

The Quantum-Mechanical Frame of Reference

Part 3: Inside-View Physics

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Abstract: As shown in Part 1, the physical reality encountered and on which quantum physics experiments are performed is the superposition of a whole class of decoherent quasi-classical worlds, a second-logical-type phenomenon, hence the paradoxical results. This is the physical reality of the protagonist defined by Everett (1957): the record of observations, Tegmark's (1998) 'inside view'. The collapse dynamics impossible in the quasi-classical world occurs naturally in this world superposition. Everett's formulation has a complete ontology.

In humans the protagonist defined by the record of observations takes the form of a three-dimensional field of information: the perceptual reality, here the 'world hologram'. Because the physical reality of the protagonist is determinate solely where observed, the world hologram defines the sole determinacy of the physical reality encountered. The protagonist is thus significant in a manner incomprehensible in the current paradigm.

For better or worse the implications are isomorphic to certain myths and legends: "As above so below". This, however, is simply inside-view physics. Crucially, the new paradigm offers the breakthrough in the global human culture that is so desperately needed. As King (2006) states, for the human race to survive and prosper: "... evolution beyond the egoism that motivates every individual" is a requirement. Such a development has proven generally unattainable, but understanding the extraordinary involvement with the world encountered modifies the self-identity, altering the agenda of the ego, and effectively producing the required result.

1 The Inside View

As described by Tegmark:

I find it useful to distinguish between two ways of viewing a physical theory: the outside view of a physicist studying its mathematical equations, like a bird surveying a landscape from high above, and the inside view of an observer living in the world described by the equations, like a frog being watched by the bird.

From the bird perspective, Everett's multiverse is simple. There is only one wavefunction, and it evolves smoothly and deterministically over time without any kind of splitting or parallelism. The abstract quantum world described by this evolving wavefunction contains within it a vast number of classical parallel storylines ("worlds"), continuously splitting and merging, as well as a number of quantum phenomena that lack a classical description. From their frog perspective, observers perceive only a tiny fraction of this full reality, and they perceive the splitting of classical storylines as quantum randomness. (2007, p. 3)

Questions about parallel universes may seem to be just about as deep as queries about reality can get. Yet there is a still deeper underlying question: there are two tenable but diametrically opposed paradigms regarding physical reality and the status of mathematics, a dichotomy that arguably goes as far back as Plato and Aristotle, and the question is which one is correct.

- **ARISTOTELIAN PARADIGM:** The subjectively perceived frog perspective is physically real, and the bird perspective and all its mathematical language is merely a useful approximation.
- **PLATONIC PARADIGM:** The bird perspective (the mathematical structure) is physically real, and the frog perspective and all the human language we use to describe it is merely a useful approximation for describing our subjective perceptions. (2003, p. 12)

Both are correct. On each view, that view is ontologically fundamental.

Naturally, on the objective, outside view, it is the physical reality that defines the information it instantiates, the inside view. This is the obvious perspective. The inside view, however, is the view of a class-of-worlds-as-a-world, superposed. *On* this inside view, this structure of information defines the determinacy of the physical world: the world superposition. As a result, on the inside view, the physical world is indeterminate except where observed. This provides a physical ontology for epistemic realities as defined in QBism (Fuchs, 2013) and the many-minds theories e.g. Zeh (1970), Albert & Loewer (1988), Lockwood (1996), Donald (1997).

2 World Superposition

As Tegmark (2003, p. 10) also states, decoherence prevents the individual in a quasi-classical world from perceiving parallel copies of herself. This is perfectly correct given the standard outside-view identity, the body-mind. Taking this as the protagonist of the quantum-mechanical dynamics, however, is where the category error arises that produces all the paradoxes. As defined by Everett (1957, p. 457) quoted in Part 1, the *observer* is the physical entity that makes observations. This entity is a component of the quasi-classical world, and cannot perceive anything but the specific quasi-classical world in which she exists. This entity, however, is not the protagonist of the dynamics. As Everett makes clear, the protagonist is the state of the memory, defined by the record of observations: the *product* of the observer mechanism. As described in Parts 1 and 2 this is both the inside view and the self-aware substructure in the physics as as Tegmark (1998) calls it, here termed the *individual*.

In humans this takes the form of a three-dimensional virtual reality representation of the world, mentally projected to coincide with the physical reality. This is here the world hologram, a field of information that fully defines the functional identity. *This* entity is simultaneously present in a whole class of quasi-classical worlds, all those in which it is instantiated. The effective physical environment of this inside view is thus their superposition, the class-of-worlds-as-a-world, a second-logical-type phenomenon as described in Part 1.

The key implication for the quantum theory is that the universe is operationally bi-level. The evidence is the two fundamental and incompatible dynamics. It means that there are two quasi-ontological realms, different types of frame of reference, each cardinal on that view. The outside view is the objective 'view from nowhere'; the inside view is the subjective perