Humphrey and Whitehead posit this original and direct mode of sensory perception (let’s agree to call it ‘Prehension' from now on) can, I believe, provide us with an explanation for the reality and function of qualia: Prehension is the mode via which we experience qualia. Perception, by contrast, is an 'information only' channel via which we construct models of our environment. Perception, therefore provides us with factual, propositional knowledge about the world around us. Prehension allows us to subjectively experience how the world feels! However, as to the reality of qualia, part of the definition of qualia is also that they have to be ***conscious***. The point here is that (as we have previously established) only a tiny fraction of our sensory activity is conscious. Consequently, in order for an unconscious sensation (i.e. a neurological response to the environment) to turn into a consciously 'Prehended' qualia, we have to add something to it.

I want to argue that this 'something' consists of an affective response, either positive, negative or neutral, which is probably the most numerous case. (By 'affective response' I mean the subjectively experienced component of an emotional reaction.) I'm suggesting that this addition of affect is what Humphrey refers to as an 'active first-person response' and what Whitehead means when he talks about Prehension interacting with the environment. Another way of putting this is to say that we pick out a tiny fraction of qualic experiences, from the tidal wave of incoming sensation which is continually washing over our bodies, by paying affective attention to them. And where does this 'affect' come from? We can find an appropriate answer from Whitehead's ontology: from the drops of experience of which the entire universe is composed. (In my view, this is a preferable explanation of qualia than 'the curvature of space/time' which, as we saw in the last chapter, is offered by the PenOff theory.) Also, as per Whitehead's ontology, this affect which is built into all aspects of reality is not simply 'there for the taking': it constitutes rather a 'raw material' which we have to process in order to experience - that's why we need a brain and nervous system! To take the example of a severe electric shock (which we used in chapter six), the pain which we experience on receiving the shock arises from our body actively processing the high energy of the electrical discharge, thus unleashing the painful experience implicit in the entities composing the charge. If we were under a general anaesthetic, we could receive an electric shock of equal strength without any subjective experience of pain.

This explanation of the nature of qualia also goes halfway toward accounting for their function: our affective reactions to qualia are, of course, ***evaluations*** of them, either positive, negative or neutral. So, in effect, qualia provide a 'value tag' to each experience as we successively have them. These tags act as a guide for our behaviour: we seek to repeat the experiences which had a positive tag and avoid those with a negative tag. Superficially, this may sound like the familiar Behaviourist doctrine of conditioning through reinforcement or aversion. The big difference, however, is the insertion of affect as a causal agent between stimulus and behavioural response. As Jaak Panksepp points out affect is conspicuous by its absence in all Behaviourist theory: "Rather than using subjective words like satisfaction and discomfort - words that suggested a motivated mental state accompanied by a feeling tone - the Behaviourists substituted more objective terms, referring to externally observable events: rewards and punishments (or reinforcements when used in the context of learning). They thought that all behaviour was learned on the basis of psychologically undefinable aspects of rewards and punishments. They explicitly chose to ignore the likelihood that affective changes in the brain gave rewarding and punishing events the power to control behaviour. Rather than leaving open the possibility that rewards and punishments worked by generating experiences within the brain, 'reinforcements' were defined as in purely operational terms - in terms of the ability of objects in the world to 'reinforce' behavioural changes in one direction or another. To this day, we do not know whether 'reinforcement' is a specific kind of non-affective brain function, or simply a word used to describe how we train animals by systematically manipulating brain systems that control their feelings."[493]

In Panksepp's alternative theory, therefore, it's the 'affect element' of qualia which drive our behaviour. This 'affect causation' theory has the added attraction of accounting for the flexibility of mammalian, and especially human behaviour. Edmund Rolls argues that behavioural flexibility arises from the fact that our genes determine our emotional reactions rather than our patterns of behaviour: the positive emotions provide rewards and the negative punishments. We strive to maximise the former and minimise the latter. Rolls, however, is what Panksepp calls a 'read out' theorist of emotion: he doesn't believe that affect can have a causal role because he doesn't believe that we directly and immediately experience affect on receiving a stimulus. Rather, like all 'read out' theorists, he assumes that the sequence of events is as follows: the stimulus evokes an 'emotion', which consists of neurophysiological processes, such as

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[493] Panksepp, Jaak,'The Archaeology of the Mind', 2012, New York, W.W. Norton and Company, p.58

changes in blood pressure, body temperature, hormone releases, etc. Once these have been set in train, the ‘higher’ regions of the brain generate the affect, which we subjectively experience and consequently associate with this emotion. For evolutionary reasons, this means that it’s the neurophysiological ‘emotion’ which must be causative, not the affect. Panksepp, on the contrary, rejects this and believes that we directly and immediately experience affect from the initial stimulus. Again, for evolutionary reasons, this opens the possibility of a causal role for affect. In addition, I’d argue that consciously experienced affect provides more flexible rewards and punishments than neurophysiological ‘emotion’ does (see the discussion of acquired tastes in chapter six).

Qualia Part of Mind, Not Consciousness

My inspiration for this idea of qualia as a composite between; 1) the neurophysiology of an incoming sensory input, and 2) an affective, evaluative response to this stimulus, was taken from the work of the neurologist and researcher, Antonio Damasio. He talks about ‘Qualia 1’ and ‘Qualia 2’. Damasio describes a parallel response to incoming sensory stimuli by the brain. Firstly, there are the devices and regions which map and display the incoming sensory information. Secondly, he says; “... the brain is equipped with a variety of structures that respond to signals from those maps by producing emotions.” Damasio then adds; “… out of which arise subsequent feelings.” I follow Panksepp (see discussion above about ‘readout’ theorists) in holding that this second, ‘feeling’ or consciousness stage of emotion is an illusion: in other words, the deep structures of the brain that Damasio refers to in this context, what he calls ‘hot-buttons’, the amygdala, the prefrontal cortex and an array of nuclei in the basal forebrain and the brain stem, in fact, produce conscious emotion directly, without requiring this second, ‘feeling’ stage. Apart from this difference, Damasio’s account, thus far, virtually mirrors the ‘evaluating and behavioural flexibility’ theory of qualia, which I presented above. However, Damasio then goes on to claim that his Qualia 1 do not, in fact, occur in consciousness at all, but should really be classified as part of the ‘mind’, or what has come to be known as the ‘cognitive unconscious’: he says that in a normal conscious state there are a number of objects to be known, rarely one. But consciousness hardly ever accords equal conscious time and space to every object. Damasio states that: “Part of the process of according different values to different images relies on the emotions they provoke and the feelings that ensue in the background of the conscious field - the subtle but not discardable Qualia 1 response. This is why, although the qualia issue is traditionally regarded as part of the consciousness problem, I believe it belongs more appropriately under the mind rubric. Qualia 1 responses concern objects being processed in mind and add another element to the mind.” He describes this process as; “… an ‘ordering’ of images best described as a spontaneous form of editing.” Damasio adds that he does not, therefore, regard the Qualia 1 problem as a mystery.[494]

Damasio next attempts to deal with the Qualia 2 problem. (This is essentially the famous ‘Hard Problem’, i.e. ‘Why should anything feel like something?’) This poses an even more perplexing question, namely; “… why should perceptual maps, which are neural and physical events, feel like

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[494] Damasio, Antonio, ‘Self Comes to Mind’, 2010, London: William Heinemann, p.331/332

anything at all?" Damasio begins his explanation with the primordial feelings. These feeling states, he says, should be regarded as the foundation of both the mind and the self. The primordial feelings describe the state of the organism's interior as reflected in the brain's perceptual maps. So, in order to explain why these maps, which are in themselves nothing but neural and physical events, feel like something, then we must first explain the origin of these primordial feelings, which always occur together with the maps. Damasio starts his attempt at an explanation by stating that: "Feeling states first arise from the operation of a few brain-stem nuclei that are highly interconnected among themselves and that are the recipients of highly complex, integrated signals transmitted from the organism's interior." These signals from the body and the nervous system's response to them, are part of the process of regulating life; part, in fact, of the process of homeostasis. The activity of the brain-stem nuclei transforms the body signals. Damasio continues that: "The transformation is further enhanced by the fact that the signals occur in a looped circuit whereby the body communicates to the central nervous system and the latter responds to the body's messages. The signals are not separable from the organism states where they originate."[495]

Neurones Become One with Life!

Damasio's claim here is that this ensemble of looped circuits constitutes a dynamic, bonded unit, which enacts a functional fusion of body states and perceptual states: he says: "Neurones in charge of conveying to the brain signals about the body's interior would have such an intimate asso-

[495] Ibid, p.332-334

ciation with interior structures that the signals conveyed would not be merely about the state of the flesh but literally extensions of the flesh. Neurones would imitate life so thoroughly that they would become one with it. In brief, in the complex inter-connectivity of these brain-stem nuclei, one would find the beginning of an explanation for why feelings - in this case, primordial feelings feel like something." As previously, in his attempt to explain the origin of subjective feelings in large multi-celled creatures like us, Damasio appeals to the sensory capacities of single-cell organisms: "Unicellular organisms are 'sensitive' to threatening intrusions. Poke an amoeba, and it will shrink away from the poke. Poke a paramecium, and it will swim away from the poke. We can observe such behaviours and are comfortable to describe them as 'attitudes', knowing full well that the cells do not know what they are doing in the sense that we know what we do when we evade a threat.

But what about the other side of this behaviour, namely, the cell's internal state? The cell does not have a brain, let alone a mind to 'feel' the pokes, and yet it responds because something changed in its interior." Damasio calls these aspects of cell life the forerunners of a 'feeling' function. These characteristics of single cells, Damasio states, can be transposed to neurones; "… therein could reside the physical state whose modulation and amplification, via larger and larger circuits of cells, could yield a proto-feeling." In other words, he's claiming that subjective feelings may start in any of the body's trillion or so individual cells and then be 'amplified' via the nervous system to organism level.[496]

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[496] Ibid, p.334/335

Damasio refers to the fact that neurones are differentiations of other living cells to support this idea: despite having a specialised function, neurones (like all other body cells) are organically similar. Damasio specifically denies that neurones can be reduced to simple electro-mechanical 'microchips': Neurones, like all living cells, have more complex response capabilities, which, as above, he describes as 'cellular attitudes'. He suggests that neurones have inherent 'sensitivity' or 'irritability', and he cites the neuroscientist, Rodolfo Llinas who has proposed that feelings, which arise from the specialised sensory functions of neurones, can be scaled up to large neuronal circuits. Damasio uses as an example the 'will to live', which we feel ourselves to possess. He suggests that this is built up from the attitudes of numerous single cells joined cooperatively in an organism: "Such an idea draws on the notion of the summing up of cellular contributions: large numbers of muscular cells join forces, literally, by contracting simultaneously and producing a major singular and focused force."

And Damasio proposes that this could work in a similar way for subjective feelings, such as our consciously experienced will to live. Damasio points out the intriguing nuances of the concept of cellular 'attitudes': he says that the specialisation of neurones comes, mainly, from the fact that neurones, like muscle cells, are excitable. Their excitability derives from the fact that the neurone's cell membrane is permeability for charged ions, which make up nerve impulses. Damasio cites N. D. Cook, who suggests that; "… the temporary but repeated opening up of the cell membrane is a violation of the nearly hermetic seal that protects life in the neurone's interior and that such vulnerability would be a good candidate for the creation of a moment of proto-feeling. I am by no means affirming that this is how feelings arise, but I regard this line of inquiry as worth pursuing." However, contrary to the thesis of this book, Damasio notes that these ideas should not be confused with efforts to locate the origins of consciousness at the level of neurones, based on quantum effects. As I hope will have become clear by now, I'm arguing that the consciousness produced by human neurones has its origins in the 'raw material' of experience, which (according to Whitehead's ontology) is what composes the ultimate components of reality.[497]

Very much in line with Panksepp, Damasio observes that, for evolutionary reasons, perceptual maps of the body ought to generate subjective feelings: "If perceptual maps of the body are to be effective in leading an organism toward avoidance of pain and seeking of pleasure, they should not only feel like something, they actually ought to feel like something." He suggests that pain and pleasure states appeared early in evolution, probably before the development of brains, or even nervous systems. He suggests that, early in evolution; "… un-brained organisms already had well-defined body states that necessarily corresponded to what we came to experience as pain and pleasure. The arrival of nervous systems would have spelled a way of portraying such states." I think that this is an extension of Damasio's proposal that feelings originate inside single cells: as primitive nerve cells evolved, which when excited opened their membranes, these 'single-cell' feelings could

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[497] Ibid, p.335/336

be aggregated and communicated to the neural centre of a larger organism.[498]

Qualia and Homeostasis

Key to this evolutionary explanation, according to Damasio, is that; "… the functional divide between pleasure and pain states, which are correlated, respectively, with optimal and smooth life-managing operations, in the case of pleasure, and impeded, problem-ridden life-managing operations, in the case of pain." Again, these remarks of Damasio's are very close to the ideas of Panksepp, who sees a direct evolutionary line between the mechanisms which maintain homeostasis, the additional systems which generate subjective emotions and consciousness itself. Damasio refers to 'life-managing operations', which surely is more or less the same as homeostasis, and suggests that pleasure signals homeostatic states which should be pursued, while pain marks states to be avoided.

Pleasure and pain feel different, says Damasio, because they are mappings of very different body states; "… just as a certain red is different from a particular blue because they have different wavelengths and the voices of sopranos are different from those of baritones because their sound frequencies are higher. It is often overlooked that information from the body's interior is conveyed directly to the brain by numerous chemical molecules that course in the bloodstream and bathe parts of the brain that are devoid of blood-brain barrier." He goes on to say that there are a huge number of these of these transmitter/modulator molecules. As the blood bathes the receptive areas of the brain, these mo-

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[498] Ibid, p.336/337

lecules directly activate neurones. He asks what do the signals that arise in such areas end up causing? And suggests that: “A reasonable guess is that they cause or modulate feelings.” Which are then communicated, as qualia, to other centres in the brain.[499]

Damasio next introduces two phenomena in the brain/body system, which he believes also have a crucial role in generating, or at least influencing the production of qualia. The first is map-making in the brain and especially the interlocking of different types of map. The second is the influence of what he calls ‘sensory portals’. Damasio uses visual maps, to illustrate the interaction of these two phenomena: he says that visual maps are sketches of visual properties, such as; shape, colour, movement, depth. These four maps, of different visual properties, are then interconnected, ‘cross-fertilising their signals’, as Damasio puts it. This merged map then produces a blended, multidimensional visual scene. “If one takes this blend and adds to it information from the visual portal - to the effect that the flesh around the eyes is involved in the process - and a component of feeling, it is reasonable to expect a full-blown, properly ‘qualied’ experience of what is being seen.” He says that the sensory portals are involved in gathering the information. For example, changes in the sensory portals play a role in the buildup of perspective and also contribute to the construction of perceptual quality.

But how do they do this? To attempt to answer this question, Damasio switches to the sound modality; “… we know where the sound maps are created in the brain, but we

[499] Ibid, p.337/338

hear the sounds both in our ears and with our ears. In all probability, we feel sounds in our ears because our brains are assiduously mapping both the information that comes to the sensory probe - from the entire auditory signalling chain including the cochlea - and the slew of co-occurring signals coming from the apparatus that surrounds the sensory device. In the case of hearing, this includes the epithelium (skin) covering our ears and the external ear canal, along with the tympanic membrane and the tissues holding the system of ossicles that transmit mechanical vibrations to the cochlea. To this we must add the small and not-so-small head and neck movements that we constantly make in an automatic effort to adjust the body to the sound sources. This is the auditory equivalent of the notable changes that occur in the eyeball and the surrounding muscles and skin when we are in the process of looking and seeing, and it adds qualitative texture to the percepts."[500] (Again, Whitehead's ontology makes this somewhat desperate search for the origins of subjectivity unnecessary.)

Similarly, the feelings of smelling or tasting or touching arise, Damasio claims, via the same sort of mechanism: "For example, our nasal mucosa contains olfactory nerve endings that respond quite directly to the conformation of chemical molecules in odourants — that is how we come to map scents and how we deliver jasmine or Chanel No 9 for their encounter with our self." Then, I assume to illustrate the power of these reactions, he takes an example where a smell irritates the nerve endings in the nasal mucosa; i.e.,

[500] Ibid, p.338/339

"… when you put too much wasabi on the sushi and are forced to sneeze."[501]

All this resonates very well with Whitehead's account of Prehension, which he also calls 'perception in the mode of causal efficacy'. Part of this account includes the notion that we see with our eyes, hear with our ears, etc… Not that we 'perceive' things in this way, but that the interaction involved in these processes is what makes Prehension a more profound channel from organism to environment than the traditional model of perception (which is only a secondary, 'information-only' channel.)

Qualia - Astride Mind and Self

As above, Damasio believes that a substantial part of the problem of qualia can be solved by reference to the merging together of different kinds of brain maps. He specifically identifies three types of such of maps: firstly, maps of a particular sense modality, generated by the appropriate sensory devices, that is, sight, sound, smell, and so forth. Secondly, maps of the activity in the sensory portal within which the sensory device is embedded in the body. And, thirdly, maps of the emotional-feeling reactions to the first two types of map. According to Damasio, therefore, qualia come into being; "… when different kinds of sensory signals are brought together in mind-making maps of the brain stem or cerebral cortex." As have many philosophers before him, Damasio sees an intimate connection between qualia and the self: he suggests that qualia are an important element in the construction of the mind, and that they are part of the contents which, "come to be known as the self process". Damasio states that the construction of the self 'illu-

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[501] Ibid, p.339/340

minates' the construction of the mind. He suggests also that qualia are the grounding for what he calls the proto-self, and thus sit astride mind and self, in a hybrid transition: "The neural design that enables qualia provides the brain with felt perceptions, a sense of pure experience. After a protagonist is added to the process, the experience is claimed by its newly minted owner, the self."[502]

Damasio states that his theorising about qualia is aimed at bridging; "… the gulf between the brain and the starting point of the sensory chains in the body's end-organ periphery." So far, we've been looking at how what he calls the 'brain-stem-body loop' accomplishes this for feeling; by creating a functional linkage that sets up a reverberating process. Damasio suggests that this could well be accomplished for a sensory process such as hearing by; "… back-projections from the brain aimed at the body's periphery, including the periphery that contains specialised sensory devices: The input cascades aimed at the brain would be complemented by output cascades aimed at the very 'flesh' where the signals originated, thus contributing to the integration of inner and outer worlds." He explains that we know such arrangements exist, particularly for the auditory system, in which the cochlea receives feedback signals from within the brain. However, we still have a lot to learn about the circuitry of the sensory devices.[503]

At the end of his book, "'Consciousness: Creeping up on the Hard Problem', Jeffrey Gray sets out on a survey of all the theoretical efforts to explain the mystery of how the

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[502] Ibid, p.340/341

[503] Ibid, p340

brain generates qualia. He starts by rejecting the functionalist explanation that qualia are simply identical to the input-output functions with which they are associated. But, as he points out, this rejection has radical consequences, since all existing hypotheses about the empirical basis of consciousness (including his own); "… are functionalist in spirit, either explicitly or … by way of covert assumption. Thus the demise of functionalism - if demise it be - will necessitate a whole new approach to theory construction." Gray calls functionalism a correlational game on two levels; "… correlations between qualia and behavioural or cognitive functions, as studied in the psychological laboratory; and correlations between qualia and neural systems studied by neurophysiology or neuroimaging." But, he points out, no matter how detailed these three-way correlations become, they will never explain how the brain creates qualia, because, as Hume pointed out a correlation is not a cause and correlations can often mislead us as to the real mechanisms involved. Nor can correlations answer the question whether the same functions, discharged by systems other than brains, for example, digital computers or computer-controlled robots, could also produce qualia. Gray claims that the majority of cognitive scientists would say 'yes', while most neuroscientists would say, 'no' and adds that; "Neither answer has any substantive empirical or theoretical foundation."[504]

Qualia: Where in the Brain?

Consciousness researchers, Francis Crick and Christof Koch coined the phrase, 'the neural correlates of consciousness', as a sort of 'Holy Grail' objective for their en-

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504 Gray, Jeffrey, 'Consciousness: Creeping up on the Hard Problem', 2004, Oxford U.P., p.314/315

terprise. Gray points out that the intuitions of researchers in the field have differed wildly as to what should be included in these correlates: at one extreme Dan Dennett and Marcel Kinsbourne insist that nothing short of the entire brain can be the site of conscious experience. At the other extreme lies Semir Zeki's hypothesis that (sufficient) activity in, say, the colour-selective region of the visual system V4, is the necessary and sufficient condition for the subjective experience of colour. In between, are hypotheses like those proposed by Jean-Pierre Changeux and Stanislas Dehaene and by Jerald Edelman and Giulio Tononi which point to networks that are very widely distributed but nonetheless clearly do not involve the brain as a whole. Gray comments on these various proposals as follows: "It is undoubtedly premature to bring closure to this debate; however, certain conclusions can already be reached." Gray's first conclusion is to rule out the whole brain as the neural correlate of conscious experience. As he explains, he takes this view for two reasons: "First, there are classes of behaviour which require a very considerable degree of neural processing but which remain unconscious." Consequently, we can reasonably conclude that the neural activity which generates these types of behaviour does not participate in the neural correlates of consciousness. "Second, the brain may suffer a variety of often quite extensive forms of damage without compromise of conscious experience."[505]

Having dismissed the entire brain, Gray then considers the pre-frontal cortex as the neural basis of consciousness. A strong focus on this area of the brain is a feature of the various proposals for 'global neuronal workspace' as an expla-

[505] Ibid, p.315/316

nation for consciousness: “Vital as is this region (which has grown particularly large in the human species) for the control of complex behaviour (by way of so-called ‘executive functions’), there are strong reasons to doubt that it plays a critical role in the neural correlate of conscious experience.” Gray lists three of them: 1) It can sustain massive damage without affecting consciousness experience as such. 2) The pre-frontal cortex deals only with conscious functions like imagining, directing covert attention, subvocal rehearsal, mental problem-solving, etc., while important, they’re not the principal features of conscious life. 3) there have been a number of neuroimaging experiments in which conscious experience has not been accompanied by activity in the prefrontal cortex.[506]

Qualia: Deep in the Brain?

The next proposal Gray considers is an amalgam between ‘top-down' and ‘bottom-up’ processing, as proposed by the philosopher, Ray Jackendoff, in his ‘intermediate-level’ theory of consciousness: “This holds that one is not normally aware of sensation unaffected by conceptual interpretation, nor of pure conceptual structure, but only of an admixture of the two that optimises their mutual fit.” The conceptual structure emerges from top-down processing, while sensation is generated from bottom-up processing. Conscious experience is produced when these two forms of processing meet. Gray adds, however, that this; “… analysis seems generally to be true of cognitive consciousness of the external world, but not of many (perhaps any) of the bodily sensations.” This idea of a merging of incoming sensory stimulation with internal cognitive conceptual pro-

[506] Ibid, p.316

cessing to produce qualia, sounds, initially similar to the theory of qualia outlined at the beginning of this chapter. The big difference, however, is that Jackendoff's theory calls for a merging with conceptual processing, whereas in my theory it's a fusing of sensory stimuli with affective reactions. These different neural phenomena originate in very different areas of the brain; cognitive processing from the higher cortical regions, emotions from the deep, 'limbic' systems. Gray cites neuroimaging results which throw doubt on the notion of a substantial role for top-down processing in generating consciousness. Specifically, he points to: "Zeki's hypothesis that visual conscious experience can result from activity in just one module of the visual perception system, with little if any additional activity in either higher cortical regions responsible for executive functions or lower parts of the visual system. So, under at least some circumstances, activity in V4 is sufficient to produce an experience of colour, activity in V5, an experience of motion, and so on."[507]

Given this, Gray concludes that; "… qualia are far more independent of cognitive influences from top-down processing than has hitherto seemed likely." This view is congruent with Gray's own idea that, as he says; "'raw feels' are just that. They can occur without any of the trappings of intentionality, spatial framework, feature binding or the like. They can similarly occur in the absence of any manipulation by executive processes (attention, working memory, decision making etc)." Gray describes how this view has been force on him by the evidence. However, he says, "… it seems reasonable for now to conclude that separate types

[507] Ibid, p.316-318

of qualia (such as colours, visual motion, scents, pain, and so on) each result from activity in a circumscribed neo-cortical region that is specialised in the analysis of the corresponding type of information." So, unlike Panksepp and Damasio, Gray doesn't directly link qualia with emotion, but he does clearly deny a role for higher level processing in generating qualia. Gray is clear, of course, that the idea that qualia originate deeper in the brain does not mean that they are not then subject to manipulation by executive processes: there is a role for the prefrontal cortex or hippocampal system in organising conscious experiences constructed in the sensory neo-cortex in selective attention or in working memory, or involved in problem solving or conflict resolution.

In the overview and summary at the end of his book, Gray touches on Damasio's intriguing idea that qualia may originate inside individual cells. There are, however, two problems for this proposal: the first is how do qualia get amplified from single cells to play a role in the entire organism. The second problem is how do qualia emerge within the cell in the first place? In other words, what sort of energies and/or processes are involved in generating qualia within individual cells? Gray approaches this problem by stating that: "If we abandon functionalism, the only other place to seek a natural-science account of qualia lies in the non-system properties of the brain. These might be properties of the brain that are specifically neural or biological, or properties that stem from the physics and chemistry that are common to all matter."[508] This is about the closest that Gray gets to Whitehead's solution, namely that the private,

[508] Ibid, p.314-318

ineffable 'raw feels' of qualia are already 'there' in the components which make up the fabric of reality. This explains how qualia arise in cells in the first place. As to how they get amplified from single cells to play a role in the entire organism, Whitehead's ontology posits a direct mode of sensory perception, Prehension via which we experience qualia. Prehension, as explained above, allows us to subjectively experience how the world feels! This is very similar to both the Platonic and Aristotelian traditions, in which 'thought' referred to; "… both an internal process by which humans come to understand the world and to the external order of things which must be understood. 'Actual knowledge', Aristotle wrote, 'is identical with its object.' Ideas are not representations of the world confined to the mind, but are located in the world itself." And for Plato; "… the process of thinking was the process of coming to realise the rational order that existed in the world. What makes us think and act as we do, lies not simply within us."[509]

509 Malik, Kenan,, 'Man, Beast and Zombie', 2000, W&N, p.43/44

Chapter Sixteen: The ‘Whit-Tum Self’ - Reinstalling the ‘Affective Heart’

Having, in the last chapter, considered how qualia are conceptualised in Whit-Tum world, in this chapter we’ll look at how Whit-Tum world conceives of the self. As before, ‘Whit-Tum world’ is ***not*** a pan-psychic world: consciousness and the self have to be generated out of the ‘raw material’ consisting of the ‘drops of experience’, which are the fundamental building blocks of everything which exists. (This need for the ‘construction’ of the human self and its consciousness is the explanation as to why rocks, for example, are not as conscious as we are, despite the fact that they are ultimately composed out of ‘drops of experience’.) In ‘Cart-Ton world’ the self is either an illusion or a social construction, but even in Whit-Tum world (given that it’s not pan-psychic) we have to ***account for*** the emergence of consciousness and the self. We’ll be considering the processes that lead us to our sense of selfhood. In trying to identify these processes, I’ll be relying mainly on the work of Jaak Panksepp, the Estonian-American neuroscientist and psychobiologist who coined the term ‘affective neuroscience’ and Daniel Siegel, clinical professor of psychiatry at the UCLA School of Medicine and Executive Director of the Mindsight Institute. The feeling ‘Whit-Tum self’ described by these theorists can be seen as moving in the opposite direction from the Oxford philosopher, Gilbert Ryle’s project of removing ‘the ghost in the machine’: Whit-Tum world’s project is to ‘reinstall the affective heart into the machine’.

The Self as a 'Centre of Feeling'

As with consciousness in general, theories of the self can be divided between 'command and control' variants and those that see the self as principally concerned with receiving and responding to sentience. Folk Psychology and Workspace theories are examples of the former. My own preferences, however, are very definitely for a receiving, responding and sentient model of the self. As regards the 'Commander Self', I am persuaded that the social psychologist, Jonathan Haidt's[510] metaphor of the self as a person passively riding on an enormous elephant is an accurate one. Rather than controlling the elephant (who is perfectly capable of taking care of himself), the 'purpose' of the small boy is to act as a 'centre of feeling': to respond with appropriate affect to the incoming stream of qualic input, and to keep the records of these responses. This record is the core basis of identity for each individual. Defending the integrity of this record is what mobilises the psychic resources of the individual. This is what a leading Cart-Tonist, like Dennett, ignores when he asks rhetorically was that infant, whose primitive paintings you mother still has 'really you?'[511] Despite Dennett's irony, the answer is a very definite yes! It's this continuity of feeling (not always necessarily conscious) that defines and gives meaning to the concept of the self.

Let's try to 'unpack' these claims a little within the context of Whit-Tum world: Panksepp identifies seven 'primordial

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[510] Haidt, Jonathan, 'The Righteous Mind', 2012, Penguin, p.19

[511] Dennett, Daniel,'Consciousness Explained', 1991, Boston, MA: Little Brown, p.423

emotions' and claims that they form the basis of a 'core self'. He doesn't speculate as to the ultimate origins of the primordial emotions, other than associating them with 'emotional centres' in the brain. Let me, however, suggest these powerful qualic experiences can be seen as part of the ontology of Whit-Tum world: Whitehead's doctrine distinguishes between 'simple' and 'compound' individuals. As explained in chapter twelve, simple individuals are the most elementary units of nature, e.g. quarks or other subatomic particles. Compound individuals are compounded from; "… simpler individuals, as when atoms are compounded out of subatomic particles, molecules out of atoms, living cells out of macromolecules, and animals out of cells. These compound individuals are true individuals because the experience of their members gives birth to a highest level experience, which is the 'dominant' member of the organism as a whole. This dominant member gives the compound individual a unity of experience and a unity of action, so that it can act purposively with a degree of freedom. These compound individuals hence differ in kind from mere aggregations of individuals, such as rocks and telephones, in which the experiences of the individual molecules do not give rise to a higher level, inclusive experience."[512]

Given the universality of the primordial emotions in humans (and indeed across all mammalian species) they could be characterised as 'compound individuals' in this Whiteheadian sense. What this means is that the 'affect' component of the seven primordial emotions identified by Panksepp (and perhaps others, for example 'awe' as described

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[512] Griffin, David Ray, 'Whitehead's Radically Different Post-Modern Philosophy', 2007, SUNY Press, loc:864

by Haidt[513]) exist at least as potentials, independently of the organisms which experience them: they are ‘patterns of experience’ waiting to be activated by an appropriate response, a bit like Jungian archetypes though consisting not of complex symbols but rather directly experienced, powerful affective reactions. A similar conception of the self can be found in ancient Greek culture, which; “… prior to Plato, had little conception of a self as a single entity within the body.” Homer rarely referred to mental states: “Equally, there is an absence in the Odyssey and the Iliad of ideas such as ‘mind’, ‘soul’ or ‘consciousness’. The Homeric psyche seems to designate a life-force within us - a life-force not unique to humans, or even animals, but something possessed even by trees and magnets … And where does thinking and feeling occur? For Homer’s heroes, there seems to be no single place, but a variety of different bodily locations.”[514]

Why Do We Have a Self?

So, Panksepp postulates a ‘core SELF’, based on the primordial emotional centres in the brain. He then asks why this emotional self might have evolved: “From a neurophysiological perspective, we must envision how the fundamental coherence of organisms - their internally felt unified presence in the world - is created by the ancient subcortical midline systems of the brain. What evolutionary reasons do we have to argue for the existence of a SELF within these ancient neural complexities?” His answer is that the various primary-process emotional systems are, in fact, evolutionary ‘tools for living’, which we all inherit

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[513] Haidt, Jonathan, ‘The Righteous Mind’, 2012, Penguin, p.398

[514] Malik, Kenan, ‘Man, Beast and Zombie’, 2000, W&N, p.43

and which help us to deal with the basic challenges of life. Together with the core SELF, they provide the necessary ingredients for both organismic emotional-behavioural coherence as well as the associated affective states. Panksepp also proposes that; "… the core SELF and the seven emotional systems interacting with higher brain functions, such as working memory, permit the emergence of higher levels of reflective 'knowing' (noetic consciousness) as well as a multilayered existential self-awareness, which is a developmental, perhaps unique, quality of the human mind. The ineffable feeling of experiencing oneself as a specific and individual active agent amid the perceived events of the world surely reflects a recently emergent ability of the MindBrain, constituting a cognitive, even rational, form of consciousness." In other words, Panksepp's claim is that the core SELF, which is dominated by emotions, is the foundation for our higher forms of self-consciousness: these are generated by an intermingling of these primary affective capacities with secondary/tertiary mental abilities which emerge from an animal's interactions with its ecological, social, and cultural environments.[515]

Panksepp argues, therefore, from an evolutionary perspective, that emotion may have guided the construction of many sensory-perceptual abilities. Therefore, if we want to fully understand higher forms of consciousness, we first have to examine more primal, emotional forms of consciousness. And Panksepp insists that this includes studying the, much neglected, neural foundations of the emotional self-representation, what he has called, the core SELF: "It took care of immediate bodily concerns - engendering (i)

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[515] Panksepp, Jaak, 'The Archaeology of the Mind', 2012, New York, W.W. Norton & Company, p.393/394

SEEKING, first to take care of homeostatic needs such as water, energy, and thermal balances … and then more subtle emotional needs: (ii) RAGE and FEAR to avoid bodily destruction and to compete effectively for many resources that are essential for (iii) primal LUST, which promotes species survival. These reptilian emotions were gradually supplemented with more subtle social principles. The next phase of mind evolution, presumably in species existing before the divergence of birds and mammals, added the uniquely social-emotional systems of CARE, GRIEF, and PLAY, all built upon the preexisting reptilian emotions, especially SEEKING."[516]

Panksepp asks: "What is affect, if it is not experienced by a subjective 'me'? It first represented various homeostatic states as affective states of the MindBrain, experienced by changes transpiring in the neural representations of the body within the brain (neural networks that remained, of course, interlinked with what was actually happening in the peripheral body)." He gives the examples of low body water levels and high blood solute levels: these are experienced as thirst. A rapid decline in blood sugar arouses hunger, and so on: "The most important sensory experiences like the odour of foods, and various types of touch, are experienced as affectively pleasant or unpleasant. Often these associated affects may be learned, highlighting how we develop learned preferences and dislikes." On the other hand, the 'idiographic' or individual self, requires a self-conscious 'I'; "To make sense of core-consciousness we also need to envision how higher levels of mind emerged evolutionarily from the more fundamental forms. Thus, we must

[516] Ibid, p.398

make a distinction between primitive phenomenal forms of consciousness, which provide the capacity for pure experience without yet having the capacity to reflect on the experience (namely to have self-conscious awareness, defined as the ability to envision one-self as an experiencing actor on the world stage). That is fairly complex stuff, much farther along than the mere capacity to experience oneself in the world."[517] Let me suggest that what Panksepp calls here 'primitive phenomenal consciousness', which provides a 'capacity to experience oneself in the world' is in fact the immediate biological realisation of Whitehead's compound individual: 'These compound individuals are true individuals because the experience of their members gives birth to a highest level experience, which is the *dominant* member of the organism as a whole', as Griffin describes above.

The Emotional Self

Jaak Panksepp identifies two 'flavours' of raw, phenomenal consciousness: First, we can experience the various types of positive and negative emotions, the different forms of 'goodness' and 'badness'. Second, we have the capacity to sense the perceptual world, what some theorists have called the 'movie in the head'. This, Panksepp explains, is the foundation for cognitive awareness. He also speculates that the emotional form is older than the cognitive: "It is easy to claim that we do not really know which is more ancient in brain evolution, or how these types of phenomenal experiences are coupled. But if we had to make a choice, we would suggest that affective forms of subjective experience are older in MindBrain evolution than the cognitive forms." Panksepp argues this because these emotional forms of sub-

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[517] Ibid, p.394-399

jectivity are elaborated in more more ancient regions of the brain, whereas; "… the discrete sensory-perceptual functions are situated more laterally, which suggests a more recent origin." Panksepp resists a sharp and simple 'I'/'Me' separation (such as Norretranders') and argues for a deep and evolutionarily early integration between sensory and emotional experiences: "Were primary affective and sensory-phenomenal experiences initially intimately linked during early BrainMind evolution, or were they two fundamentally distinct forms of primordial consciousness of the brain from the outset? We don't know. But new theoretical perspectives could be crafted from the supposition that the experience of conscious sight and sound were initially largely affective."

So, Panksepp is suggesting that the recent, sophisticated, 'distance' sensory channels of sight and sound (the modalities which Humphrey argues are the basis of Perception) evolved initially in conjunction with our affective (subjective emotional) equipment. Panksepp is basing this conclusion about an affect-perception link on the following evidence: "The immediacy with which sudden visual or auditory stimuli can startle and frighten us especially when such stimuli originate very close to our bodies, suggests a deep primal integration of these sensory systems with some of our most essential affective survival mechanisms." He also appeals to our tendency to associate specific colours with feelings; "… red with passionate arousals, yellow with happiness, blue with cool or relaxed states, greens and browns with a secure love of the living land, black with death. Likewise, consider how easily sound arouses our emotional feelings, from the tone of someone's voice, and the songs of birds in nature, to the miracle of human-generated music."[518]

Contrary to the neuroscientist, Edmund Rolls, and many other mainstream emotion researchers, Panksepp insists that all other mammals (and perhaps other species) ***do*** have subjective emotional experience. As he says: "Read-out theories imply that affects can only occur either in animals that are intelligent enough to interpret emotional physiology or in animals that have language. This would mean that only human beings and perhaps some other primates are affective creatures. Presumably less intelligent mammals copulate without lust, attack without rage, cower without fear, and nurture without affection." Panksepp considers where the affective networks in the brain are located. He envisages this in terms of nested hierarchies: "In this view, the lower BrainMind functions are embedded and re-represented in higher brain functions, which yield not only traditional bottom-up controls but also top-down regulations of emotionality. This provides two-way avenues of control that can be seen to be forms of 'circular causality' that respect the brain as a fully integrated organ that can have dramatic intra-psychic conflicts."[519]

Panksepp also notes that the neural areas he associates with the core SELF are massively connected to many other parts of the brain. The core SELF is connected with various sensory triggers and regulatory feedbacks, to motor functions, autonomic integrative responses, as well as to many higher cognitive processes. Panksepp suggest that this massive

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[518] Ibid, p.395/396

[519] Ibid, p.17 and 77

interconnectedness may be regulated by the concepts of nonlinear dynamics, such as the 'attractor landscapes' of chaos theory. As an example, Panksepp says that; "… in humans the intense whole-body motor patterns of primary-process emotional responses, such as laugher and crying, can effectively promote affective changes of joy and sadness."[520]

The Developmental Self

Further support for the notion of affect as the organising principle for the self can be found in the work of the developmental psychologist and researcher, Daniel Siegel. He insists that emotion is central and fundamental to the process of integration: "Emotion can be seen as the fundamental process of the mind that links states of arousal with the appraisal of the value or the meaning of its own representational processes. In this way, the mind's creation of representations provides us with insight into how reality is shaped by emotional and interpersonal processes. Our internal experiences are constructive processes; our interpersonal relationships help shape the ways in which these representational processes develop. Emotion can thus be seen as an integrating process that links the internal and interpersonal worlds of the human mind." Addressing the question; 'What is the mind?' Siegel is very clear that it's a real entity: unlike the heart, lungs or brain, it can't be directly observed, but this doesn't mean that it's not just as real as these other human organs.

Siegel is also very clear as to the function of the mind; "… it governs the total organism and its interaction with the

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[520] Ibid, p.405

environment." (Though not, of course, consciously for the vast majority of the time.) He also describes the mind, "... as a subjectively perceived, functional entity, based ultimately upon physical processes but with complex processes of its own." Siegel further suggests that the central goal of the mind is to attempt to bring about the integration of experience across a life-time: "We can have complex representations of sensations, perceptions, ideas, and linguistic symbols as we think, for example, of some time in the past. The integration of these distinct modes of information processing into a coherent whole may be a central goal for the developing mind across the lifespan."[521]

The quality of an individual's interpersonal relationships, especially during early childhood, are (according to Siegel) crucial to the process of trying to integrate experience: "Interpersonal relationships may facilitate or inhibit this drive to integrate a coherent experience. Relationships early in life may shape the very structures that create representations of experience and allow a coherent view of the world: Interpersonal experiences directly influence how we mentally construct reality. This shaping process occurs throughout life, but is most crucial during the early years of childhood. Patterns of relationships and emotional communication directly affect the development of the brain."[522] The self emerges, during early infancy, as a product of the mind's efforts to integrate its experience: Siegel quotes the child psychologist, Alan Sroufe's definition of the self; "… as an internally organised cluster of attitudes, expectations,

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[521] Siegel, Daniel 'The Developing Mind', 1999, The Guilford Press, p.2-7

[522] Ibid, p.4

meanings, and feelings. In [Sroufe's] view, the self emerges from an 'organised caregiving matrix' that in part determines how the individual responds to and engages with or avoids the environment. Relationships also determine how children interpret experience."[523]

Siegel claims that neural connections are shaped by human connections and that from this process the mind and the self emerge. He identifies three principles which guide the development of the mind. The first principle is that the; "… human mind emerges from patterns in the flow of energy and information within the brain and between brains." These patterns in the flow of energy and information, Siegel says; "… can be described as emanating from the activity of the neurones of the brain." The 'flows of energy' that Siegel is referring to may be conceived of as emotional, 'analogue states' in the brain, which tend to be neglected by cognitive theorists in favour of computational information processing. Siegel is very keen to emphasise that these 'energy flows', which he claims create our mental processes, are not figments of the 'New Age' imagination but based on the findings of modern neuroscience: "These assessments of 'energy flow' are not popularised, unscientific views of the flow of some mysterious energy through the universe. Neuroscience studies the way in which the brain functions through the energy-consuming activation of neurones. The degree and localisation of this arousal and activation within the brain - this flow of energy - directly create our mental processes."[524] (Let me note that there are

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[523] Ibid, p.229/230

[524] Ibid, p.2/3

obvious analogies between this ‘energy flow’ and the ‘experience processes’ of Whitehead’s ontology.)

Siegel’s second principle insists that the social, inter-personal dimension in our mental development just simply cannot be ignored, even by neuroscience: “The mind is created within the interaction of internal neurophysiological processes and interpersonal experiences.” The third principle states that the specific experiences of each individual will have specific effects on that individual’s nervous system as it matures: “The structure and function of the developing brain are determined by how experiences, especially within interpersonal relationships, shape the genetically programmed maturation of the nervous system.” Siegel is arguing that we need to investigate in detail the ways in which experience shapes the brain, thus influencing future behaviour: “By altering both the activity and the structure of the connections between neurones, experience directly shapes the circuits responsible for such processes as memory, emotion, and self-awareness. We can use an understanding of the impact of experience on the mind to deepen our grasp of how the past continues to shape present experience and influence future actions.” This is a new frontline of research where psychotherapy meets neuroscience.[525]

Shaping the Self

Developmental research has made it clear that early life-experience may be especially crucial in organising the way the basic structures of the brain develop. Siegel gives the example, of traumatic experiences at the beginning of life,

[525] Ibid, p.2

these; "… may have more profound effects on the 'deeper' structures of the brain, which are responsible for basic regulatory capacities and enable the mind to respond later to stress. Thus we see that abused children have elevated baseline and reactive stress hormone levels." Siegel goes on to say that common, everyday experiences also shape brain structure in a process called 'pruning'. This is because the brain's development is an 'experience-dependent' process, in which experience activates certain pathways in the brain, strengthening existing connections and creating new ones. Lack of experience can lead to cell death, which is sometimes called the 'use-it-or-lose-it' principle of brain development. Siegel explains that infants are born with a genetically programmed excess of neurones, but the postnatal establishment of synaptic connections is determined by both genes and experience: "Genes contain the information for the general organisation of the brain's structure, but experience determines which genes become expressed, how and when. The expression of genes leads to the production of proteins that enable neuronal growth and the formation of new synapses." Thus experience activates specific neural pathways, which can shape gene expression. This leads to the maintenance, creation, and strengthening of the connections that form the neural substrate of the mind: "Early in life, interpersonal relationships are a primary source of the experience that shapes how genes express themselves within the brain."[526]

In addition to the pruning of neurones, Siegel also identifies the mechanisms of epigenetics as playing a role in this mind/brain 'sculpting process: "A typical environmental/

[526] Ibid, p.13/14

parental response to a child's behavioural output may reinforce that behaviour. Therefore, the child plays a part in shaping the experiences to which the child's mind must adapt." So, behaviour itself alters genetic expression, which then creates behaviour. Gradually, changes in the organisation of brain function, emotional regulation, and long-term memory are mediated by alterations in neural structure: "These structural changes are due to the activation or deactivation of genes encoding information for protein synthesis. Experience, gene expression, mental activity, behaviour, and continued interactions with the environment (experience) are tightly linked in a transactional set of processes. Such is the recursive nature of development and the way in which nature and nurture, genes and experience, are inextricably part of the same process."[527] What's driving, or guiding, this sculpting of the infant mind-brain is what Siegel calls, 'the pattern of emotional communication between child and caregiver'. This is the primary ingredient which determines the quality of the attachment experience that the child has. According to Siegel, this explains why; "… emotion is so important for the evolving identity and functioning of a child, as well as in the establishment of adult relationships." The specific 'shape' into which each individual's child's mind/brain is sculpted is, according to Siegel, dependent on different patterns of child-parent attachment. These ultimately result in; "… differing physiological responses, ways of seeing the world, and interpersonal relationship patterns." He also identifies the communication of emotion as; "… the primary means by which these attachment experiences shape the developing mind. Research suggests that emotion serves as a central organis-

[527] Ibid, p.4-6

ing process within the brain. In this way, an individual's abilities to organise emotions - a product, in part, of earlier attachment relationships - directly shape the ability of the mind to integrate experience and to adapt to future stressors."[528]

Attachment

Attachment theory was developed in the 1960s and '70s. It states that, to facilitate survival, evolution has ensured that human infants will attempt to bond with their 'primary caregiver'. Depending on the sensitivity of this adult, the extent to which they 'attune' to the infant in their care, this attempt at bonding will result in basically three types of 'attachment' outcome: 'secure', 'anxious–preoccupied' and 'avoidant'. As the names imply, the achievement of 'secure attachment' with the primary caregiver means that the infant will go on in life to form 'healthy' and 'positive' bonds with others, especially with a spouse. 'Avoidant' essentially implies a failure of attachment, due to negative or inadequate responses from the caregiver, the infant concludes that 'others' are not to be trusted or relied upon to fulfil needs, or (in the worst case) that others represent a physical or psychological threat. Clearly, these infants grow into adults who have few and difficult relationships and generally are not 'socially successful' in life. Developing an 'anxious–preoccupied' attachment results in adults who are excessively dependent or controlling and generally tend to be very neurotic regarding relationships. The infant's process of attaching to, or bonding with, its mother (or other primary caregiver) 'engrains' the mental and emotional architecture of the infant's mind: "Repeated patterns of chil-

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[528] Ibid, p.4-6

dren's interactions with their caregivers become 're-membered' in the various modalities of memory and directly shape not just what children recall, but how the representational processes develop."[529] (This is the process that I refer to as 'deep learning'.)

Siegel explains how this process of 'engrainment' shapes; behaviour, emotions, perceptions, sensations, and models of others. Siegel also claims that this occurs before children have verbal, autobiographical memory processes available to them. Despite this lack of adult mental capacities, these 'shapes' will influence the later structure of autobiographical narrative. These have been found to differ dramatically according to the particular individual's pattern of early attachment. The child's attachment experience results in what Siegel calls 'engrained self-states': "Mental states reflect specific patterns of activity, such as states of anger or shame. Some of these states become engrained over time with characteristic patterns of activity." According to Siegel, the self attempts to create a sense of coherence across time by trying to integrate its various self-states as they become active. One of the key processes by which the self organises and modulates its emotions is autobiographic narrative. Siegel's idea is that these narratives have an integrative function, both for the self and others: autobiographical narratives integrate varied representations and mental models: "Autobiographical narratives are reviewed, in order to explore how the mind creates coherence within its own processes and how this central integrative function influences the nature of interpersonal relationships. In part, such an integrative function reveals the capacity of the

[529] Ibid, p.5

mind to represent and process the activity of the minds of both self and others. Such a capacity appears to be central to secure attachment relationships."[530]

At this point Siegel introduces the concept of adult attachment patterns as an indicator of the extent of coherence of the self achieved by an individual (as assessed by Adult Attachment Interviews): narratives are, in fact, used as a means of assessing self integration, depending on the coherence of the structure of a subject's autobiographical narrative. This is reflected both in the way a life story is told and the manner in which life activities are lived. These linguistic and behavioural outputs are generated from a 'central integrative process', which Siegel is proposing: "Developing the capacity to integrate mental coherence is profoundly influenced by experience. In this way, attachment histories revealed in adult attachment narratives reflect the capacity of the individual to integrate a coherent sense of self. By organising the self across past, present, and future, the integrating mind creates a sense of coherence and continuity." Not only is the attachment relation between child and parent crucial in forming the child's mind, but, Siegel claims, its quality can be empirically measured and even used to make predictions. This claim is based on extensive programs of interviewing adults about their experience of childhood and parenting, in order to establish the structure of the adult's narrative of their own childhood: "A profound finding from attachment research is that the most robust predictor of a child's attachment to parents is the way in which the parents narrate their own recollections of their childhood experiences. This implies that the structure of an

530 Ibid, p.5-6

adult's narrative process - not merely what the adult recalls, but how it is recalled - is the most powerful feature in predicting how an adult will relate to a child. Studies of couples expecting their first child can predict how each parent will relate to their yet-to-be-born infant by examining the nature of the narratives of their own childhoods."[531] (This reality of attachment has important implications for my theory of the self and what I call 'deep learning', as opposed to cognitive learning.)

We can contrast this account from Siegel with Dennett's description of the human 'narrative self', which we looked at in chapter five: Dennett gives the examples of spiders and beavers who, respectively and automatically, spin webs and build dams in order to realise their biological selfhood. But how do humans achieve this? Dennett says that: "Our fundamental tactic of self-protection, self-control, and self-definition is ... telling stories, and more particularly concocting and controlling the story we tell others - and ourselves - about who we are." And Dennett is insistent that just as spiders and beavers don't have to think, consciously and deliberately, about building their respective structures, nor do humans: "Our tales are spun, but for the most part we don't spin them; they spin us. Our human consciousness, and our narrative selfhood, is their product, not their source."[532] In other words, Dennett (in contrast to Siegel) flatly denies that there is any conscious control or structuring of the self's narrative processes: rather than being a conscious, on-going attempt by the emotional self to inte-

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[531] Ibid, p.5-9

[532] Dennett, Daniel,'Consciousness Explained', 1991, Boston, MA: Little Brown, p.418

grate its experiences, Dennett's narratives are instinctively triggered processes, which, in an apparently random and environmentally driven way, automatically generate a self which is passively indifferent to its own integration.

Dennett also insists that this narratively constructed self is non-biological and can be literally divorced from the brain and body out of which it was initially devised and maintained. In fact, Dennett sees the 'program of the self' as being so independent and separable from its biological 'hardware', that he speculates that it might survive death in another medium: "If you think of yourself as a centre of narrative gravity, ... your existence depends on the persistence of that narrative .. (it) could theoretically survive indefinitely many switches of medium, be teleported ... and stored indefinitely as sheer information. If what you are is that organisation of information that has structured your body's control system (or, to put it in its more usual provocative form, if what you are is the program that runs on your brain's computer), then you could in principle survive the death of your body as intact as a program can survive the destruction of the computer on which it was created and first run."[533] Again, this is in stark contrast to Siegel and Panksepp, who see the self as intimately anchored in the primordial emotional memories of the individual brain. This anchoring would certainly not permit the self to be 'downloaded', as a complex information set, to a computer! In addition, and once again, Whitehead's ontology would also rule out Dennett's phantom of 'computer immortality for the self' because our current information technology is thoroughly Cart-Tonist: in other words, it treats matter as

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[533] Ibid, p.430

passive and 'dead' and ignores its experiential 'feeling' capacity. (A possible objection here may be the advent of quantum computing, however; a) the notion of using it to reproduce a human self is wildly speculative, and b) it's clearly not the sort of computing that Dennett had in mind.)

Regulating Emotion for Self Organisation

Siegel next introduces the concept of 'emotional self-regulation'. This is fundamentally related to the modulation of emotion; "... this process involves the regulation of the flow of energy and information via the modulation of arousal and the appraisal of meaning of cognitive representations of experience." A capacity for such emotional regulation has to be cultivated by interpersonal relations during infancy and childhood. Each self thus acquires, via the quality of parenting during which it developed, effective (or less effective) mechanisms to modulate its emotions and organise itself.[534] Siegel is suggesting that emotion needs to be modulated not only for its own sake, but also because emotion has an essential role in integrating the mind/brain in time and across time. But, of course, this process of emotion generating coherence in the mind is by no means automatic: it's a function of an individual's experiential history: "Not all individuals are able to find emotional well-being in integrating multiple self-states into a coherent experience of the self. From early in development, the resolution of multiple models of attachment may be one of the determinants of later developmental outcome." Siegel is here referring to the possibility of a contrasting character or quality of relationships with different caregivers, which can generate conflicts within the developing mind's efforts to achieve

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[534] Siegel, Daniel, 'The Developing Mind', 1999, The Guilford Press, p.8

integration. “Experiences within relationships and the ways in which the mind comes to create a coherent perspective, access to information, and models of such experiences are important variables in determining emotional resilience or vulnerability.” In other words, a successful integrative process may be essential to the acquisition of well-being, and the capacity to achieve such an internal integration may be intimately dependent on interpersonal experience, initially from attachment relationships, and later shaped by individuals’ ongoing involvement with parents, teachers, and peers.[535]

What happens when, as a result of suboptimal interpersonal relations in early life, there’s a failure to achieve the viable level of integration which Siegel describes? The neuroscience journalist, Rita Carter says that it’s essential that we believe that the self is firm and solid, because only then can we think of ourselves as located within it. She says the boundary drawn in the brain to define the physical ‘self’ from the ‘non-self’ is permeable and fluid: the brain system on which it’s based can be shown, in certain situations, to generate illusions. This sense of physical location is important for our sense of self because it provides us with a unique point of view: Carter says; “... only by being located can we have a point of view which is ours and ours alone - a unique, private and owned little slice of the conscious universe. ‘Owned’ experience is our window on the outside world, but one that only ever accords a limited view. For example, we see objects literally from the point from which we view them.” (Combining this personal point of view, with the concept of an ‘objective world’ is the problem ad-

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[535] Ibid, p.310/311

dressed by the philosopher, Thomas Nagel's book, 'The View from Nowhere'. This phrase also represents the outlook of Cart-Ton world, which rather than a personal perspective, seeks to take a 'God's eye' view of the world.) Carter continues that the boundary we draw around our non-physical self is even more changeable and plastic: "Sometimes we feel our mental realm is huge, solid and impervious. At other times we feel shrunken and transparent." As if we could dissolve like a soluble tablet in a glass of water.[536]

The Bee-Hive Mentality and the Sense of Awe

Carter then discusses how profoundly the social context can effect on where we draw the boundary of our ego-self: "The modern Western world is highly individuated and the selves within it generally regard themselves as discrete 'atoms' of consciousness, constantly interacting with one another, but essentially separate." Other cultures, however, define the self almost exclusively in terms of social interactions, such as Polynesian islanders: "Asked, for example, to describe an emotion like sadness, the response will be to describe a sad social situation ... rather than an inner feeling." But even in our 'atomist' societies, we can experience the boundaries of our selves as flexible. Part of the process of falling in love, for example, is the feeling of merging with another person. Also, when we form groups, such as choirs or sports teams, our boundaries can, again, become permeable. Carter says that: "Like ants in a colony or bees in a hive, our individual intentions become subsumed by that of the group."[537] Here again, we can detect a Cart-Ton-

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[536] Carter, Rita, 'Consciousness', 2002, Weidenfeld Nicolson, p.221

[537] Ibid, p.220

ist predisposition: compare Carter's social-cultural account of this transition from individualism to 'hive-mentality' with that of Jonathan Haidt, from his book, 'The Righteous Mind'. He says that human societies have often been compared to beehives, and asks how loose this analogy is: "If you map the queen of the hive onto the queen or king of a city-state, then yes, it's loose. A hive or colony has no ruler, no boss. The queen is just the ovary. But if we simply ask whether humans went through the same evolutionary process as bees - a major transition from selfish individualism to 'groupish' hives that prosper when they find a way to suppress free riding - then the analogy gets much tighter."[538]

Haidt goes on to say that many animals are social, living in groups, flocks, or herds, but only a few species have crossed the threshold and become 'eusocial'. This means that they live in very large groups with some form of internal structure, enabling them to reap the benefits of the division of labour. For example, beehives and ants have separate castes of soldiers, scouts and nursery attendants, and, of course, human societies also have a division of labour. Haidt argues that we are 90 percent chimp and 10 percent bee and that religion has been; "… an essential part of the evolution of our hivish overlay; sometimes we really do transcend self-interest and devote ourselves to helping others, or our groups." Without it human societies can descend into Durkheim's norm-less anomie because we; "… evolved to live, trade, and trust within shared moral matrices. When societies lose their grip on individuals, allowing all to do as they please, the result is often a decrease

538 Haidt, Jonathan, 'The Righteous Mind', 2012, Penguin, p.296/297

in happiness and an increase in suicide, as Durkheim showed more than a hundred years ago."[539]

Haidt suggests that this switch from individualism to hive-mentality may originally have been a group-related adaptation, but he also associates it with the feeling of 'awe': "The emotion of awe is most often triggered when we face situations with two features: vastness (something overwhelms us and makes us feel small) and a need for accommodation (that is, our experience is not easily assimilated into our existing mental structures; we must 'accommodate' the experience by changing those structures)." Awe functions as a 'reset button': it makes people forget themselves and their petty concerns. Awe opens people to new possibilities, values, and directions in life. Haidt claims that awe is one of the emotions most closely linked to the 'hive switch', together with collective love and collective joy. "People describe nature in spiritual terms - as both Emerson and Darwin did - precisely because nature can trigger the hive switch and shut down the self, making you feel that you are simply a part of a whole."[540] Haidt gives three examples as to what can cause people to switch into the 'hive-awe' state of mind and also speculates as to the mechanism which may underlie it: "I described three common ways in which people flip the hive switch: awe in nature, Durkheimian drugs, and raves." He describes recent findings which suggest that oxytocin and mirror neurones are the stuff of which the hive switch is made: "Oxytocin bonds people to their groups, not to all of humanity. Mirror neurones help people empathise with others, but particu-

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[539] Ibid, p.388

[540] Ibid, p.332

larly those that share their moral matrix."[541] Once again, we can recognise here a great deal of congruence with Whitehead's ontology: this ten-percent-tendency of human groups to transform into an 'awe-hive super-organism' can be equated with Whitehead's notion of 'compound individuals' emerging from a vast hierarchy of 'drops of experience'.

541 Ibid, p.354

Chapter Seventeen: Free Will, Compatibilism and Whit-Tum World

As will be apparent from the structure of this book, I believe that qualia and the self are above all the important characteristics of consciousness. Many alternative accounts of consciousness, Folk Psychology for example, would include free will as being equally important. I do not believe this, nor do I believe that we are possessed of an absolute, divinely given free will, though I do think that we have a limited, though significant form of free will in certain areas of behaviour (all of which I shall expand upon at the end of this chapter). I begin the chapter by looking at modern forms of 'Compatibilism', specifically those of the philosopher, Gilbert Ryle and his student, Daniel Dennett: 'Compatibilism' is the belief that free will and determinism are mutually compatible and that it is possible to believe in both without being logically inconsistent.

Compatibilists believe that freedom can be present or absent in situations for reasons that have nothing to do with ontology. (I, therefore, categorise them as Ideological Empiricists, who dismiss ontology as delusional and unnecessary.) Compatibilists define free will as freedom to act according to one's motives without arbitrary hindrance from other individuals or institutions. I move on to examine the work of the psychiatrist, Jeffrey Schwartz who successfully treats obsessive-compulsive patients using the 'power of the will', based on quantum theories of free will develop by the physicist, Henry Stapp, including the quantum 'zeno effect'. Finally, we look at a quantum theory of conscious choice developed by the science writer, David Hodgson, before I present my own views on these topics.

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Freedom within Reductionism? - Ryle's Compatibilist Paradoxes

In his introduction to a recent edition of Gilbert Ryle's classic, major work, 'The Concept of Mind', his student Daniel Dennett described Ryle's philosophy as a form of 'linguistic therapy'. We can look at an example: it concerns a man accused of shooting someone. Ryle considers the sort of questions that can be asked about how and why the gun fired, both in terms of how guns work and how human beings 'work'. He says that men are not machines, they are men: "People often ask such questions as 'How does my mind get my hand to make the required movements?' and even 'What makes my hand do what my mind tells it to do?' Questions of these patterns are ***properly*** asked of certain chain-processes. The question 'What makes the bullet fly out of the barrel?' is ***properly*** answered by 'The expansion of the gases in the cartridge'." When someone then asks: 'How does my mind get my finger to squeeze the trigger?' "… the form of the question presupposes that a further chain process is involved, embodying still earlier tensions, releases and discharges ***though this time 'mental' ones***." But; "... the performance of it ***has to be*** described in just the same way as in ordinary life we describe the squeezing of the trigger by the marksman. Namely we say simply ***'He did it'*** and not 'He did or underwent something else which caused it'." (my emphases)

Ryle seems to be claiming that asking: 'How does my mind get my finger to squeeze the trigger?' is an 'improper' question. Ryle then refers to billiards, as another example illustrating how explaining events in mechanical terms may be necessary without being sufficient. If one knew the complete state and all the relevant conditions of all the balls, then it would, in principle, be possible to predict any later state of the balls from their present state. But, Ryle says it; "… does not follow from this that the course of the game is predictable in accordance with those laws alone. A scientific forecaster, who was ignorant of the rules and tactics of the game and of the skill and plans of the players, could predict, perhaps, from the beginning of a single stroke, the positions in which the balls will come to rest before the next stroke is made; but he could predict no further. The player himself may be able to foresee with modest probability the sort of break that he will make, for he knows, perhaps, the best tactics to apply to situations like this and he knows a good deal about his own skill, endurance, patience, keenness and intentions."[542]

Ryle uses this billiards example to illustrate the compatibility, or even necessary connection, between mechanical laws and skilful judgement: a player must have, at least, a 'rule-of-thumb' knowledge of the mechanical principles which govern the accelerations and decelerations of the balls in order to play skilfully. Ryle says: "His knowledge how to execute his intentions is not at loggerheads with his knowledge of mechanical laws; it depends on that knowledge." Ryle claims that we couldn't have games of skill if; "... the instruments of the game behaved randomly." A player of billiards doesn't ask for favours from laws of physics, nor from rules of billiards: "Why should he? They do not force his hand." Ryle criticises moral philosophers who believe that the advance of science undermines the exercise of

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542 Ryle, Gilbert, 'Concept of Mind', 1949, Routledge, (2009), p.77-79

moral virtues. Their false assumption consists in the claim that there's a; "… contradiction in saying that one and the same occurrence is governed both by mechanical laws and by moral principles." Ryle is adamant that such an assumption is baseless. A golfer can simultaneously obey the laws of ballistics and the rules of golf while still playing with elegance and skill: "Not only is there plenty of room for purpose where everything is governed by mechanical laws, but there would be no place for purpose if things were not so governed. Predictability is a necessary condition of planning."[543]

Why does Ryle take this position? To explain this, he asks us to imagine a naive 'researcher' observing a chess match: he commiserates with players on their bondage, because, the observer says: "Every move that you make is governed by unbreakable rules; from the moment that one of you puts his hand on a pawn, the move that he will make with it is ... accurately predictable. The whole course of what you tragically dub your 'game' is remorselessly pre-ordained; nothing in it takes place which cannot be shown to be governed by one or other of the iron rules. Heartless necessity dictates the play, leaving no room in it for intelligence or purpose."

Ryle's players respond by saying that; "… though every move is governed, not one of them is ordained by the rules. True, given that I start to move my bishop, you can predict with certainty that it will end on a square of the same colour as that from which it started. That can be deduced from the rules. But that, or how far, I shall move my bishop at

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[543] Ibid, p.75-78

this or that stage of the game is not stated in, or deducible from, the rules." So, Ryle points out that, despite the rules, there's plenty of room for cleverness and stupidity, for deliberation and choice when playing chess. The rules are the same for all games of chess ever played, but yet every game is unique: "The rules are unalterable, but the games are not uniform. The rules prescribe what the players may not do; everything else is permitted, though many moves that are permitted would be bad tactics." The players explain to the naive observer that 'explanations' for particular moves can be discovered, but not explanations in terms of the rules of the game. These real explanations are in terms of quite different things, for example, the player's use of tactical principles, and every move may obey both a tactical principle and a rule of the game. Ryle says: "Knowing how to apply tactical principles involves knowing the rules of the game, but there is no question of these principles being 'reducible' to rules of the game."[544]

Two Different But Compatible Modes of Explanation

Ryle then says that the laws of physics are not really like the rules of chess: nature is not a game and its laws are not human inventions or conventions. But, he claims, the chess illustration indicates that there's no contradiction in saying that; "… one and the same process, such as the move of a bishop, is in accordance with two principles of completely different types and such that neither is 'reducible' to the other, though one of them presupposes the other." In other words, there can be two quite different sorts of 'explanation', neither of which is incompatible with the other. A

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[544] Ibid, p.75/76

spectator might ask (using one meaning of ‘why’) why a bishop always ends its move on a square of same colour as the square it started on. This can be answered by the rules of chess. He might then ask (in another sense of ‘why’) why a player moved his bishop. This can be answered by referring to the player’s concern to remove a threat to his King. Ryle concludes that: “Words like ‘explanation’, ‘law’, ‘rule’, ‘principle’, ‘why’, ‘because’, ‘cause’, ‘reason’, ‘govern’, ‘necessitate’, etc, have a range of very different and distinct meanings. Mechanism seemed to be a menace because it was assumed that the use of these terms in mechanical theories is their sole use: that, for example, all ‘why’ questions are answerable in terms of the laws of motion.” Whereas, in fact, says Ryle, all ‘why’ questions of one type are perhaps answerable in those terms but no ‘why’ questions of other types are answerable merely in those terms.[545]

Ryle attacks the pretensions of rationalists who try to reduce the whole world to propositions in arithmetic, geometry or chemistry. (This sounds strangely, and ironically, Whiteheadian coming from Ryle! - But wait.) They include system-builders like, Darwin and Freud, who believe that unquestionably ‘scientific solutions’ can be found to solve all difficulties. Rationalists see mechanical laws, not as ideal-typical scientific laws, but as, the ultimate laws of Nature. They hope or fear that biological, psychological and sociological laws can be ‘reduced’ to mechanical laws, though they don’t know how this might be achieved. But, Ryle says, this is a baseless hope or fear, which really makes no sense. Physicists may find answers, to ***all*** physic-

[545] Ibid, p.76

al questions, but not all questions are physical. Physical laws may 'govern' everything that happens, but, he claims, they don't ***ordain*** everything that happens: indeed, they do not ordain anything that happens. And Ryle concludes that natural laws are not fiats. He says that natural laws are now seen not as necessities but as probabilities with very long odds and that this is welcomed as providing a desirable 'non-rigorousness' element in Nature.

This leads people to think that one can still be scientific while occasionally making judgements about personal responsibilities. This, however is a 'silly view' which; "… assumes that an action could not merit favourable or unfavourable criticism, unless it were an exception to scientific generalisations."[546] Hodgson criticises Ryle's position: "The rules of chess generally leave open alternatives concerning the piece to be moved and the square to which it is to be moved; and it is precisely this which leaves room for the exercise of intelligence and choice." But this is not true of the mechanistic laws of pre-quantum physics. They leave open no such alternatives; "… given all relevant initial conditions and the relevant laws, only one result is possible at any particular later time." Hodgson goes on to claim that quantum physics, on the other hand, ***does*** open up the possibility of true alternatives, even given the same initial conditions. It's therefore a real question, Hodgson continues; "… whether this leaves room for the operation of some non-mechanistic intelligence and choice, or whether ... intelligence and choice is itself entirely mechanistic."

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[546] Ibid, p.74-78

So, according to Hodgson, the ‘myth of reduction’ can ***only*** be overcome by what Ryle, above, calls this ‘silly view’.[547]

It seems to me that Hodgson’s critique here is entirely correct: Ryle, and other Compatibilists (such as his student Dennett) want to ‘have their cake and eat it too’: they want to believe that we live in a fully determined world, but human beings are still able to exercise free will. The paradox of their position is especially acute since they specifically rule out quantum physics as its solution. I have pondered long, and as deeply as I can, as to why anyone should choose to hold these apparently incompatible beliefs. I’ve come to some tentative conclusions: firstly, it might be because of the overpowering strength of the Ideological Empiricist belief in the wickedness of ‘Grand Theorising’, as expressed by Ryle above. They actually want to live in a world in which people do not speculate about the underlying causes of events. And what motivates this? Again, pure speculation, but if one belongs to a social elite it may be more comfortable to accept things the way they are rather than ponder the deep causes; comfortable, indeed, to the point of complacency. (One has an image of Ryle, the post-war, Oxford philosophy don, puffing on his pipe as he reads an account of quantum developments. A slight flicker of anxiety crosses his brow, but then he reflects: ‘All that this quantum business amounts to is that natural laws can now be seen not as necessities but as probabilities with very long odds - a desirable ‘non-rigorousness’ element in Nature.’ As Russell said of Kant’s sleepless nights over Hume’s ‘scandalous’ philosophical views, the sage of Königsberg soon found an explanation which returned him

[547] Hodgson, David, ‘The Mind Matters’, 1991, Clarendon Press, p. 37

to a sound sleep.) As I'll explain at the end of the chapter, my own view is that some version of Compatibilism is correct, but that it is precisely quantum physics which renders this doctrine non-paradoxical.

Dennett's Freedom via Perspective

Ryle's student, Dennett shares his teacher's Ideological Empiricist outlook and, consequently, is also a champion of Compatibilism. Dennett points out that for two millennia philosophers have insisted that free will as an all, or nothing issue: either we have free will or we don't. Consequently, any compromise proposals, suggesting that Determinism is compatible with at least some kinds of free will, have been resisted as dangerously deceptive and subversive of morality. Dennett says: "Libertarians have long insisted that the Compatibilist sorts of free will I am describing and defending are not the real thing at all, and not even an acceptable substitute for the real thing, but rather a 'wretched subterfuge', in the oft-quoted phrase of Immanuel Kant." Agent causation is, says Dennett; "… a frankly mysterious doctrine, positing something unparalleled by anything we discover in the causal processes of chemical reactions, nuclear fission and fusion, magnetic attraction, hurricanes, volcanos, or such biological processes as metabolism, growth, immune reactions, and photosynthesis. Is there such a thing?"

Dennett goes on to say that Libertarians insist that there must be. By doing so, however, Dennett claims; "… they play into the hands of those at the other pole, the hard Determinists, who are content to let the Libertarians' uncompromising definition of free will set the terms of the debate, so that they can declare, with science as their ally, so much the worse for free will.” Dennett’s point here is that hard Determinists prefer the ‘straw man’s’ version of free will, as defined by supporters of the radical agent-causation position. He makes the point that if we do have free will, Determinism must be false and indeterminism is true; “… thanks to quantum physicists, the received view among scientists today is that indeterminism is true (at the subatomic level and, by implication, at higher levels under various specifiable conditions), this can look like a happy resolution of the problem, but there is a snag: How can the indeterminism of quantum physics be harnessed to give us a clear, coherent picture of a human agent exercising this wonderful free will?” So, the problem becomes: “How, exactly, could subatomic indeterminism yield free will?” Dennett explains that different groups have tried to solve this problem in different ways: some simply declare it to be somebody else’s problem, a job for neuroscientists, perhaps, or physicists. They take a top-down view: a human agent is ‘free’ if the agent’s choice was not determined by the total set of physical conditions that obtained prior to the choice.[548]

[548] Dennett, Daniel, ‘Freedom Evolves’, 2003, Viking Press, p.98-101

Another, smaller group, is represented by the philosopher, Robert Kane, in his 1996 book, 'The Significance of Free Will': Kane claims that; "… freedom is a term with many meanings", and he says that; "… even if we lived in a determined world, we could meaningfully distinguish persons who are free from such things as physical restraint, addiction or neurosis, coercion or political oppression, from persons not free from these things, and we could allow that these freedoms would be worth preferring to their opposites even in a determined world." But, in addition to these 'freedoms from', humans also have, according to Kane, a capacity for 'freedom to', and this kind of freedom definitely is incompatible with Determinism. On the other hand, it is the most significant kind of freedom and certainly worth wanting. Kane defines this form of freedom as; "… the power to be the ultimate creator and sustainer of one's own ends or purposes."[549] Kane provides a radical Libertarian account, resulting in what he calls 'Ultimate Responsibility'.

[549] Kane, Robert, 'The Significance of Free Will', 1996, Oxford U.P., p.15

Another, smaller group, is represented by the philosopher, Robert Kane, in his 1996 book, ‘The Significance of Free Will’: Kane claims that; “… freedom is a term with many meanings”, and he says that; “… even if we lived in a determined world, we could meaningfully distinguish persons who are free from such things as physical restraint, addiction or neurosis, coercion or political oppression, from persons not free from these things, and we could allow that these freedoms would be worth preferring to their opposites even in a determined world.” But, in addition to these ‘freedoms from’, humans also have, according to Kane, a capacity for ‘freedom to’, and this kind of freedom definitely is incompatible with Determinism. On the other hand, it is the most significant kind of freedom and certainly worth wanting. Kane defines this form of freedom as; “… the power to be the ultimate creator and sustainer of one’s own ends or purposes.”[550] Kane provides a radical Libertarian account, resulting in what he calls ‘Ultimate Responsibility’.

Kane begins with the familiar claim that if Determinism is true, then every decision I make is an effect, ultimately, of chains of causes leading back into times before I was born. Dennett argues that; “… determination is not the same as causation, that knowing that a system is Deterministic tells

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[550] Kane, Robert, ‘The Significance of Free Will’, 1996, Oxford U.P., p.15

you nothing about the interesting causation - or lack of causation - among the events that transpire within it.” Dennett admits that this is a controversial conclusion, flying in the face of a long tradition. It may be seen as simply an eccentric recommendation about how to use the word ‘cause’. Dennett suggest that we see what happens if; “… we stick with tradition and treat Determinism as the thesis that each state of affairs causes the succeeding state.”

And here Dennett applies a very specific (and for him, decisive) critique of this traditional position: he calls it the; “… retreat of the self into a walled enclave within which all the serious work of authorship has to be done.” This, he says, parallels another retreat into the centre of the brain, namely, Dennett’s notion of ‘the Cartesian Theatre’. This is; “… the imaginary place in the centre of the brain ‘where it all comes together’ for consciousness”. Dennett is adamant that: “There is no such place, and any theory that tacitly presupposes that there is should be set aside at once as on the wrong track.” Dennett’s point is that all the work supposedly done inside this imaginary Cartesian Theatre must, in reality, be distributed in time and space around the brain. And he says that Kane has a double problem, not only has he got; “… to figure out some way to get the undetermined quantum event to be not just in you but yours. He wants above all for the decision to be ‘up to you’, but if the decision is undetermined … it isn’t determined by you, whatever you are, because it isn’t determined by anything. Whatever you are, you can't influence the undetermined event - the whole point of quantum indeterminacy is that such quantum events are not influenced by anything.” So, Dennett says, you have in some way to meaningfully incorporate this indeterminate event into your decision-making. But, he continues; “… in order to do this, there has to be more to you than just some mathematical point; you have to be someone; you have to have parts - memories, pains, beliefs and desires - that you've acquired along the way. And then all those causal influences from the past, from outside, come crowding back in, contaminating the workshop, pre-empting your creativity usurping control of your decision making."[551] In other words, Dennett is saying that only an empty mathematical point can have 'magical' free will: if you have a biological history, it will determine your decisions.

Extending this argument, Dennett says; "… if you make yourself as small as possible, you can externalise virtually everything." Then, perhaps, you can have 'magical' free will. This approach, Dennett claims, pushes free will; "… into a single moment, somewhere in the heart of an atom." This, as we've seen from other contributors, is a very inadequate perspective on quantum free will, but it's enough to persuade Dennett to dismiss any quantum involvement in it. Instead, he reasserts his Compatibilist version of free will: "Events in the distant past were indeed not 'up to me', but my choice now to Go or Stay is up to me because its 'parents' - some events in the recent past, such as the choices I have recently made - were up to me (because their 'parents' were up to me); and so on, not to infinity but far enough back to give my self enough spread in space and time so that there is a me for my decisions to be up to!" Dennett then asks what the point of Libertarianism might be said to amount to. His answer is essentially nothing: the Kane type of quantum Libertarianism doesn't amount to, 'a difference that makes a difference': "An indeterministic spark occurring at the moment we make our most important

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[551] Dennett, Daniel, 'Freedom Evolves', 2003, Viking Press, p.123

decisions couldn't make us more flexible, give us more opportunities, make us more self-made or autonomous in any way that could be discerned from inside or outside, so why should it matter to us?"[552]

'The Buck Stops Here'

Dennett's concept of 'freedom to' includes moral responsibility. In order to achieve this status, he says: "I have to be the ultimate source of my decision, and that can be true only if no earlier influences were sufficient to secure the out-come." In other words, my decisions have to be 'truly up to me' and not the result of genetic predispositions or environmental conditioning. Dennett then refers to the famous sign Harry Truman had put on his white house desk: 'The Buck Stops Here' and Dennett says that: "A human mind has to be a place where the buck stops." According to Kane, only Libertarianism can provide this kind of free will, the kind that can give us Ultimate Responsibility. Kane says that a mind is an arena of willings (choices, decisions, or efforts) and that: "If these willings were in turn caused by something else, so that the explanatory chains could be traced back further to heredity or environment, to God, or fate, then the ultimacy would not lie with the agents but with something else".[553] But Ryle and Dennett reject this line of argument: according to them, even if our decisions and actions are by causal chains. Once again, I believe that the ultimate explanation for this Compatibilism of Ryle, Dennett and others can be found in in their espousal of an extreme ontological position which I've dubbed, 'Ideological Empiricism'. This doctrine holds that

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[552] Ibid, p.135/136

[553] Kane, Robert, 'The Significance of Free Will', 1996, Oxford U.P., p.4

not only are we unable to access the 'ultimate reality' behind our observations, but it also denies that there ***is*** any such 'ultimate reality'. In other words, not only are observations all we can hope for, they're ***all that there is!*** This is, in some ways, very close to the British philosopher, Bishop Berkeley's Idealism: according to him, to exist ***is*** to be ***perceived***: to exist and to be perceived amount to the same thing. (In contrast to Berkeley, however, the Idealogical Empiricists take a Cart-Tonist view in regard to consciousness, qualia and the self, namely they deny that they exist in any significant sense.)

This position enables Compatibilists to deny that there's any contradiction in the slogan that, 'Determinism does not mean inevitability'. When Dennett talks about 'freedom' he does not mean Descartes' absolute freedom of the will. Rather, in Dennett's world, the possibility of freedom can be seen as arising from competition between various causal chains within the human organism: this provides a real basis for behavioural flexibility, which we experience as freedom of choice. Dennett calls this experience of freedom of choice, 'the Intentional Stance': this accepts that people will believe that both they and a wide variety of other entities are 'engaged agents', responsible for their intentions and behaviour. From this perspective, it seems to us that we have real choices and can exercise freedom - even though everything that happens has material causes. Ironically, I have a substantial amount of sympathy and concurrence with Dennett's account of the scope of human free will. This is probably because, like Dennett, I don't accept the Folk Psychological view that the exercise of free will is one of the important and obvious functions of consciousness. For me sentience is overwhelmingly the most important feature of consciousness and the role of sentience in adapting behaviour to particular environments fully justifies the evolutionary development of consciousness. (I shall expand on my own views of free will at the end of this chapter.) Meanwhile, let's move on from the Compatibilists, and other Cart-Tonist theories of free will, who see quantum's only role in human freedom as injecting a certain amount of true randomness into the unfolding of events, to consider some more sophisticated accounts of free will in the context of quantum mechanics.

Quantum Mechanics: Uniting Mind and Matter?

The quantum view of reality directly challenges the Cartesian separation of mind and the material world. As the theoretical physicist, Wolfgang Pauli stated in a letter to Niels Bohr in 1955, in the quantum universe; "… there is no radical separation between mind and world… In quantum mechanics … an observation here and now changes in general the 'state' of the observed system … I consider the unpredictable change of the state by a single observation … to be an abandonment of the idea of the isolation of the observer from the course of physical events outside himself". (As quoted by Jeffrey Schwartz[554]) And Schwartz concludes that; "This is the textbook position on quantum mechanics and the nature of reality: that the Cartesian separation of mind and matter into two intrinsically different 'substances' is false." Schwartz goes on to argue that: "Ignoring quantum physics thus deprives both philosophers and neuroscientists of an avenue into, if not a way out of, the mystery of mind's relationship to matter." This ignorance, he says, results in the belief that interac-

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[554] Schwartz, Jeffrey, 'The Mind and the Brain', 2002, Harper, p. 287/288

tions among large assemblies of neurones are causally sufficient to account for every aspect of mind. He then quotes one of the Cart-Tonist culprits, Daniel Dennett who says that: ‘A brain was always going to do what it was caused to do by local mechanical disturbances’. In other words, the mind is nothing more than billions of interacting neurones - in short, nothing more than brain processes. There is no mental power that can’t be completely explained by electrochemistry. Because most attempts to resolve the mind-matter problem are still based within a Cart-Tonist, Newtonian worldview, they dismiss both consciousness and will as illusions, products of human fallibility or hubris. Schwartz comments that; “… such conclusions, built as they are on an outdated theory of the physical world, are built on a foundation of sand… If the mind-brain problem has resisted resolution for three centuries, it is because the physical theory that scientists and philosophers have wielded is fundamentally incorrect.” He claims that the fault for our failure to tackle the mind-body problem lies more within physics than within philosophy or neuroscience; “… we are not doing all that badly in our efforts to understand the mind side of the equation. It’s our understanding of the role of matter that is seriously off. For this, we can thank the materialist view that grew to predominance over the last three centuries.”[555]

Schwartz concludes: “Historically, the great advances in physics have occurred when scientists united two seemingly disparate entities into a coherent, logical whole. Newton connected celestial motions with terrestrial motion. Maxwell unified light and electro-magnetism. Einstein did it for space and time. Quantum theory makes exactly this

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555 Ibid, p.287/288

kind of connection, between the objective physical world and subjective experiences." Consequently, it can offer us a way out of the morass that the mind-brain debate has become. This is because it radically rejects the account of classical physics as to the nature of the dynamical interplay between minds and physical states, between physical states and consciousness: "It ushers the observer into the dynamics of the system in a powerful way. Following quantum theory into the thicket of the mind-matter problem actually leads to a clearing, to a theory of mind and brain that accords quite well with our intuitive sense of how our mind works." Schwartz quotes the work of the American physicist, Henry Stapp. In his; "… formulation, quantum theory creates a causal opening for the mind, a point of entry by which mind can affect matter, a mechanism by which mind can shape brain. That opening arises because quantum theory allows intention, and attention, to exert real, physical effects on the brain." Schwartz is a psychiatrist who has been very successful in treating obsessive-compulsive patients. He encourages his patients to exercise their will in managing their condition. Schwartz believes that the patient's will power is an effective force in the treatment of obsessive-compulsive conditions, and that the fact that he encourages them to exercise it, is what accounts for his success. Through a cooperation with the physicist, Henry Stapp, he believes he has found a scientific explanation for this therapeutic technique: As Schwartz concludes: "The fact that the collapse of the wave function so elegantly allows an active role for consciousness - which is required for an intuitively meaningful understanding of the effects of effort on brain function - is itself strong support for using a collapse-based interpretation in any scientific analysis of mental influences on brain action." In other words, Schwartz is claiming that quantum mechanics makes it possible to describe the mind as capable of exerting effects that neurones alone cannot achieve.[556] Here below is an account from Stapp as to how such 'quantum will' might work.

Effective Will, William James and the Zeno Effect

Remarkably, in 1892, William James produced a theory of volition which, in psychological terms, very much parallels Schwartz's quantum account of free will. James began by claiming that our attention, i.e. the array of things to which we can attend, is wholly determined by neural conditions: "No object can catch our attention except by the neural machinery. But the amount of the attention which an object receives after it has caught our attention is another question."[557] As the physicist and philosopher, Penelope Rowlatt, put this: "It seems that we are presented with a situation in which there are many things that are immediately available to consciousness and we select from these what to focus on, what to pay attention to, at any point in time."[558] James suggests that we can exert effort to keep our minds focused on a particular object: "We feel that we can make more or less of the effort as we choose. If this feeling be not deceptive, if our effort be a spiritual force, and an indeterminate one, then of course it contributes coequally with the cerebral conditions to the result."[559] This exertion of

[556] Ibid, p.288/289

[557] James, William, 'Text-Book of Psychology', 1892, Kessinger Publishing, chapter 11

[558] Rowlatt, Penelope, 'Mind: A Property of Matter', 2017, Ionides Publishing, p.32

[559] James, William, 'Text-Book of Psychology', 1892, Kessinger Publishing, chapter 11

effort will deepen and prolong our consciousness of, for example, an idea which otherwise would soon fade away. Our 'grasp' of the idea may last no more than a second, but that can be enough to favour one set of ideas over a competing set where the two; "… are nearly in equilibrium it is often a matter of but a second more or less of attention at the outset, whether one system shall gain force to occupy the field and develop itself and exclude the other, or be excluded itself by the other." This is a 'voluntary' achievement of the will, brought about by focusing attention on a difficult object and holding it fixed before the mind. As Stapp points out, James claims that 'effort of attention' is the essential phenomenon of will.[560]

Henry Stapp provides support as to how James's theory of volition might work in practice, in terms of his version of quantum theory: he claims that a well-known feature of quantum theory does, in fact, provide a way to convert available 'free choices' into effective mental causation. It's known as the 'Zeno effect'. (As we saw in chapter thirteen, the name comes from Zeno's arrow paradox, which states that because an arrow in flight is not seen to move during any single instant, it cannot possibly be moving at all.) and it provides a technical explanation as to how quantum theory can explain the efficacy of the consciousness will. Stapp explains the Zeno effect in terms of two processes, 1 and 2, which John von Neumann introduced in his version of quantum mechanics: process 1 is a conscious, information-creating process, which has come to be called the collapse of the wave function. Process 2 is deterministic and information preserving or conserving. Process 1 gives rise

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[560] Stapp, Henry, 'Mindful Universe', 2007, New York: Springer, loc:474-509

to the so-called problem of measurement, because its randomness prevents it from being a part of the deterministic mathematics of process 2. Stapp says that via the Zeno effect: “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 1 actions can be increased by mental effort. But then we obtain, as a mathematical consequence of the basic dynamical laws of quantum mechanics described by von Neumann, a potentially powerful effect of mental effort on the brain of the agent.”[561]

Stapp explains that the Zeno effect is analogous to the situation of an unstable particle, which if observed continuously, will never decay. In other words, one can ‘freeze’ the evolution of a system by measuring it frequently enough in its known initial state. Stapp says: “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.” Stapp also claims that: “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.” As a result, agents whose mental efforts can exert an influence on the ‘mental side’ of quantum processes (von Neumann’s Process 1) have an evolutionary advantage over those who can’t. Stapp claims that the Zeno effect can enable human beings to sustain practically useful action templates in place longer than competitors who lack this capacity. In this way the rules of quantum mechanics permit conscious effort to be endowed with causal efficacy, and

[561] Ibid, loc:474-509

having causal efficacy is what would make conscious effort both a 'useful tool for living' and (consequently) a trait likely to be favoured by natural selection.[562] I would moderate this claim to the extent of describing conscious decision-making as an 'after-the-event' mechanism for adapting behaviour (very similar to Gray's description of it as a 'late error detector', as described in chapter seven). To expand on this position, I'm accepting the standard neuroscience view that our 'fast' reactive behaviours are ***not*** under conscious control. The evolutionary function of consciousness is rather to ***experience*** the consequences (positive and negative) of particular forms of behaviour and to apply this affective feedback in the process of adapting future behaviour.

Hodgson's Quantum Theory of Conscious Choice

As we have seen, David Hodgson argues that there is a very strong correlation between consciousness and quantum phenomena in the brain. He then claims, in addition, that his theory can also provide a plausible theory of conscious choice. His 'quantum' theory of free will does not require recourse to the sort of dualist approach to freedom of choice, as proposed, for example, by the Nobel-Prize-winning neurophysiologist, John Eccles. Specifically, Hodgson is keen to reject any postulation of; "… some immaterial entity which makes the real decisions, using some other faculty apart from the human brain." Hodgson is clear that the physical human brain (even physical in a quantum sense) does not choose between the decision alternatives which it throws up. Rather, the physical brain is a manifestation of the underlying reality of the corresponding

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[562] Ibid, loc:487-496

quantum physical state function. This reality is also manifested in the subjective world of consciousness: “So, both the chooser and a faculty by which the choice is made can be located in just this same underlying reality.” Hodgson adds that the best subjective description of this state of affairs would be phrased in the language of Folk Psychology (which, of course, may need to be refined and improved).[563] He also points out that, from the physical viewpoint, the brain is a physical object operating in accordance with physical laws, while from, the mental viewpoint, we know (or at least believe) that people can make rational indeterministic choices. The ambition of his theory is that there should be no contradiction or conflict between these two viewpoints.

He’s also concerned to give; “… an account of choice which gives an appropriate role to our elaborate brains, and does not postulate some ghostly entity which, without the assistance of the brain, makes the real decisions.” On the other hand, Hodgson wants to make it clear that he’s not simply basing free will on quantum indeterminism: “I do not seek to infer a theory of choice from quantum indeterminism: at best, quantum indeterminism makes room for such a theory.” He explains that effective human choice may be based on a combination of computational procedures plus quantum physics. These could give rise to probability-weighted alternatives: “Each choice would appear as a random state reduction.” We can then look at the brain-mind either from a physical viewpoint or from a mental viewpoint: “From the physical viewpoint, it can be considered as a macroscopic object, operating in accordance

563 Hodgson, David, ‘The Mind Matters’, 1991, Clarendon Press, p.393/394

with laws appropriate to such objects; and for many purposes that will give a sufficient approximation to the true position." But, where conscious subjective choices are being made, i.e. all cases of conscious decision and action, then an adequate physical account of the brain has to consider quantum mechanical effects. Even with quantum rules factored in, however; "… the physical account could not, even in principle, predict or explain which choice is made: it would at most show the alternatives and their respective probabilities. So, the brain-mind can be considered (consistently with the approach of cognitive psychology) as a mechanistic (though indeterministic) computer; but only in so far as it throws up alternatives for choice."[564] There's a quotation from Karl Marx which seems relevant here. It says, in effect that, yes, the human mind creates the human world, but not from conditions of its own choosing. It must start from the conditions it finds around it.

From the mental viewpoint, however, Hodgson states that there would be little, if any, consciousness of the computer-like processing which gives rise to the alternatives: there would be some consciousness of the alternatives (even if only an awareness that something or nothing might be done). In addition, there would be a vague consciousness of 'weighting' each alternative, for and against. These 'weightings' might be felt as; "… various kinds and degrees of inclination and aversion, of obligation and inhibition, and so on. The felt weight of the considerations, the mental effort required to give effect to one set of considerations rather than another, and the difficulty of coming to a decision, may perhaps be related to the probabilities indicated by the quantum physical viewpoint." Hodgson is sug-

[564] Ibid, p.388-390

gesting that this prior weighting of the alternatives is associated only with probabilities; it doesn't determine the choice; "… it is only the conscious choice which determines which considerations prevail in the particular case, and thereby precisely determines their weighting." Hodgson cites a similar idea which has been proposed by the philosopher, Robert Nozick, in 1981. Using the analogy of quantum mechanical measurement, Nozick argues that a person prior to making a decision has reasons without fixed weights; he or she is, in effect, in a superposition. The process of making the decision then reduces the superposition to one state; "… but it is not predictable or determined to which state the decision (analogous to a measurement) will reduce the superposition." Nozick goes on to assert that 'uncaused' does not entail 'random'; "… that is, that choice or decision need not be either random or wholly determined."[565] Hodgson seizes on this as an opening through which his conception of plausible reasoning can pass into the causal chain: rational decisions, Hodgson says; "… give effect to rational considerations in ways which cannot be formalised and which are accordingly not mechanistic or predetermined. They are fallible, but may have a probability of being correct greater than the mechanistic probability suggested by the physical viewpoint."[566]

Hodgson attempts to produce a 'formula' for a conscious system: he says it must have the following two features: 1) it must represent, within the system, some part of the world as presently encountered, for example a potential food

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[565] Nozick, Robert, 'Philosophical Explanations', 1981, Oxford U.P., p.298/299

[566] Hodgson, David, 'The Mind Matters', 1991, Clarendon Press, p.390/391

source, and 2) it must create within the system at least two alternative, possible responses to the representation, and these potential responses must be; a) individually linked with the goals of the system and b) in quantum mechanical superposition. Hodgson insists that; "… if a brain or other physical system does not have properties which provide for both 1) and 2), then it will not be conscious. I say this, on the grounds that the usefulness of consciousness appears to lie in the capacity it gives to make choices on the basis of fallible qualitative comparisons of wholes." This phrase, 'fallible qualitative comparisons of wholes', Hodgson later defines as meaning both that; a) the comparisons being made should be unaffected by spatial separation and b) the outcomes should not be mechanistically determined. These two conditions can be achieved, he says, if the wholes to be compared are in quantum physical superposition. The fact that this is the case is what drove evolution to select physical structures which exploited this useful feature of quantum mechanics, resulting in the emergence of consciousness.[567] (In my view, this equating of consciousness with decision-making leans too far in the direction of Cart-Tonist cognitivism. I'll give my own view of the function of consciousness, which has much more to do with sentience and the adaptive capacity of an individual's affective life-history, at the end of this chapter.)

Two 'Domains' of Explanation

Hodgson cites an objection from Thomas Nagel to this autonomous intentional explanation of human behaviour which Hodgson is promoting: Nagel objected that such an explanation fails to explain; "… why I did what I did rather than the alternative that was causally open to me. It says I

567 Ibid, p.395

did it for certain reasons; but does not explain why I didn't decide not to do it for other reasons." Either this question has no answer or the answer will take us out of; "… the domain of subjective normative reasons and into the domain of formative causes of my character or personality."[568] Hodgson insists that this objection is fundamentally incorrect because accepting the rationality of plausible reasoning is equivalent to accepting that reasoning to a rationally based conclusion is not compelled by its premisses; "… other conclusions may be less rational, or even irrational, although not excluded by the premisses or indeed by any weighing of commensurable reasons. (By 'less rational', I am suggesting a qualitative rather than a quantitative judgement.)" Consequently (according to Hodgson) a complete explanation of action can be given, without any need to go to 'formative causes' of one's character. Nagel is right, says Hodgson; "… only if one rejects the rationality of plausible reasoning and says, with Hume and others, that it is only a matter of useful habit selected by evolution; and that approach, as I have suggested, undermines all reason and all knowledge." This disagreement with Nagel, claims Hodgson, is crucial to the entire free will debate. He accuses Nagel of making the unstated assumption; "… that an explanation must either be conclusive (and so algorithmic, mechanistic, etc.) or else no explanation at all." In reality, however, this is contradicted by our whole experience of reasoning and acting: "It is of the nature of most of our justifications and explanations of action that they are not con-

[568]Nagel, Thomas, 'View from Nowhere', 1986, Oxford U.P., p. 116/117

clusive - but, nevertheless, they may be rational, and different ones may be less rational, or irrational."[569]

Just as Hodgson does, the British psychologist, David Rose discusses reasons as causes for actions, as part of a theory which he calls 'Teleological Functionalism'. This involves backwards cause and effect, which implies that functions, mental and physical states of the brain are the way they are in order to achieve some desired goal in the future. Rose suggests that simple cause and effect may now be a redundant paradigm: "Cause and effect analysis may be useful in the simple systems studied in chemistry and physics (e.g. in the billiard ball model of the universe explicit in Newton's first law of motion), but with biological systems there are a lot of feedback loops that render the notion irrelevant." In other words, if there are two entities A and B, where A affects B and A, it is very difficult, perhaps inappropriate, to talk about cause and effect; "… does A cause B to change or does B cause A to change? Well, because they are mutually interacting, there is a cycle generating properties beyond those explicable on the basis of isolated causes and effects." Therefore, it may be preferable to; "… talk in terms of a dynamic, continuous, ongoing change in the whole system formed by A and B. The system is the appropriate level of description, and describing lower-level events as though they could be isolated from the whole system's dynamics is missing the point." A concrete example would be the mutual interactional between the individual and the environment, which involves mutual causality: "Individuals act upon the environment, both deliberately and accidentally, often to bring about changes in the environ-

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[569] Hodgson, David, 'The Mind Matters', 1991, Clarendon Press, p.391

ment that suit the individual… Such changes include killing predators, building safe dwellings, storing food, wearing clothes, creating fire, making tools, etc. One should not analyse the individual organism as a passive recipient of inputs from an unchanging environment."[570]

Rose is arguing explicitly that the meaning of 'causation' is different in biology and evolution from what it has meant in classical physics. For example; "… the teleological effect of natural selection is killing off the variations that are not beneficial and that will not lead to that final goal of survival. The changes that survive are the ones that are permissible: they are not going to be killed off by the environment or by any internal inconsistency. So the action of natural selection is one of constraining, of preventing the wrong thing from happening, rather than causing the right thing to happen. It is causing the wrong things to die out. Meanwhile, the right things are not themselves 'caused' - they happen spontaneously - as in the replication of genes, for example." Perhaps 'reasons' can be seen as a form of this 'backward, mutually interacting' type of causation? After all, to appeal to a reason; "… is to identify the causes of behaviour and decisions with our desires and wishes. I do something because I want to do it. That want can be treated as a traditional cause, since it precedes the behaviour in time. What past history gives is the content of our desires: it determines what the 'something' is that I want to do."[571]

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[570] Rose, David, 'Consciousness; Philosophical, Psychological and Neural Theories', 2006, Oxford U.P., p.132-134

[571] Ibid, p.132-134

According to Hodgson, a freely willed decision or action is; "… partly the result of physical mechanistic causes, and partly the result of choices between alternatives left open by those causes." However, he points out that normally we do not try to combine the objective and subjective viewpoints, as he is doing in this statement. In everyday practice, we; "… would normally take either an objective approach, and say that the decision or action is caused by physical laws operating upon physical events, in the sense of being the outcome of deterministic developments plus random steps; or alternatively take a subjective approach, and say that the decision or action is made or done for reasons."[572] This is very close to Ryle's position (above) where he says; a spectator might ask (using one meaning of 'why') why a bishop always ends its move on a square of same colour as the square it started on. This can be answered by the rules of chess (which like natural laws ***are deterministic*** as to what is legitimate play). He might then ask (in another sense of 'why') why a player moved his bishop. This can be answered by referring to a the player's concern to remove a threat to his King (this constitutes a 'reason' in Hodgson's sense). But, of course, the big difference between these two theorists is that Ryle is an Ideological Empiricist who explicitly denies a role for quantum mechanics in the exercise of free will, while this is exactly the thesis which Hodgson is trying to validate. While (as should be clear from the general argument of this book) I empathise and identify far more with Hodgson and not at all with Ryle, I would nevertheless reject ***both*** Hodgson's and Ryle's account.

[572] Hodgson, David, 'The Mind Matters', 1991, Clarendon Press, p.394

The Whit-Tum Alternative

The problem with Hodgson's position is that he exaggerates the scope and nature of free will; for example, having made the argument above, he then says that from both the objective or the subjective viewpoint, a decision or action could have been otherwise: "On the objective approach, the random steps could have been other than they turned out to be. On the subjective approach, the reasons are not conclusive, and the person acting could have weighed them differently."[573] However, in Hodgson's 'objective approach', it is surely quantum randomness rather than human free will which allows for this 'freedom' of outcome. And in his 'subjective approach', a person is not abstractly 'free' to weigh their alternatives: for example, a would-be recovering addict may wish to maintain abstinence, but find themselves, for reasons of their personal, affective life-history, unable to resist the object of their addiction. As above, what's wrong with Ryle's account is the Ideological Empiricist's failure to recognise the existence of any ultimate reality in which coherence and consistency across domains needs to be maintained.

This denial of ultimate reality is illustrated (as described above) by Ryle's attacks on Rationalists system-builders (amongst whom he would certainly have included Whitehead). The hopes and fears of the system-builders, in regard to Determinism are baseless. Physicists may find answers, to ***all*** physical questions, but not all questions are physical. Physical laws may 'govern' everything that happens, but, he claims, they don't ***ordain*** everything that happens: indeed, they do not ordain anything that happens. And Ryle concludes that natural laws are not fiats. Consequently, we

[573]Ibid, p.394

know that human beings have free will because we conclude this from our observations.

In confronting Compatibilism from Whitehead's viewpoint, his student, Victor Lowe first refers to traditional dualism which; "… held that to the scientist every event, inanimate or human, is bound to appear mechanically caused in its entirety; yet the moralist is bound to think of right and wrong as freely done; and the two beliefs do not really conflict, they are merely asserted from different points of view." Whitehead considered this a bogus solution: "Our life is one life; you cannot parcel it out to thinkers sworn not to interfere with each other. Causality and freedom, like all fundamental contrasts, are in existence itself. You cannot reconcile them by distinguishing points of view, but only by finding a way to think them together."

Compatibilism ignores the gap between inanimate nature and human experience, and it is precisely this gap that the philosopher must bridge: "Whitehead faced up to the fact that this requires general concepts which apply to both extremes. The physicist's concepts of physical existence won't do the job, because they omit altogether the existence of experiences. On the other hand it would be fantastic to generalise, as metaphysicians so often have, from what is peculiar to man or only fitfully exhibited by him - from such traits as his consciousness, sense-perception, or thought."[574] The point here is that Whitehead insisted that the physical world and the human world are united at the deepest level by being constructed out of the same funda-

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[574] Lowe, Victor, 'Understanding Whitehead', 1962, Johns Hopkins U.P., p.21

mental building blocks: the interactions between them go right down to their origins.

As I hope I have demonstrated (and will further elucidate here), Whitehead's ontology avoids the errors and shortcomings of both Compatibilism and Hodgson's quantum version of free will. In the Whit-Tum account we have a limited amount of free will within this randomly determined universe, and what we have is governed and shaped by our affective life-histories. (I could describe my position as 'Affective Compatibilism'.) Clearly Dennett, and other Cart-Tonists, are right to reject Descartes', divinely inserted, absolute free will. On the other hand, are they right to deny any and all reality to any form of personal, 'freely exercised' choice in regard to actions decisions and to dismiss free will as an illusion? (This is what Dennett's 'intentional-stance' version of Compatibilism amounts to.)

My own views on the reality of human free will are best illustrated by reference to major, long-term decisions, such as; 'should I' - 'have children', 'get married', 'get divorced', 'have an extramarital affair', 'commit a crime like pre-meditated murder or theft', 'move to another country', 'change my job', or (as above) try to give up an addiction. What all these dilemmas have in common is that they are neither routine issues with a daily frequency (such as; when to brush one's teeth, or how to respond to common greetings, etc.) nor are they immediate, emergency situations in which split-second action is required (such as; blinking when an object closely approaches our eyeballs, or pulling a companion out of the path of a fast moving vehicle, etc.). In relation to these two categories of decision-making, I agree with the Cart-Tonists that these have been automated into our 'cognitive unconsciousness' by our reflexes and habits. In the case of the sort of major, long-term decisions referred to above, however, I would apply my ***affective*** version of Compatibilism: clearly, decisions of this type are subject (at least potentially) to prolonged reflection, pondering and rumination before a particular course of action is selected. The question as to whether we have free will or not, then resolves into what 'guides or decides' the course of these reflections, ponderings and ruminations?

The answer to this question (in my view) is the affective life-history of the individual making the decision. In other words, the course of our trajectory from birth and infancy into adult life is punctuated for all of us by incidents of affective reaction: this population of affective incidents arises overwhelmingly from interactions with our primary care-providers. We can further resolve the free will question by now asking to what extent does this affective life-history determine or merely influence our major decisions. My answer is that it very heavily influences these decisions, but leaves us with a degree of freedom to nudge our lives in one direction rather than another, as per the discussion above of; Jeffrey Schwartz's treatment of obsessive-compulsive patients, William James theory of the power of attention and Henry Stapp's account of the quantum Zeno effect.

These phenomena and the argument I've just made above, are the basis for my explanation of the evolutionary function of consciousness (or sentience, which is my axiomatic defining feature of consciousness): we have consciousness so that our affective reactions to our environment (especially our early environment, which consists mainly of our interaction with our primary care-providers) can adapt our future behaviour to the environment indicated by the quality of these reactions. Cart-Tonists ignore all of this because their ontology blinds them to it and many progressive thinkers in the field, such as Jeffrey Gray and David Hodgson, wish (for whatever reasons) to keep one foot in Cart-Ton world. In my own view, a paradigm shift from Cart-Ton world to Whit-Tum world (or something closely resembling it) is long overdue - especially if we want to achieve a scientific explanation of consciousness. The next chapter addresses precisely this question; what is the nature and function of consciousness. It's appropriately entitled (like this book itself) 'Consciousness as Feeling'.

Chapter Eighteen: Consciousness as Feeling

In this last chapter I'll be dealing mainly with qualia and the sentience that underlies them. This is because; a) I believe that sentience is overwhelmingly the most important and significant feature of consciousness, and b) I intend to address the two questions implicit in my subtitle, i.e. 'what is the nature and function of consciousness?' As to the nature of consciousness, I have (hopefully) made my view clear in previous chapters: I believe in Whitehead's ontological account of sentience as the basic 'stuff' of reality, out of which all other entities, mental and physical are constructed. I like to call Whitehead's 'drops of experience' the fundamental 'raw material' out of which our human consciousness is constructed. This solves the 'Hard Problem' of consciousness because the notion that something feels like something is accounted for by the fact that everything feels like something! Sentience is built into the very fabric of reality! Its strange properties don't need to be explained. They just are. Regarding the function of consciousness, I summarise this as; 'promoting the homeostatic well-being of organisms.' Along with Panksepp and Damasio, I believe that sentience manifested as qualia form the highest, ***conscious*** level of our homeostatic feedback systems. Unlike them, however, (as above) I'm proposing a viable origin for sentience: in other words, a theory of the nature of consciousness.

In the process of progressing from a detailed discussion of the nature and function of qualia in order to get to these two grand conclusions, we will, however, be 'stopping-off' at a number of conceptual staging posts. These will include; the turning on its head of the Cart-Tonist notion that classical Realism is our main functional ontology and that quantum theory is a bizarre, specialist 'niche'. In other words, I argue that in reality the entire universe is governed by quantum concepts and that the classical world is a minor niche which provides a comfortable (but largely deceptive) environment for human beings. We will also look at Bose-Einstein condensates as a possible substrate for consciousness. We will examine the 'evolutionary paradox of free will', in which certain theorists have proposed that, despite being an illusion, evolution has tricked us into believing that we have free will. (I dismiss this as being an inherently contradictory theory.)

In regard to our analysis of qualia, we look at the relationship between qualia and meaning (or 'intentionality'), consider Gray's unusual idea that single quale and their individual meanings may be just as arbitrary as are words and their meanings, i.e. there's a fixed variation and its relationship with meanings has to be learned. In contrast, we examine Panksepp's insistence that we don't need words or intelligence to experience qualia, and especially affects, which are a subgroup of qualia. We also look at Panksepp's key idea that positive and negative affects are themselves the rewards and punishment which reinforce or decondition behaviour. A final staging post will be Nicholas Humphrey's (in my view) very sensible proposal that the Achilles heel of most attempts to produce a theory of consciousness has been the assumption that the having of consciousness should in some way positively promote our exercise of a particular function or functions. Such approaches are entrenched in the 'Command and Control' school of consciousness studies, which, as stated previously, I believe to be fundamentally mistaken. So, just before we embark on this epic conceptual journey, let me crave the reader's patient indulgence: so much close and detailed analysis may tend to provoke tedium, but the effort of the ascent must be balanced against the glory of the vision from the summit.

Rehabilitating a 'Scientific' Mental Dimension

In his major work, 'Mind Matters' David Hodgson proposes a theory of mind which he describes as; "… in one sense dualist-interactionist, in another sense monist. It also gives the beginnings of an account of free will."[575] He points out that earlier 'quantum' theories of consciousness have focused on indeterminacy as providing possible 'room' for free will. However, in addition to this, Hodgson's theory concentrates on the (possibly more fundamental) quantum claims that matter is ultimately 'non-material, and non-local', and (perhaps) that mind and matter are interdependent. Hodgson summarises this position in three propositions: 1) The physical, macroscopic events of a neural firing are based on quantum micro events, in just the same way as the mental events associated with those physical, neural events. But, contrary to conventional, mechanistic views, the mental events are ***more closely related*** to the quantum events than to the physical events. 2) Even the best contemporary scientific accounts of the physical events of a neural firing (even those which recognise

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[575] Hodgson, David, 'The Mind Matters', 1991, Clarendon Press, p.379

quantum mechanics) ***still can't fully explain*** the associated mental events. Such conventional scientific accounts especially ***fail to explain*** the ***causal properties of mental events***. 3) Given points 1) and 2), it remains the case that the best description of mental events available to us is still 'Folk Psychology', i.e. our everyday way of thinking about mind and consciousness, though, of course, the language and concepts of Folk Psychology could be made much more sophisticated and precise. Taken together, what these propositions are suggesting is that; a) there is a 'monist' quantum reality which underlies ***both*** the physical and the mental manifestations of the brain and is the ***effective cause of both.*** (This is of course d'Espagnat's 'Veiled Reality', which we encountered in chapter eleven.) And, b) the mental processes which emerge from this monist, 'dual-aspect' brain have much more in common with our everyday thinking about mind and consciousness than they do with the modern Cart-Tonist consensus as to the nature of mind and consciousness.[576]

Classical physics, perhaps with some quantum mechanical trimmings, is (according to Hodgson) quite adequate if one wishes to give a complete and fundamental account of physical events - except, that is, for events within the brain. Hodgson explains that, in theory, the complexity of many-particle quantum systems should make a classical account impossible. In practice, however, a classical account is, in fact, adequate because; "… the developments of the quantum physical states are such that indeterminacies, interference effects, EPR correlations, and suchlike quantum physical properties make no detectable difference to what

[576] Hodgson, David, 'The Mind Matters', 1991, Clarendon Press, p.381

happens.” But, the big and important exception is events in the brain. This is because classical physics is inadequate to explain the mental events involved, and not only insufficient, but misleading because it suggests a gulf between the physical and the mental. In order to explain the correlation between mental and physical events, it is necessary to go to the quantum level: “A brain-mind (or a person) is a physical-mental object. Its behaviour seems to be determined to some extent by mental events, choices based on beliefs, desires, etc.; and to some extent by physical events, the objective brain processes of neural firings, etc.” He concedes that the success of the objective sciences suggests that human behaviour might be completely determined by physical events. Were this true, the apparent causal power of mental events would be either an illusion or else simply based on coincidences with physical events. These assumptions give rise to the ‘hard-science’ project of abstracting measurable physical properties of human behaviour and then seeking quantitative physical laws of nature. (This is a very clear account of what I call the Cart-Tonist Project.) According to this ‘hard-science’ project, these laws should be sufficient to explain and even control behaviour.

But Hodgson insists that; “…when that project is pursued to the limit, it becomes clear that the physical properties and laws are not sufficient to determine completely the behaviour of the brain-mind, because of quantum indeterminism. It may still be possible to exclude independent mental determination, however, by showing that quantum indeterminism has no significant impact on the behaviour of the brain-mind.” Hodgson offers, as examples, that the firing of neurones cannot be affected by quantum indeterminism, or that cognitive psychology and/or artificial intelligence can account for all purposive behaviour, but neither of these propositions has been proven to be the case. Consequently, mental events still have a claim to an independent determinative role in behaviour.[577]

The core of Hodgson's quantum explanation of consciousness is to argue that; "… mind and brain are both manifestations of the same underlying reality. Mind can, to some extent, be said to be a function of the brain, but only if the brain here is understood not as the detectable macroscopic object, but as the quantum reality underlying both this object and the mental events of consciousness. Mind and brain are two manifestations of, and viewpoints towards, a single reality."[578] In a similar way the physicist, David Bohm says: "Thought processes and quantum systems are analogous in that they cannot be analysed too much in terms of distinct elements, because the 'intrinsic' nature of each element is not a property existing separately from and independently of other elements but is, instead, a property that arises partially from its relation with other elements."[579]

Roger Penrose also invokes quantum explanations for the operation of the mind-brain, but at a somewhat lower ontological level: he particularly invokes; "… the (non-local) quantum correlations which can occur over widely separated distances. It seems to me to be a definite possibility that such things could be playing a role in conscious thought modes. Perhaps it is not too fanciful to suggest that

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[577] Ibid, p.383-389

[578] Ibid, p.381

[579] Bohm, David, 'Quantum Theory', 1951, Prentice Hall, p.169

quantum correlations could be playing an operative role over large regions of the brain. Might there be any relation between a 'state of awareness' and a highly coherent quantum state in the brain? Is the 'oneness' or 'globality' that seems to be a feature of consciousness connected with this?"[580] Note here that Penrose seems to be using a thoroughly physical model of the brain as the basis for mind. This physical brain may, however, be 'influenced' over 'large regions' by 'quantum correlations'. Hodgson, on the other hand (like Whitehead), is promoting a much more 'ontologically thorough' vision of the brain-mind: he suggests that, because the mind and the brain have a common underlying substratum, there will be strong correlations between macro physical events (such firings of neurones in the visual cortex) and mental events (such as perception of particular shapes and colours). Even if these patterns could be artificially created; "… the same types of mental events will not occur unless … appropriate developments of quantum states also occur."[581] So, rather than the physical brain underpinning the mind, both it and the mind are manifestations of a 'common underlying substratum'.

Consciousness and Non-Locality in 'Veiled Reality'

A consequence of this neutral monist position is to undermine the foundations of Cart-Tonist, Realist ontology which underlies the materialist, reductive consensus regarding explanations of mind and consciousness: "Quantum physics confirms that the world, uninterpreted by the mind,

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[580] Penrose, Roger, 'Mindwaves', in 'Two Sciences of Mind: Readings in Cognitive Science and Consciousness', 1987, edited by Seán Ó Nualláin, Paul McKevitt, John Benjamins Publishing, p.247

[581] Hodgson, David, 'The Mind Matters', 1991, Clarendon Press, p.382

can be considered as a cosmic code." The conclusion that Hodgson draws from this is that there cannot be any simple identity between brain and mind at the level of neurones and neural firings. In other words, the mind is not simply a function of neurones and neural firings. He suggests instead that; "… both mental events and neural firings are 'functions' of the development of the underlying state of the brain." And he's clear that (contrary to the Cart-Tonist view); "… mental events must relate more directly to the quantum level than to the macroscopic level." It's also true that macroscopic events within the brain; "… will, as a matter of fact, have extensive correlations with the mental events of subjective experience and action." This may be the origin of the Cart-Tonist delusion that mental events can be reduced to neural firings at the macro level. Both mental events and the development of quantum physical states demonstrate non-locality. This, according to Hodgson, strongly indicates a close relationship between consciousness and quantum processes.

He gives several examples from the functioning of the brain-mind to illustrate this: firstly, he points out that the neural underpinnings of perception may occur over large and perhaps spatially separated areas of the brain; "… perception of an object involves events in the brain associated with detection of many features of the appearance of the object, and with recognition of (and consequent beliefs about) the object: such events must involve many neurones and accordingly some spatial extension." However; "… subjectively, the perception of an object is a unified experience, which at any instant of time includes detection of many features of the object's appearance together with beliefs about what the object is. Somehow, it would seem, the subjective experience has to take in, all at once and non-sequentially, contributions from extended and perhaps separate regions of the brain." His suggestion is that quantum non-locality is responsible for converting these sequential and spatially separated macro events into a unitary and immediate conscious perception.[582]

Having looked at perception, Hodgson extends these considerations to include 'experience-action'. This involves physical brain events spread out in space; "… including some at least of the following: sensation events, cognition events, other association events (involving memory and understanding), affective events (appreciation, enjoyment, pain, emotion), and action events." All of these mental events are associated with signalling in the brain, at well under the speed of light, yet (as we experience them) they seem to be combined non-sequentially in a unified conscious experience. Such experience; "… appears to be unified, to comprise many aspects presented all at once, to embrace many features which must be contributed to by events spanning appreciable space. Not only does a complete experience appear to be present to consciousness at each instant, but also changes to different aspects of that experience appear similarly to be simultaneously present to consciousness, together with the remainder of the experience continuing unchanged. If I am watching a moving object, I see its movement and the still background at the same time."

In other words, there is a paradox here: in compliance with the theory of relativity, signals move around the brain at less than the speed of light, but any conscious experience which apparently arises from this sequence of signals is

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[582] Ibid, p.382-384

instant and simultaneous! So, mental events appear to be indifferent to spatial separation: they bring together, non-sequentially, elements associated with spatially separated physical events. Hodgson uses the example of visual perception, this, he says; "… seems to place images in space around an observer, with the experiencer-subject being placed, if anywhere, behind the eyes of the person in question." This suggests that; "… mental events somehow span space, so as to enable simultaneous experiencing of, and acting upon, matters associated with spatially separated physical events." Hodgson then invokes quantum states as the only possible scientific explanation for this: he says, consistent; "… with the theory of relativity, there can be (instantaneous) correlations effected between space-like separated events only in the quantum world, that is, in the world of potentialities comprised in quantum states." He then points out that the existence of EPR correlations between such states, and also the non-local correlations of probabilities associated with any 'collapse' of a quantum state, show that to some extent quantum states are indifferent to spatial separation, in a way which (due to relativity) macroscopic physical events cannot be.[583]

Clearly, what Hodgson is suggesting here is an association between mental events and the development of quantum states. This strong association may fall short of a causal explanation: "I am not asserting that the unity of conscious experience is provided specifically by EPR correlations, or indeed any particular kind of quantum non-locality; merely that quantum states have this property of non-locality in various respects, and this general property seems to be what is necessary to explain the unity of consciousness." On the

[583] Ibid, p.384/385

other hand, it does, he claims, cast considerable doubt on the Cart-Tonist, computational explanation: “For a decision to be based on all available information, such information must be co-ordinated, either in stages or all at once. A computer achieves this in stages by cause and effect. This is perhaps most obvious in relation to a Turing machine, where the different pieces of (coded) information are correlated by steps dictated by the information itself and by the organisation of the machine.” In the brain, however, perhaps quantum processes can enable all the available information to be mentally correlated instantaneously; “… if, as I contend, conscious experience makes an irreducible difference, then the whole experience must enter into the causal order at whatever location or locations in the brain the choice becomes manifest; and for this to happen its parts and their correlations must be simultaneously effective, so that each part can simultaneously contribute to the one action or decision. And this in turn suggests the instantaneous correlations which do exist between spatially separated quantum potentialities.”[584]

Given the plausibility of this proposed association between mental events and quantum states, Hodgson suggests that it may now be possible to answer a question posed by the non-local character of quantum states, as shown by Bell’s theorem. As we saw in chapter ten on the measurement problem, in connection with these issues Hodgson cites science writer, Frank Herbert’s, 1986, formulation of this question: ‘Why does nature need to deploy a faster-than-light subatomic reality to keep up merely light-speed macroscopic appearances?’ And provides the answer: “To make

[584] Ibid, 387/388

possible consciousness and mental events."[585] Let's be clear that Herbert is using the concept of nature's 'motivations' in a metaphorical sense: the physical world has evolved, just as the biological world has (in conjunction with it), in terms of what 'worked' in promoting survival and reproduction. For creatures of our size, the macro world, with its classical characteristics, has proved highly adaptive for our evolutionary success. All the while, however, nature was using the more fundamental characteristics of the quantum world, at the micro-level of our brains, to foster the evolution of a causally effective consciousness.

An ironic conclusion can be drawn from this perspective on evolution: It's plausible to argue that it is the classical world, of Folk Psychology and Cartesian philosophy, that's the 'bubble of illusions' to which we cling for practical, evolutionary reasons. Cart-Tonists, like Dennett and others, have been so insistent in preferring the Realism of classical physics to the bizarre, mind-like qualities of quantum mechanics. So much so that they have striven to exclude quantum effects from events at the macro scale, such as brain functioning. (Rather than the clinical term 'exclude', their efforts might be better described as a desperate urge to 'banish the quantum spectre' from the consciousness debate.) They have sought to achieve this by dismissing quantum mechanics as a technical, highly specialised theory designed only to address phenomena which occur exclusively at the profoundest, micro level of physics. At the everyday level, they assure us, the disturbingly non-common-sensical conclusions of this theory are all 'safely cancelled out'. In reality we can turn this piece of Cart-Tonist ontology on its

[585] Ibid, p.385

head: we live in a quantum universe and it is quantum laws which govern everything which happens within it. Classical physics is merely a special case, which is pragmatically useful to a biological species of our individual, physical size.

Consciousness, Condensates and Evolution

Within this context of quantum realities applying also to brain functioning, Hodgson feels free to boldly state that: "The non-local character of reality at the quantum level suggests that there is no reason in principle why there could not be co-ordination of the resolution of indeterminacies affecting many neural firings." Indeed, a particular quantum mechanism, the Bose-Einstein condensate, has been speculatively nominated by many theorists (Lockwood, 1989, Zohar, 1990 and Eccles, 1990) for just this function. As we saw in chapter fourteen, Stuart Hameroff also suggested that Bose–Einstein condensates could form in neural microtubules. Such condensates are the most ordered form of condensed matter possible; the many parts constituting the condensate not only behave as a whole, they become a whole. Hameroff also proposed that the condensates in one neurone could extend across many others, via gap junctions between neurones, forming a macroscopic quantum feature covering an extended area of the brain.

The idea here is that when the wave function of this extended condensate collapses, it will generate consciousness from the 'experience', which Whiteheadian ontology believes constitutes the fabric of the universe. Hodgson comments that if considered from the physical view-point, the development of the condensate would appear random; "…

because that viewpoint can take no account of subjective mental processes, in so far as they transcend physical processes. However, from the mental viewpoint, this co-ordinated resolution of indeterminacies could be a matter of choice."[586] In other words, Bose-Einstein condensates could embody a stream of consciousness, including purposive human decision-making.

In contrast to this vision of the effective exercise of human freewill via quantum processes, theorists in the Cart-Tonist approach to consciousness often presents free will as a delusion (Hodgson cites Michael Gazzaniga and Richard Restak as examples). In addition, many such theorists also make a vague claim that this delusion has some evolutionary value. But, as Hodgson points out, to; "… suggest that the conscious self is in some general way deluded into believing itself to be responsible for actions, … seems to make little evolutionary sense. If consciousness is efficacious, this is no general delusion; and if it is not efficacious, why is there any evolutionary use for a comforting delusion?"[587] It's rather like an invading army setting up a puppet regime in a conquered country: if there really is no opposition to the invasion (the position of the reductive Determinists) then why bother to create an illusion of self-government?

An exception to this 'no-evolutionary-purpose' objection is Nicholas Humphrey. He has suggested that having the feeling that we have freewill makes us believe that we have immortal souls, which, in turn, has the evolutionary ad-

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586 Ibid, p.401

587 Ibid, p.399-401

vantage of making us care about the quality of our lives and generally gives us a higher level of motivation in life. Humphrey's argument occupies an intriguing, 'bridging' position in the field of consciousness theory: on the one hand, he's a card-carrying Cart-Tonist, who believes that mind and consciousness are entirely dependent on classical physical processes in the brain. On the other, he's a 'qualiophile'; he clearly delights in, and is enchanted by, the phenomena of raw sensory experience. Far from denying, or ignoring, qualia, like many of his fellow Cart-Tonists, such as Daniel Dennett, Humphrey's work is replete with literary and artistic quotations extolling the virtues of everyday sensory experience.

Moreover, qualia are key to his explanation of the biological function of consciousness: Humphrey very cleverly side-steps the pitfall of most attempts to explain consciousness, which try to link it to the carrying out of some biological skill or function. No, according to Humphrey, we have consciousness not to enable us to do something we could not otherwise do, but rather to encourage us to do something we would not do: to make us take an interest in, and mind about things and to set ourselves goals, which we otherwise wouldn't. In other words, consciousness is about motivation not performance! This culminates (in Humphrey's theory) in natural selection tricking us, via consciousness, into the delusion that we have immortal souls, again purely for the beneficial, biological side-effects that this generates.

His book, ‘Soul Dust’[588], deals much more about what consciousness is for than what it is. (When Humphrey does stray into the territory of what causes consciousness, he nods in the direction of Douglas Hofstadter’s ‘strange loop’ theory. This, as we saw in chapter five, while based on some extremely esoteric mathematical thinking, is still physicalist and deterministic.) What is missing for me, and I suspect for many others interested in consciousness theory, is any reference to quantum mechanics, and consequently to Whitehead’s ontology, which we need in order to begin our efforts to try to understand quantum theory. Why should Humphrey’s neglect of a quantum dimension in consciousness matter? It matters because I see Humphrey’s argument as an analogue of the ‘God-created-the-fossil-record’ position against Darwinism. As many a good Victorian bishop once argued, the evidence of the fossil record was not to be taken seriously: it was simply God’s way of testing our faith in the biblical creation story. In a similar way, Humphrey is now arguing that ‘the Magic of Consciousness’ is not to be taken as indicating any connection between human beings and the ultimate basis of reality. Except, that is, as an evolutionarily useful delusion – a trick played on us by natural selection to promote the biological success of our complex but potentially fragile species. This position neatly corrals the wild phenomena of consciousness safely within the paddock of classical physics, fenced in by the tight bounds of functionalism.

Do Qualia have Meaning and Purpose?

In order to move on from this position of Humphrey’s, let me suggest that we need to attempt to answer the question,

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588 Humphrey, Nicholas, ‘Soul Dust’, 2011, Princeton U.P.

'do qualia have meaning and purpose'. Any attempt to do this requires some consideration as to what is meant by 'meaning'. Cart-Tonist philosophers tend to seize on propositions as the exclusive source of meaning for the human mind: propositions provide information about the world, or about personal preferences, in a very conventional sense. For example, the propositions; 'there is a chair in this room' or 'I like tomatoes' are perfectly comprehensible and can be tested for their truth or falsity. But can this be said about qualia? If people tell us that they are experiencing certain sensations or emotions, we may feel we understand what they mean, in the sense that we can identify what they are talking about as states that we have also experienced. (It can now also be claimed that we understand such states of mind via our mirror neurone reactions, as we saw in chapter six.) However, to pose a question as to whether a particular sensation or emotion is true or not, doesn't feel meaningful. Arguably, the closest philosophy has come to a discussion of the 'truth' or 'meaningfulness' of qualia is the 'Inverted Spectrum', which (as we saw in in chapter four) asks whether you feel the same thing when you see red as I do. Clearly, pain, pleasure and other emotional states can be very important and meaningful to the individuals experiencing them, but these qualic states don't have meaning in the abstract public sense that propositional states do. This may be one reason why some theorists believe that all mental states are propositional and deny that qualia exist at all.[589]

Another way to pose this question as to the meaningfulness of qualia is to ask: what's the relationship between qualia and intentionality? Intentionality being the philosophical

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[589] Rose, David, 'Consciousness; Philosophical, Psychological and Neural Theories', 2006, Oxford U.P., p.6/7

term for the power of minds to be about, to represent, or to stand for, things, properties and states of affairs. (The word 'Intentionality' is derived from the Latin, meaning to be directed towards some goal or thing.) Intentionality is closely related to the concept of meaning, in the sense that being in an intentional mental state, by definition, means something. David Rose points out that some philosophers identify consciousness in terms of qualia (or, how it feels), while others claim that consciousness is based on intentionality. In other words, consciousness is always about something, i.e. meaningful. As Rose continues, however, this proposed dichotomy raises two very basic questions: firstly, perhaps consciousness is characterised by both qualia and intentionality, and second, maybe it's a false dichotomy, i.e. it may be that qualia, just like intentional states, always mean something. And indeed, Rose makes it clear that some philosophers have argued exactly this; "… that qualia cannot exist without intentionality, in that all experiences have some kind of meaning."[590] Jeffrey Gray, the experimental psychologist, argues almost the same thing: he claims that qualia, as the contents of conscious experience, are purely and entirely perceptual. But, he says; "This does not imply that they consist in what the philosophers call 'sense-data': as-yet un-interpreted sensory fragments awaiting integration into a meaningful or 'intentional' whole. On the contrary, the contents of consciousness are almost always intentional, that is, interpreted as having meaning."[591]

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[590] Ibid, p.362/363

[591] Gray, Jeffrey, 'Consciousness: Creeping up on the Hard Problem', 2004, Oxford U.P., p.90/91

Rose cites the French philosopher, Maurice Merleau-Ponty's (1945) argument that even when looking at a patch of white, there is still meaning linked with it: for example, it's a figure, with shape, intensity and function. Merleau-Ponty is saying that qualia cannot be experienced in an elemental, abstract, isolated fashion: Rose goes on to suggest the same applies vice versa, i.e. that intentional states always have a 'qualic feel' attached to them; that there's 'something it is like' to hate someone, to believe in God, or to want to understand Kant. Thus, he claims that meaning and experience always occur together. Furthermore, he claims that there is some experimental evidence to support this view: "The recurrent and tightly coupled activity patterns seen in the brain during object recognition, recall and imagery … are consistent with this integrated picture." Rose, then asks; "… can we make a case for there being identity between the neural substrates of qualia and intentionality?" However, Rose also has a third alternative; rather than identity or dichotomy between qualia and intentionality, their true relationship may be a continuum: "According to the serial processing view, the purest qualia would be generated in the primary regions of sensory cortex, and then progressively less vivid percepts would arise as neural activity moves away from the primary regions. For instance, thinking about your grandmother's personality (let alone justice, or what Kant really meant) evokes relatively weak mental images. (Stronger images can be evoked by these thoughts if we make an effort to engage imagery.)"

In this 'serial processing model', incoming waves of neural activity from the sensory areas are progressively assessed for significance or meaningfulness as it moves through the nervous system. The incoming signals are assessed as to whether the stimulus is; good or bad, familiar or unfamiliar, dangerous, edible, a potential mate, etc. Rose comments that, in this serial view, intentionality is increasingly 'built up' as signals progress towards the 'higher' centres of the brain and they are subject to ever deeper levels of processing. Consequently, in the serial processing model, qualia and intentionality are inversely related: in other words, as meaning increases, qualia decline. This is similar to the Behaviourist view that meaning arises from the associations evoked by a stimulus. As a stimulus is analysed progressively through several stages, so the brain derives more and more meaning from the stimulus as the number of associative connections activated in the semantic network of long-term memory increases. And so, there is no single point or stage at which meaningfulness starts, it's a matter of degree.[592]

Meaning, Feeling and Ontology

In support of this conception of a continuum from qualia to full meaningfulness, Rose cites the philosopher, David Lyons (1995) who suggests that; "… intentionality develops ontogenetically through several levels or layers, first by the formation of associations between sensory experiences, and between these and the sensory consequences of actions. Later, other people become involved in the causal loops that link our own experiences, and so arise symbolic representations, beliefs, propositional attitudes and public language." Rose also refers to the Nobel-Prize-winning physicist, Robert Millikan's view; "… that intentionality is a matter of degree … It depends upon the extent to which a

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[592] Rose, David, 'Consciousness; Philosophical, Psychological and Neural Theories', 2006, Oxford U.P., p.362-366

signalling system interacts properly with other co-evolved systems, and to what extent their contents correlate with the real-world states they are supposed to signify."[593]

Rose also appeals to neurological conditions to support the view of a progressive neural pathway from qualia to full meaningfulness. He refers to two distinct types of neurological loss of function, known, respectively, as apperceptive and associative agnosia: "The apperceptive agnosias are those in which the patients have problems with perceptual analysis per se, such as in perceiving the relationships between the different parts of objects. They may have problems with copying, drawing and integrating details into wholes (in the case of vision). The associative agnosias are cases in which people have problems more with understanding. They cannot tell the uses of an object, identify what the object is, know what it is for - for example, knowing that a comb is used to comb your hair, a pen is for writing, or that a door is hard and you will hurt yourself if you walk into it. Thus perceptual and conceptual processing are separable anatomically as well as functionally." The implication is that the neural damage in apperceptive agnosias is closer to the primary regions of sensory cortex, while in associative agnosias, it's closer to the 'higher' centres.[594] Finally, Rose appeals to the findings of the Canadian neurosurgeon, Wilder Penfield, who starting in the 1950s, electrically stimulated the brains of his patients for experimental purposes: in considering the view that 'simple' qualia are generated at the periphery of the nervous system and brain, while 'meaning' arises from the 'higher centres',

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[593] Ibid, p.367

[594] Ibid, p354

Rose claims that; "… support can be taken from the data presented by Penfield (1958, 1975) showing that electrical stimulation of primary sensory cortex evokes experiences of simple flashes of light, buzzing sounds and so on, whereas stimulation of cortex away from the primary regions can engender more complex experiences, of a deeper and more meaningful nature, such as feelings of familiarity accompanying evoked memories."[595]

But if qualia and meaning always occur together, how are they related to each other? Gray speculates that this relationship may be as arbitrary in perception as it is in language; "… at the evolutionary level, the relationship between perceptual qualia and functions may possess at least some of the flexibility that holds in ordinary language between qualia (phonetics) and meanings (semantics)." What Gray is saying here is that the meanings of spoken and written words are simply assigned to them by the language community which uses them. (We can be certain of this because different language communities use completely different words for the same things.) Gray's analogy here implies that just as human vocal equipment is capable of producing a certain range of sounds, to which human communities assign meanings, so nature is capable of producing a certain range of qualia, to which evolution has assigned meanings. As Gray says, solving the Hard Problem might then consist in trying to discover the syntactical and semantic apparatus which evolution has put in place between nature's range of qualia and human meanings. So that just as a word goes into a human ear or eye and a particular meaning emerges in the attached human brain, in a similar way, evo-

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[595] Ibid, p.364

lution has arranged that particular qualia, in the five sensory modalities, goes into, say, a mammalian organism and a particular meaning emerges for that organism. Gray links this way of seeing qualia with the 'PenOff' quantum-mechanical theory of consciousness (which we looked at in chapter fourteen).

However, as per the general argument of this book, I would link this notion that the origin of qualic experience can be located outside of the human organism, to Whitehead's ontology: if, as this ontology claims, the ultimate fabric of reality consists of 'experience', then clearly the full range of human qualia are (at least potentially) already present in the universe. As a human being (and, to a lesser extent, any other living creature) passes through life he or she experiences a vast range of qualia; colours, sounds, tastes, etc., fear, anger, joy and the other primordial affects described by Panksepp. The suggestion here is that this range of qualic experience already exists, at least as potentials, in the feelings and processes which compose reality. Again, as we saw in chapter fourteen, Gray is ambivalent about PenOff 's capacity to explain how the different types of qualia (shape, colour, sound, smell, taste, touch, etc.) are produced. The theory proposes that qualia enter into consciousness when a quantum wave function collapses. It then postulates that a reduction in a particular brain region gives rise to the corresponding type of qualia, i.e. area V4 produces colour qualia.

But, Gray complains, there's no reason within the quantum mechanical model to link a given type of qualia with a given region. The explanation of the kind of qualia is Gray says; "… smuggled into the model by way of knowledge stolen from elsewhere." By this reference to stolen knowledge, Gray is pointing to the already well-established correlation between certain kinds of qualia and certain areas of the brain, e.g. (as above) between area V4 and colour: "All we do have is a series of brute correlations between, on the one hand, activity in this or that part of the brain and, on the other, the occurrence of this or that kind of qualia." As Gray insists; "… the presence of a systematic relationship, on its own, is no more than a 'brute correlation'. To advance to the status of a scientific theory, one needs an account of just why the systematic relationship takes the form that it does. No-one has yet achieved this for the brute correlations of either function or neurophysiology with qualia." However, Gray does hope for for something more from the PenOff theory: it "… does say something about the nature of qualia. They are 'super-positioned patterns embedded in fundamental space/time (Planck scale) geometry'. To be more accurate, a quale is the particular one among these proto-conscious patterns chosen at any given moment to achieve quale-hood due to orchestrated objective reduction in a microtubule system located in a sufficiently highly organised brain." Gray comments that this does indeed represent progress, albeit modest, over the other two forms of brute correlation: "To say something about the nature of qualia is already an advance - it at least recognises that something needs to be said."[596]

My comments on this conclusion of Gray's are as follows: while one can admire Gray's heroic struggle to pin down the most obvious facts of human experience onto the Procrustean bed of Cart-Tonist 'science', the struggle is an in-

596 Gray, Jeffrey, 'Consciousness: Creeping up on the Hard Problem', 2004, Oxford U.P., 255-257

evitable consequence of a failure to cut the Gordian knot of ontology, and this failure is shared with many other mainstream consciousness researchers (including the PenOff partners). What exactly do I mean by this rather flowery statement? My basic contention is that anyone formulating a scientific theory is (consciously or unconsciously) referencing an ontology of some variety. In claiming this I am appealing to the Popperian tradition that (in opposition to induction) the ***only*** source of theory formation is the human imagination. Putting these two statements together, we can arrive at the claim that the ontology to which you subscribe can limit or inspire your theoretical imagination. Applying this principle to the problem of consciousness, I'd like to claim the following conclusions: a) if you subscribe to Cart-Tonist ontology, your imagination will be cognitively unable to produce a theory capable of encompassing ***sentient*** consciousness. There may be more scope for Ideological Empiricists, who for pragmatic reasons I've tended to 'lump together' with Cart-Tonist anti-sentience theorists. On the other hand, they (Ideological Empiricists) have an aversion to, and disinterest in, theory itself. Consequently, they tend to suffer from the same limitations of the imagination as do the Cart-Tonists. On the bright side, however, we can claim the following proposition: if you subscribe to Whitehead's ontology, you can imagine a viable ***scientific*** theory which will account for ***sentient*** consciousness and also be consistent with the findings of quantum mechanics, and other contemporary scientific theories.

Immediately Meaningful Qualia?

We can now turn to the task of evaluating the various views (expressed above) on the relationships between qualia, intentionality and meaning. I'll attempt to do this in the context of the contrast between the Cart-Tonist and the Whit-Tum ontologies. In approaching this issue (as I do) from a Whit-Tum perspective, I'm struck by the highly cognitive interpretation of 'meaning' which the Cart-Tonists, generally, seem to employ: 'meaning' for them involves producing accurate information about objects or states of affairs in the world, in an objective, Realist way. What's lacking, it seems to me, is an analysis using an alternative, 'evaluative' interpretation of meaning: in other words, a search for meaning, not so much in terms of what is the state of affairs in the world, but rather, 'what does this object or state of affairs mean to me'? From an evolutionary point of view, this evaluative interpretation of meaning would certainly have been given priority in selecting the 'design' of an organism's cognitive system, simply because an 'evaluate-first' approach promotes survival and reproduction more effectively rather any effort to be neutrally objective. We can now revisit this question of the relationship between qualia and meaning from this alternative, evaluative point of view. Starting from this interpretation of meaning, then the notion of qualia as directly and immediately meaningful makes more sense, than does the continuum view (outlined above), where meaningless qualia gradually 'accrue' meaning as they progress through higher and higher levels of information processing. Again, from an evolutionary point of view, it's surely necessary for the survival for an organism for it to have immediate and direct evaluations of incoming sensory input, rather than waiting for this to emerge from successively more elaborate processing of the input as it ascends to higher levels of the organism's nervous system. However, as we saw earlier, there doesn't seem to be, conventionally, any explanation as to why these immediate evaluations should involve conscious qualia, and, indeed, for many simpler species, such as insects, I believe that a lack of consciousness in this process is entirely unproblematic. But for higher species, such as mammals, many theorists are now arguing, qualia do play a significant role.

Beginning with the earliest mammals (and possibly birds), I suggest that evolution did introduce consciousness into this evaluative process. I further believe that the role of consciousness in this process is to permit an element of behavioural flexibility to intrude between stimulus and response. This element of behavioural flexibility works as follows: as stated earlier, all mammals (according to Jaak Panksepp) are equipped with seven basic emotional systems. All incoming signals from the environment are 'run passed' these for an immediate response. Given the organism's history, both phylogenic and ontogenic, these inputs will trigger, 'good', 'bad' or neutral responses. This immediate, 'fast-reaction' system operates in addition to the slower, 'cognitive knowledge', which passes through the 'higher' centres of the brain. Notice that the fast reaction system relies on emotional responses (most of which are not conscious). And, according to contemporary researchers like Jaak Panksepp, it not just the neurophysiological part of the emotions that's important in this system; the conscious, subjective part of emotion, 'affect' is also important. This is because affect provides the 'rewards' and 'punishments' which guide learning and hence, flexible behaviour. Panksepp points out that, although the Behaviourists were keen to refer to 'rewards' and 'punishments' in connection with learning, in their theory, these were somehow transmitted direct from the environment to the organism, with no affect involved.

Panksepp argues that it makes much more sense to see the positive or negative affect itself as providing the 'rewards' and 'punishments'. These affective responses may not immediately guide behavioural reactions in fast, conditioned or unconditioned responses, but in the long run they contribute to learned flexibility of behaviour in mammals, via, for example, the late error detection system described earlier by Jeffrey Gray. Another emotion theorist and animal researcher, Edmund Rolls, expresses this role of emotion as follows: he claims that the evolution of the complex mammalian emotional systems enabled genes to specify goals and rewards, rather than behavioural responses themselves: "… the theory that genes set many goals for action does not mean that our behaviour is determined by genes. Modern evolutionary theory has led to the understanding that many traits, particularly behavioural ones, may have some genetic basis but that does not mean they will inevitably appear, because much depends on the environment." He goes on to explain that in evolution genes specify rewards and punishers which act as goals for action, but the genes do not specify the actions themselves, which gives us behavioural flexibility, enabling us to learn different patterns of action, as appropriate to different environments.[597]

Qualia as Rewards and Punishments

Rolls outlines how the brain achieves this flexibility as follows: the action systems in the brain are designed to optimise the output of the reward and punishment systems, in conjunction which particular experiences or representations. Put another way, the brain systems involved in motivation and emotion must pass on reward or punisher signals

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[597] Rolls, Edmund, 'Emotion Explained', 2005, Oxford U.P., p.vii

to the action systems, which then attempt to obtain and maximise the reward signals being received. Rolls says: “Since it’s the range of emotional responses, and not the behavioural responses that are fixed, the brain can switch behaviour from one reward to another as the reward signals being received change. It can, also, of course, switch behaviour if signals indicating possible punishers are received.”[598] Rolls talks here about ‘receiving signals indicating’ rewards and punishments.

This is too Behaviouristic for Panksepp, who prefers to conceive of the felt, affective emotions, i.e. the positive or negative qualia, as being ***themselves*** the actual rewards and punishments. The thrust of this argument from Panksepp is that emotion may be the basis for our immediate, primal, sensate consciousness, in other words, our qualia. This is in sharp contrast with, for example, the perspective in the field of artificial intelligence, which links intelligence, if not consciousness, with mathematical, digital processing rather than the rapid analogue forms of emotional reactions. As the British philosopher Andy Clark suggests, the truth is probably that we have both types of mental processing continually going on, but, as Panksepp insist, the emotion-based system is biologically predominate.

Individual human organisms learn to associate the reaction of one, or some combination, of the seven emotional systems with particular experiences and situations. This may, in fact, be the most primeval level of ‘meaning’ and learning in the brain. In other words, the qualia of these affective reactions would definitely have direct and immediate

[598] Ibid, p.8

meaning to the individual experiencing them. The emotional responses then signal the brain's motor system to produce an appropriate behavioural response. The flexibility comes from the notion that the associations between the emotion systems and particular experiences is not fixed: it can change via learning and/or dramatic changes in the life-experience of the individual. Panksepp claims that the basic emotions are qualia, i.e. primary experiences, like seeing a colour, and specifically that language adds nothing to such experiences, but merely labels and represents them. Thus emotional experience itself, like seeing the colour red, does not require any conceptual intelligence: "Humans can use words to label their affects, but they do not need words to experience them. Thus, our use of words does not necessarily mean that other animals need to be competent with verbal concepts in order to experience affects. Primal affects are surely prelinguistic experiences - experiences common to all mammals and perhaps to other animals as well."[599]

In support of Panksepp's view, Jeffrey Gray also emphasises that conscious experiences are givens: they come unbidden, automatically and involuntarily. Provided you keep your eyes open and ears unblocked, you cannot choose to have qualic experiences: "It is commonly supposed that conscious experience is in some sense voluntary. Nothing could be further from the truth. Percepts just happen: they 'pop in' to consciousness automatically and involuntarily. We can choose not to turn our eyes towards a red apple or to keep them shut. But if the apple is in our field of view (and if we are paying attention) we cannot choose not to

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[599] Panksepp, Jaak,'The Archaeology of the Mind', 2012, New York, W.W. Norton & Company, p.79

see it. Even in the case of ambiguous percepts, the 'flip' between conscious perception of the one (a duck) or the other (a rabbit) happens automatically, with little influence from conscious deliberation."[600]

Qualia - Neither Linguistic nor Cognitive!

As we saw in chapter seven, Panksepp makes a clear distinction between qualia and concepts: He takes the example of one's first experience of seeing the colour red. Panksepp's point is that there's no learning involved in this experience, unlike the first time you saw a chair. In the chair experience you had no idea what you were looking at and what the purpose of this object might be. With repeated exposures to chairs, and with the exercise of your own ***intelligence***, you gradually develop the category 'chair' and understand its purpose. But, Panksepp is clear that; "… the raw phenomenal experience of seeing red does not require intelligence. So words like chair represent intelligent concepts, while other words like red represent primary experiences that require no intelligence except, of course, if you wished to label the experience." It is for these reasons that Panksepp objects to the position taken by Edmund Rolls who has suggested that emotional evaluations somehow become concepts too and that we only experience these emotions when we put these concepts into words. Panksepp is concerned that only intelligent animals can do this, and that, consequently Rolls believes that only intelligent animals can experience affects. (If you take qualia as a crucial component of consciousness, as I do, then this view of Rolls is an example of the common error of confusing consciousness with intelligence.)

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[600] Gray, Jeffrey, 'Consciousness: Creeping up on the Hard Problem', 2004, Oxford U.P., p.91

Panksepp finds this difficult to make sense of in evolutionary terms: we know, for example, that people experience pain before they've developed the concept of pain. And this also applies to all the primary-process emotions. Given this view, it may be, as per Humphrey's theory earlier, that the drama and 'magic' of consciously experienced emotions, plus other qualia, is what provides humans with their internal motivations, especially the motivation to go on living. However, according to this new conception of the crucial role of conscious emotion (from the various theorists and researchers presented in part four of this book), Humphrey is underestimating the importance of qualia - they may indeed provide us with life-motivation, but more importantly from an evolutionary point of view, they may also provide us with flexibility of behaviour.[601]

It's illuminating to contrast this idea of qualia and qualic emotion as providing the basis for behavioural flexibility, with conventional functionalist ideas of qualia as simply a synonym for function or as completely irrelevant for function: Gray, produces a whole list of human behavioural functions; breathing, walking, riding a bicycle, hitting a tennis ball, withdrawing your finger from a hot surface, producing a sentence, comprehending sentences spoken by others, reading a page of prose, generating thoughts. He then insists that; "… these processes of action are all discharged without the aid of qualia. To be sure, they are accompanied by qualia. But these do not directly reflect the processes of action. Qualia appear, rather, to reflect the consequences of, or triggers to, action: you feel (or hear,

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[601] Panksepp, Jaak,'The Archaeology of the Mind', 2012, New York, W.W. Norton & Company, p.79

see, etc.) your chest heaving as a result of your breathing, the wobble of the bicycle you ride, the pain due to contact with the hot surface from which your finger retracts, the sounds of the words you utter, read or think.”

Gray concludes that; “… we become conscious of events only after we have had time to respond to them behaviourally and, often, have already done so. This rule applies even to one’s own volitions, as Benjamin Libet's famous experiments show: the brain decides and then we become aware of its decision.” Gray notes that these considerations severely restrict the range of possible functions which qualia might fulfil: “They clearly are not essential for what one might call ‘on-line’ behaviour: the kind of rapid reaction that saves you from a traffic accident these days and saved our ancestors from the lion’s maw in earlier times. From the evolutionary point of view, that rules out a great deal of behaviour that contributes rather directly to survival.”[602]

A Survival Value for Qualia?

Given this, as we have seen, the Cart-Tonist answer has been to simply deny, point blank, that qualia exist. Having now presented the ‘behavioural flexibility’ theory as an explanation as to why qualia should have evolved, we can now ask; why has this explanation been missed? I think because, conventional theorists have assumed that an explanation for qualia and consciousness must involve directly contributing to one or more behavioural functions. Humphrey has identified this as the Achilles’ heel of many consciousness theories. The ‘behavioural flexibility’ theory,

602 Gray, Jeffrey, ‘Consciousness: Creeping up on the Hard Problem’, 2004, Oxford U.P., p.66/67

however, does not fall into this trap: rather than a direct functional role, it posits instead that learning and behavioural flexibility are the purpose of qualia and sentient consciousness. Qualia fulfil this role, as per Panksepp, by providing an 'in-depth', internal reaction to the consequences of behavioural outcomes. The 'qualia of outcomes' are then linked, by experience, to Panksepp's pre-given range of emotional reactions, thus providing the rewards and punishments which guide future behaviour, otherwise known as learning. The only exception to these conclusions about the role of qualia in action would be the behaviour of a 'philosophical zombie'. As we have seen, this is a philosophical invention illustrating the possibility that there may be beings which act exactly as humans do, but do not experience any qualia. Gray says: "It is a stark illustration of our lack of understanding of the functions of consciousness that no-one is at present sure whether zombies could or could not exist in reality. That is to say, we do not have a theory from which it can be deduced what kinds (if any) of information processing or behaviour could or could not be executed in the absence of qualia." And, in fact, Gray reiterates that experimental evidence indicates that the brain can do an awful lot without qualia: "We don't, for example, need qualia in order to act swiftly, to act voluntarily, to sense stimuli across the gamut of our sensory modalities, to extract meaningful categories from stimuli, to react emotionally, to solve problems, to learn or to remember." Gray then asks the classic question which has dogged the notion of qualia ever since this sort of experimental evidence has started to accumulate: "So what do qualia do? What do they do, moreover, that could have conferred upon them sufficient survival value for them to have evolved?”[603]

David Chalmers (as quoted by Minsky) asks the same question, though perhaps in a more vivid and comprehensive way; “Why is it that when our cognitive systems engage in visual and auditory information-processing, we have visual or auditory experience: the quality deep blue, the sensation of middle-C? … Why should physical processing give rise to a rich inner life at all? … When we visually perceive the world, we do not just process information; we have a subjective experience of colour, shape, and depth. We have experiences associated with other senses (think of auditory experiences of music, or the ineffable nature of smell experiences), with bodily sensations (e.g., pains, tickles, and orgasms), with mental imagery (e.g., the coloured shapes that appear when one rubs one’s eyes), with emotion (the sparkle of happiness, the intensity of anger, the weight of despair), and with the stream of conscious thought …. [That we have a sense of experiencing] is the central fact about the mind, but it is also the most mysterious. Why should a physical system, no matter how complex and well-organised, give rise to experience at all? Why is it that all this processing does not go on ‘in the dark’, without any subjective quality?”[604] The A.I. researcher, Marvin Minsky answers these questions in a fairly standard, Cart-Tonist way: “Chalmers seems to assume that ‘experiencing’ is quite plain and direct and therefore merits a simple, compact explanation. However, once we recognise that terms

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[603] Ibid, 65-67

[604] Minsky, Marvin, ‘The Emotion Machine’, 2006, New York: Simon & Schuster, p.119 and 327/328

like experience or inner life refer to big suitcases of different phenomena, we can start to make theories about each of those separate phenomena. However, it seems to me that the mysteries that Chalmers sees result from squeezing multiple mental activities into suitcase-words like subjective, sensations, and consciousness."

So, for Minsky, the Hard Problem can be solved with a little reform of our semantic usages. Once we have corrected our use of language, our illusory beliefs about subjective experience will (apparently) wither away; "… our higher level processes cannot detect … intermediate steps - and this lack of insight leads us to the belief that our sensations come to us in some way that is simple, direct and immediate." Minsky gives the examples of being touched or seeing red: you have an immediate sense of feeling the touch and seeing red, without the intervention of any complex processing. This explains why many people deny that any 'mechanical' processes can explain why different stimuli seem each to have the particular qualities they do.[605] To me, and I suspect many other people, this Cart-Tonist 'sleight of hand' in dismissing our most intimate and important experiences is not only utterly unconvincing, but also vaguely distasteful and offensive.

Energy and Information: Are Knowledge and Experience the Same?

But are the mind and consciousness nothing but the outcome of digital, algorithmic processing of abstract symbols in the brain? And if there is something more than this, what is it? Modern physicists have suggested that ultimately the

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[605] Ibid, p.119 and 327/328

universe can be reduced to energy and information. Let me, therefore, suggest that, the other force in the brain, in addition to information, is energy, and that it is these energy forces in our brain that can account for our subjective experiences, in the form of qualia, sentient consciousness and feelings. What form then does the energy in the brain take? Rather than being based on digital processes, the affects that serve as a basis for mental states ultimately come (I suggest) from Whitehead's drops of experience, which make up the fabric of the universe. Let me further suggest this 'brain-energy' can be describe as affect, the subjective part of emotion; emotion in the extended and elaborate sense as described by Jaak Panksepp and other modern emotion-theorists.

Daniel Siegel describes energy flows in the brain as follows, the; "… human mind emerges from patterns in the flow of energy and information within the brain and between brains." These patterns in the flow of energy and information, Siegel says; "… can be described as emanating from the activity of the neurones of the brain." Siegel doesn't talk much about this, but there's also the chemical, glandular brain, where flows of neurotransmitters deeply affect mind and consciousness. (Once again, my argument is that the 'raw material' for conscious sentience consists of Whitehead's 'drops of experience', but that 'intermediate' processes and mechanisms, such as these are necessary to 'convert' this base-level sentience into full-blown human consciousness.) As above, the 'flows of energy' that Siegel is describing may refer to emotional, 'analogue states' in the brain, which have been neglected by Cart-Tonist theorists in favour of computational information processing.

Siegel is very keen to emphasise that these ‘energy flows’, which he claims create our mental processes, are not figments of the New Age imagination but based on the findings of modern neuroscience. He says: “These assessments of ‘energy flow’ are not popularised, unscientific views of the flow of some mysterious energy through the universe. Neuroscience studies the way in which the brain functions through the energy-consuming activation of neurones. The degree and localisation of this arousal and activation within the brain - this flow of energy - directly create our mental processes.”[606] It’s revealing of the dominance of Cart-Tonist ontology that Siegel should feel the need to make these disclaimers. As we have seen, Whitehead suggests that his ‘drops of experience’ are present throughout the universe. The function of the brain (as I see it) is to transform these ‘cosmic raw materials’ into our mental processes (rather than creating them out of nothing). I do not regard this Whiteheadian perspective as either ‘unscientific’ or (given the long and thoroughly undeserved obscurity of Whitehead’s ontology) ‘popularised’.

While the Cart-Tonist, Dennett, has been busy trying to replace traditional dualist accounts of the origin of consciousness with computational processes, other researchers have been looking for biological, ‘embodied’ and emotional-energetic explanations for qualia: Jeffrey Gray, for example, reports several experiments indicating that various animals, such as cats and monkeys, demonstrate intentionality in their perception: in one experiment a pattern of stimulation on the monkey’s retina was constant, yet the monkey sometimes reported a starburst and sometimes a

[606] Siegel, Daniel ‘The Developing Mind’, 1999, The Guilford Press, p.2/3

face. Gray says: “This is just the kind of phenomenon that philosophers include in their concept of intentionality: that is to say, a constant input from the world outside is interpreted as this or as that.”

As discussed in chapter seven, Gray comments that any attempts by cognitive neuroscientists to interpret these results without attributing qualia and intentionality would be strained indeed: “We cannot ask a rat or a mouse if it feels pain, but we can observe its speed of withdrawal from a hot surface. Rodents respond to opiates just as human beings do. They do so because their brains contain the same receptors for opiates, and the same endogenous opiates that act upon these receptors, as does the human brain.” We could, Gray observes, nevertheless, claim that only human beings experience pain, just as we could still insist that the Ptolemaic view of the Heavens is accurate, despite the observations made by Copernicus. “But it just isn’t parsimonious to do so, especially since observations like these can readily be multiplied many times over.” So Gray concludes, that animals do have qualia and intentionality. (In a Whiteheadian world, this observation would not strike scientific researchers with awe and astonishment.)[607]

In a very similar way, Jaak Panksepp also insists that all other mammals (and perhaps other species) ***do*** have subjective emotional qualia. As mentioned previously, he says that conventional neuroscience implies that; “… affects can only occur either in animals that are intelligent enough to interpret emotional physiology or in animals that have language. This would mean that only human beings and per-

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[607] Gray, Jeffrey, ‘Consciousness: Creeping up on the Hard Problem’, 2004, Oxford U.P., p.68-70

haps some other primates are affective creatures. Presumably less intelligent mammals copulate without lust, attack without rage, cower without fear, and nurture without affection."[608] Given that animals may have qualia, Gray then starts looking for explanations as to why evolution should have selected for this. He firstly points out that the existence of animal qualia would rule out a large number of 'false leads'; e.g. Julian Jaynes' suggestions that consciousness began with the Greeks or that consciousness requires human language or that its survival value (by way of sexual selection) lies in its contribution to specifically human intelligence or artistic sensitivity. Any theory, in other words, that requires specifically human abilities.

But, as Gray points out, we are still left with the puzzle of finding a function for conscious experience, one moreover that has sufficient behavioural power to have ensured its Darwinian selection. He says: "We failed to find it in the kind of rapid on-line behaviour needed to avoid a predator (which takes place too fast for consciousness to come into it); and it is unlikely that the female rat, cat or even monkey picks her mate for the quality of his conscious life. So where does that leave us?" Gray then toys with the Cart-Tonist idea that consciousness actually has no real function: that it's simply an epiphenomenon. He finds this notion 'deeply unattractive', and points out some of the absurd consequences of such an extreme position; "… books about the problem of consciousness could not be written if conscious experiences had no causal effects, for their production is one such effect. (Philosophers have speculated that zombies with no conscious experience might nonetheless

[608] Panksepp, Jaak,'The Archaeology of the Mind', 2012, New York, W.W. Norton & Company, p.17

develop the behavioural capacities that allow them to write such books. I shall, however, ignore this bizarre speculation.) More generally, neither language nor artistic creation, at least as we know them, would be possible without qualia."[609]

And indeed, Gray uses different art forms to illustrate these ideas regarding the relationship between qualia and meaning: "Novels in prose depend strongly on meaning; poetry, song and representational painting are pretty well balanced between meaning and qualia; while abstract art and non-vocal music depend almost exclusively on qualia." I believe that what Gray is suggesting here is that some qualia have clear, direct and functional meanings for humans, whereas other qualia don't. This is not to say that these other qualia have no 'meaning' at all; abstract art and non-vocal music are well-known to produce very significant aesthetic feelings and strong emotional reactions in people. We wouldn't have 'non-meaningful' art if we didn't have qualia. What Gray is trying to suggest by his observation on different art forms is that the assertion by functionalism of a simple, direct and inevitable link between qualia and function is much too limited and narrow: Gray says; "The sheer existence of music-without-meaning, not to mention its powerful aesthetic effects, is further testimony to the independence of qualia from function."[610]

The Function of Consciousness: Homeostatic Well-Being

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[609] Gray, Jeffrey, 'Consciousness: Creeping up on the Hard Problem', 2004, Oxford U.P., p.71

[610] Ibid, p.306/307

Gray also uses colour perception to argue against the Epiphenomalist position: he points out that trichromatic colour vision evolved in primates, with the addition to the retina of new types of cell, which could distinguish between the red/green part of the spectrum, plus new specialised colour vision modules in the brain. This enabled monkeys to respond differentially to differently coloured surfaces, e.g. to pick out ripe red fruit from a background of green foliage and so improve their diet. All these developments can be explained (perhaps fully) within our standard understanding of biology, physiology and behaviour. Consequently: "There is no need to add into this explanation any mention of qualia. Yet, given the close evolutionary relationship between the human and other primate species, it is likely that the development of colour vision in monkeys was accompanied by the development of the same qualia of red, green, orange, yellow, etc., by which it is accompanied in us. What additional survival value did these qualia bring to the party?" However, as Gray continues, finding a function for qualia is not just an empirical problem, it's also a conceptual one. This is because in modern scientific culture, the traditional dualist notion that consciousness occupies a separate 'psychic' realm has virtually disappeared: it's now taken for granted that conscious experiences result from brain activity. So, whenever a function is proposed for consciousness, it's assumed that there are brain processes that cause the accompanying conscious experiences: "They are caused by other processes in the brain (and by related input received via the sense organs from the environment) and they lead to further brain processes (and, by way of output to muscles and glands, to behaviour). There seems to be nowhere in this chain that might allow for an extra contribution from conscious experience. And, if there were a gap in the chain, no-one has proposed a way in which conscious experience could contribute to its filling in a manner compatible with the way in which the rest of the chain operates". This, says Gray, is not just an empirical difficulty, it is also a conceptual problem; namely, to try to explain how consciousness arises from brain processes.

Gray, it seems to me, is dithering at the perimeter of Cart-Tonism's ontological enclosure, trying to give himself permission to cross the ontological border and think the unthinkable. Since we don't even have a consensual, instrumentalisible definition of consciousness, there's nowhere within the framework of the existing scientific paradigm to even begin. This is what Gray means by a conceptual rather than an empirical problem: without fundamental advance in our conceptualisation of consciousness, no amount of empirical data can begin to explain it. Gray goes on to explain the scientific and philosophical background which has lead us to this conclusion; "… there's no room in the standard scientific world-view for a class of entities that stands aside from full causal interaction with other classes. And, in particular, no other significant biological phenomenon stands outside the framework of natural selection. If we require that conscious experiences should fully participate in causal interactions with other biological phenomena (and, in particular, with brain processes and behaviour), we have to abandon the assumption that brain function and behaviour will yield to a full explanation within the framework of existing neuro-scientific and psychological concepts." I believe that what Gray is saying here amounts to the following: if you believe that qualia have a function, then there are only two conceptual choices; a) a return to dualism (which most modern people will find scientifically unacceptable), b) a paradigm shift in our conceptions of brain function in relation to qualia and sentient consciousness in general.[611]

For me, the appropriate shift is in the direction of Whitehead's ontology. As we have seen, within this Whit-Tum world the 'Hard Problem' of sentience does not arise since experience not only permeates the entire universe, but provides the substance out of which it is fabricated. In terms of the traditional qualia debate, this vision of qualia entails the notion that qualia are simple, direct experiences which enter the organism at the 'lowest' level of the nervous system. In this way Whit-Tum world accounts for sentience, which is the essence of consciousness and the subject of the 'Hard Problem'. Having explained the nature of consciousness, Whit-Tum world (as we have seen) also provides an evolutionary function for consciousness: this is to feel whether objects, events, situations, other creatures, etc. are 'good' or 'bad' according to the homeostatic well-being of the organism. Having been experienced, these evaluative feelings can then be used to better adapt future actions, decisions or patterns of behaviour in order to maximise rewarding, positive affects and to minimise punishing, negative affects. In other words, the naturally ubiquitous resource of sentience was harnessed by natural selection to act as a feedback mechanism which promoted the well-being of organisms.

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[611] Ibid, p.72/73

Conclusion: Summary and Implications

An 'Ontological' Strategy

This book has been an attempt to forge a theory of the nature and function of consciousness. My strategy has been to pursue this project at the level of ontology. In other words, at the deepest level of metaphysics, speculating as to the ultimate nature of reality and of what it is composed. The outline of my argument is as follows: we started by looking at the 'original ontology of consciousness', namely Folk Psychology. I characterised this as an amalgam of, on the one hand, Evolved Psychology and, on the other, Cartesian Interactive Dualism. The first of these is characterised by sentience, affect and empathy. The second embodies what I call the 'Command and Control' model of consciousness. The emergence of Cart-Tonism (comprising the ontology of late Nineteenth Century science, based on classical physics and the mechanistic half of Cartesianism) undermined both viewpoints of Folk Psychology, and became the predominant paradigm of contemporary scientific culture.

This Cart-Tonist ontology was then, in turn, profoundly challenged empirically (and potentially philosophically) by the findings of the 'new physics' and especially quantum mechanics. However, this challenge was nullified (in my view) by a 'failure of ontological nerve' on the part of the 'fathers' of quantum theory. This failure was very much influenced by the philosophical doctrine of Logical Positivism. I've labelled the most extreme version of this 'Ideological Empiricism'. This ontology can be reduced to two basic principles; 1) observations are the only reality - there is nothing 'behind, beyond or beneath' them. 2) Speculation, in the form of theories (and especially 'grand' ontologies), as to what may exist beyond observations is meaningless and futile. I've concluded that the current predominance of these two ontologies, Cart-Tonism and Ideological Empiricism, is what underlies the failure of contemporary scientific culture to make any progress in formulating a theory of consciousness.

My critique of this situation is based on a particular philosophy of science, which in turn is rooted in an existential fact about the way the human mind works. I'd formulate the basic philosophical idea as follows: 'good' or 'true' science has to comprise a balance between, on the one hand, an ability to accurately predict the outcome of events and, on the other, a comprehensible narrative which accounts for this ability. In other words, it's not enough for 'real' science to have the capacity to predict. It's also necessary to understand how the predictive process works and why the particular outcomes should be expected to occur. In addition, this 'understanding' should be located within a context of 'personably accessible meanings': this principle stipulates that the necessary understanding should be; a) comprehensible to any person of normal mental competence willing to apply themselves to the explanation and, b) that the explanations should be consistent with their sensory experience of life. (Naturally, 'Comprehensible' here does not imply that every or any person must necessarily ***agree*** with the explanation offered, just that they understand it.) Given the universal human experience of consciousness, I suggest that this 'understanding' side of science must in particular apply to any theory formulated to explain it. As above, this drive towards meaning and understanding is not limited simply to scientific theories: it is also, of course, a fundamental feature of the human mind.

As many eminent researchers have pointed out, most recently the Israeli historian, Yuval Noah Harari[612], meaningful narratives have been indispensable throughout history and in all cultures. (Although Harari himself rejects them given his commitment to Buddhism.) In the light of this 'understanding' theory of science, my argument against the two currently predominant scientific ontologies, namely Cart-Tonism and Ideological Empiricism, is as follows: Ideological Empiricism denies as a matter of principle that understanding should be part of science. As regards Cart-Tonism, it certainly violates the stipulation that, 'explanations should be consistent with people's sensory experience of life' in the sense that it rejects sentience. In addition, I criticise the interaction between these two ontologies: given the human craving for meaningful narrative, Ideological Empiricism is not really psychologically viable (apart from a tiny minority of intellectual extremists) and when the submission to ontology kicks in, the reversion will overwhelmingly be to Cart-Ton world (as its the currently predominant scientific ontology) despite all its shortcomings, as documented in this book.

Whit-Tum World

As to the positive side of my argument, I'm suggesting a fourth ontology, which I call 'Whit-Tum world', as an effective basis to underlie an explanation of consciousness.

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[612] Harari, Yuval Noah, '21 Lessons for the 21st Century', 2018, Penguin

Whit-Tum world is (as previously explained) a synthesis of the later philosophical work of Alfred North Whitehead and some of the philosophical implications of quantum theory, as drawn attention to by John von Neumann, Bernard d'Espagnat, Henry Stapp, David Hodgson and others. Whit-Tum world has a number of key features, but perhaps the most essential of them is the 'externalising' of mind and consciousness. What this means is that by postulating 'experience' (or, as I'd prefer to say, 'sentience' or 'feeling') as the ultimate constituent of reality, Whitehead broke out of the alienating Cart-Tonist cul-de-sac, which eliminated mind and consciousness from its vision of the world. As Harari put this: "Liberalism (in my terminology, read Cart-Tonism) took a radical step in denying all cosmic dramas, … the universe has no plot … The universe has no meaning, and human feelings too are not part of a great cosmic tale."[613] However, by linking sensation and affect with ultimate reality, Whitehead, in one stroke, reversed Cart-Tonism's exclusion of mind and consciousness from nature. Another way to put this is to say that Whitehead's ontology undid the alienation of consciousness from the natural world, an alienation which is implicit in both Cart-Tonism and Ideological Empiricism (because of its default to Cart-Tonism).

In this way, Whitehead re-established the continuity of the 'creation myth' in human history and culture: all previous cultures and societies have formulated some form of creation myth. The two ontologies of Scientism, Cart-Tonism and Ideological Empiricism, broke this continuity. Cart-Tonism is certainly an ontology and even, it could be ar-

[613] Ibid, loc:4563

gued, a creation myth (though since the decline of belief in a supreme being within scientific culture, its account of the ultimate origin of the universe has been frustratingly vague). Where it differs from the human tradition of creation myths is in its claim that ultimate reality is inherently meaningless: generally, mind and consciousness have had a role to play in human ontologies. They have tried to connect our affective experience of the world with a theory of its nature and composition. Cart-Tonism's bleak rejection of this link does (I believe) justify me in describing it as pathological, when seen from a humanist perspective. (As per chapter two, I suggest that Cart-Tonism was the product of two pathological personalities, Newton and Descartes, and also as per that chapter, I refute the 'ad hominem' rejection of such a line of argument.)

As for Ideological Empiricism, its breach with the human creation myth tradition is even more radical, in so far as it explicitly rejects any attempt at ontology formulation. I have previously (in chapter seven) compared Ideological Empiricism to Berkeleyan Idealism, but it can also be linked with the much older 'philosophy' of Buddhism: "According to the Buddha, then, life has no meaning, and people don't need to create any meaning. They just need to realise that there is no meaning, and thus be liberated from the suffering caused by our attachments and our identification with empty phenomena."[614] Where Ideological Empiricism differs from both the Buddha and Berkeley, however, is in its conceptualisation of consciousness: it provides no ontological account of it, whereas for both the Buddha and Berkeley, consciousness is explicitly the ultimate reality.

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[614] Ibid, loc:4585

In Whit-Tum world however, rather than being the ultimate reality, consciousness emerges out of the constituents of which everything is composed: ‘matter’ is made from ‘drops of experience’. This ‘experience’ (or sentience or feeling) accounts for the bizarre behaviour of the constituents of ‘matter’ as observed in quantum mechanics, though as yet we know very little about how this works. In addition, the sentience inherent in the fabric of all reality provides a ‘raw material’ available to all living things, which can assist them in their evolutionary struggle to survive and reproduce. This raw material is used in many different ways and at several distinct levels of sophistication: in single-celled organisms it can be used to generate the ‘cellular attitudes’ that Damasio talked about (see chapter fifteen), the basic awareness of ‘what’s happening to me’, as described by Humphrey (see chapters thirteen and fifteen), and the features of intelligent behaviour displayed by, for example, an amoeba, as demonstrated by Brian Ford (see chapter thirteen).

In the complex nervous systems of mammals, the universal raw material of sentience can be processed into an extensive awareness of the environment - the ‘movie in the head’, as Damasio calls it. And in the most complex of all organisms (us), it is the basis for the vast richness and diversity of full human consciousness. Language and culture evolved out of our primary, emotional consciousness, and in turn had a transformative effect on the depth and power of our conscious capacities. Of course, again (as with our knowledge of physics) we know very little, in terms of detailed mechanisms, as to how the raw material of sentience interacts with organisms to produce these wonders. The important thing, however, is to seize on Whitehead's insights so as to move our conceptual world out of the 'dead', billiard-ball vision of Cart-Ton world, in which mind and consciousness are by definition excluded, and into the psycho-physical ontology of Whit-Tum world, in which both quantum mechanics and mind and consciousness become immediately plausible and potentially comprehensible.

Consciousness for Infant Mind Adaptation

There's one area in particular in which we may be able to 'run ahead' in imagining how Whit-Tum world provides a vital role for consciousness in our own development. I'm referring here (as described in the last chapter) to conscious sensation and affect as the crucial factors in adapting the mind of the human infant to its environment. Before the vast influences of language and culture kick in, the conscious life of an infant consists of sensations and the infant's affective reactions to these. As we have seen, in Jaak Panksepp's work, the infant is genetically endowed to produce seven primordial affective responses to the sensations that it receives from its environment. On the one hand, this sensitive process makes the infant highly vulnerable to psychological damage, if seen from the perspective of the modern world.

On the other, it's a marvellously effective system of adapting to the infant's given environment: it enables the infant's personality and life-attitudes to be finely adjusted to the conditions it finds itself in, even if these conditions are very sub-optimal (hence the danger of psychological damage). This is the process that I have called 'deep learning' and, according to my argument, it requires Whitehead's ontological vision of sentience as basic to the fabric of reality in order to be effective: the infant must be conscious of its sensations of the world and it must be conscious of its affective reactions to these sensations if these potentially lifelong adaptations are to be effectively established. Later in life the results of deep learning generally slip into the unconscious, but consciousness is necessary when they are being laid down.

Harari's account of the technique of Vipassana meditation, comes I think very close to describing how this process of infantile adjustment unfolds. Students are; "… taught to observe not just their breath, but sensations throughout their body. Not special sensations of bliss and ecstasy, but rather the most mundane and ordinary sensations: heat, pressure, pain and so on." Harari claims that the great insight of this meditation technique is that; "… the flow of mind is closely interlinked with body sensations. Between me and the world there are always body sensations. I never react to events in the outside world; I always react to the sensations in my own body. When the sensation is unpleasant, I react with aversion. When the sensation is pleasant, I react with cravings for more. Even when we think we react to what another person has done, … or to a distant childhood memory, the truth is we always react to our immediate bodily sensations."[615] Harari also describes how his Vipassana teacher had a sign on his door, saying: "Please avoid theoretical and philosophical discussions, and focus your questions on matters related to your actual practice." By 'actual practice' the teacher meant observing; "… body sensations and mental reactions to sensations in a methodical, continuous and objective manner, thereby uncovering

[615] Ibid, loc:4718

the basic patterns of the mind."[616] This reproduction or reversion to the infant mind's process of adaptation may account for the therapeutic effects of meditation. (In this 2018 book, Harari also repeatedly, and very correctly, refutes the common confusion between consciousness and intelligence: consciousness depends on ***sentience*** and has no necessary correlation with intelligence.)

Embodied Spirituality

Let me finally, in this conclusion, consider some of the major implications of the shift in ontological outlook, which I am recommending. In their 1999 book, 'Philosophy in the Flesh'[617], George Lakoff and Mark Johnson, present a description of spiritual life within the context of the mind as embodied. They start by saying that the body could never be; "… a mere vessel for a disembodied mind." Such a concept of the mind as separate from the body is merely metaphorical and is based on a distinction between the 'subject' and the 'self'. This distinction arises from what they call, 'the primary Subject-Self metaphors': "In each primary metaphor, that Person, who has an independent existence, maps onto the Subject. Because the general Subject-Self metaphor arises from these primary experiences, and because in each case the Person that maps onto the Subject has an independent existence, so the Subject must have an existence independent from the self." Because such experiences are universal in daily life, these primary metaphors, are constantly reinforcing the notion that the subject has an existence independent of the self; "… our very

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[616] Ibid, loc:4774

[617] Lakoff, George, & Johnson, Mark, 'Philosophy in the Flesh', 1999, Basic Books

concept of a disembodied mind arises from embodied experiences that every one of us has throughout our life."

They conclude that; "… we all have a metaphor system that conceptualises our minds as disembodied. We all have constant phenomenological experience that reinforces the illusion of a disembodied Subject." However, modern science has established beyond doubt that; "… our minds are not, and cannot be, disembodied." Let me draw attention to the linguistic struggle of these two academic researchers: they want to arrive at a conception of a 'disembodied Subject, or even Soul', but their only contextual reference is the Cart-Tonist ontology which predominates in the global academic establishment. The result (as I like to describe it) can be characterised as 'ontological squirming', of which we've seen many examples in this book. In the end, Lakoff and Johnson are forced to admit: "Exactly how the body and brain give rise to spiritual experience is an empirical question for Cognitive science and one well beyond the scope of this book." In contrast, adopting a Whit-Tumist ontology would render their desired notion of a scientifically viable, 'disembodied Soul' simply and elegantly available.

Lakoff and Johnson next ask why should this disillusionment in regard to disembodied minds matter? The answer, of course, is to be found in the realm of spiritual and religious life: "What we have called variously the Subject or the disembodied mind is called in various religious traditions the Soul or Spirit. In spiritual traditions around the world, the Soul is conceptualised as the locus of consciousness, subjective experience, moral judgment, reason, will, and, most important, one's essence, that which makes a person who he or she is." They then speculate as to the possibility of a spiritual tradition in which; "… a Soul is fundamentally embodied - shaped in important ways by the body, located forever as part of the body, and dependent for its ongoing existence on the body." They insist that the existence of such an embodied soul is entirely possible. But this is not the way that the soul is conceptualised in the great spiritual traditions of the world: "Requiring the mind and Soul to be embodied is no small matter. It contradicts those parts of religious traditions around the world based on reincarnation and the transmigration of souls, as well as those in which it is believed that the Soul can leave the body in sleep or in trance. It is not consistent with those traditions that teach that one can achieve, and should aspire to achieve, a state of pure consciousness separate from the body." Christianity, especially envisages that; "… we are essentially disembodied Souls not of this world, that we are inhabiting our bodies only during an earthly sojourn, and that our ultimate purpose is to 'dwell with God' elsewhere, in heaven, not on earth."

So, clearly spirituality in all cultures has overwhelmingly been seen in the context of disembodiment and transcendence of this world. Lakoff and Johnson then ask; "… if there is no disembodied mind or Soul, then what is the locus of the real spiritual experience that people have in cultures around the world? This experience can only be embodied. It must be a consequence of what is happening in our bodies and brains." They suggest the need for 'an alternative conception of embodied spirituality', which can address such major questions as: "What embodied sense can be made of transcendence? How are we to understand our sense of being part of a larger all-encompassing whole, of ecstatic Participation - with awe and respect - within that whole, and of the moral engagement within such experience? Where is the mystery to be found in a spiritual experience that is embodied? And what is revelation there? Finally, what does the concept of God become in an embodied spirituality?"

Stretching Cart-Tonism to Breaking Point

As with so many of the science-oriented theorists we have visited through the course of this book, the answers that Lakoff and Johnson come up with stretch Cart-Tonism to breaking point but fail to decisively break with it. They start by re-asserting that the embodied mind is part of, and dependent on, the body for its existence. But, they point out: "The properties of mind are not purely mental: They are shaped in crucial ways by the body and brain and how the body can function in everyday life. The embodied mind is thus very much of this world." As examples, they refer; "… to what we walk on, sit on, touch, taste, smell, see, breathe, and move within. Our corporeality is part of the corporeality of the world." However, the mind is not merely corporeal; "… but also passionate, desiring, and social. It has a culture and cannot exist culture-free. It has a history, it has developed and grown, and it can grow further. It has an unconscious aspect, hidden from our direct view and knowable only indirectly. Its conscious aspect characterises what we take ourselves as being. Its conceptual system is limited; there is much that it cannot even conceptualise, much less understand. But its conceptual system is expandable: It can form revelatory new understandings."

Lakoff and Johnson seize on empathy as a major function of the embodied mind: "From birth we have the capacity to imitate others, to vividly imagine being another person, doing what that person does, experiencing what that person experiences." In essence, they suggest, this is a form of 'transcendence': "Through it, one can experience something akin to 'getting out of our bodies' - yet it is very much a bodily capacity." They emphasise the importance during parenting of developing empathic projection as; "… the major capacity to be developed in the child." This they claim is not only the basis of morality, but also underlies our capacity to empathically project onto our environment. To; "… understand how we are part of it and how it is part of us. This is the bodily mechanism by which we can participate in nature." And they conclude that: "Embodied spirituality requires an understanding that nature is not inanimate and less than human, but animated and more than human."[618]

Spirituality, Empathy and Nature in Whit-Tum World

This last quote form Lakoff and Johnson has a distinctly Whiteheadian ring to it, but what if we now leave Cart-Tonism behind and step decisively into the realm of Whit-Tum ontology, how then would these issues of spirituality, empathy and our relationship with nature, appear? The first point to make is that 'embodied spirituality', i.e. spiritual experience and spiritual values without a disembodied soul, becomes entirely conceivable ***without*** ontological squirming! This is possible because, in Whit-Tum world, we can both keep and use all our existing language of physics, but, in addition, we can also think of 'particles' as 'drops of feeling' capable of sustaining spiritual experience and spir-

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[618] Lakoff, George, and Johnson, Mark, 'Philosophy in the Flesh', 1999, Basic Books, p.562-566

itual values without splitting the world into two irreconcilable dualist realms. Accepting this vision means that we can finally escape from the ontological trap of Cartesian dualism and move beyond a supernatural view of the human mind. In other words, we could finally see ourselves as being one hundred percent part of the natural world which surrounds us. In addition, the mind itself can be finally accepted as a ***real entity***. Unlike the heart, lungs or brain, it can't be directly observed, but this doesn't mean that it's not just as real as these other human organs, and as Siegel argued in chapter sixteen, the central goal of the mind is to attempt to bring about the integration of experience across a life-time.

As regards our experience of spirituality, Jonathan Haidt suggested in chapter sixteen, humans may have the same capacity as bees to manifest 'groupish' behaviour. Haidt continued that while many animals are social, living in groups, flocks, or herds, only a few species have crossed a decisive threshold to become 'eusocial', meaning that they live in very large groups with an internal structure, which enables them to reap the benefits of the division of labour. Beehives and ants' nests, for example, have separate castes of soldiers, scouts and nursery attendants, and, of course, human societies also have a division of labour. Haidt argues that we are 90 percent individualistic chimp and 10 percent eusocial bee and that we can switch quickly and easily between these very different social modes. As earlier, Haidt suggests that this switch from individualism to hive-mentality may originally have been a group-related adaptation, but he also associates it with the feeling of 'awe'. This emotion is generally triggered by situations with two features; 1) vastness (settings or visions that overwhelms us and makes us feel small) and 2) total unfamiliarity of experience. In other words, experiencing situations which are not easily assimilated into our existing mental structures.

Consequently, we must 'accommodate' these experiences by changing those structures. Awe functions as a 'reset button': it makes people forget themselves and their petty concerns. Awe opens people to new possibilities, values, and directions in life. Haidt claims that awe is linked to the 'hive switch', together with collective love and collective joy. He gives the examples of both Emerson and Darwin, who described nature in spiritual terms; "… precisely because nature can trigger the hive switch and shut down the self, making you feel that you are simply a part of a whole."[619] He gives three common ways in which people can flip the hive switch: awe in nature, (what he calls) Durkheimian drugs, and raves, and he suggests that the 'hive switch' may be made out of oxytocin and mirror neurones.

In addition, Whitehead's ontology can explain this ten-percent-tendency of human groups to transform into an 'awe-hive super-organism' via Whitehead's notion of 'compound individuals' emerging from a vast hierarchy of 'drops of experience'. The take-away message is that within WhitTum world, the phenomena of spirituality, empathy and our relationship with nature become 'naturalised', i.e. they become part of nature, not split off in a dualistic fashion. Consequently, such phenomena can be accepted as natural realities of everyday life, which may become accessible to

619 Haidt, Jonathan, 'The Righteous Mind', 2012, Penguin, p.332

scientific investigation (assuming that the science is being conducted out of Whit-Tum ontology).

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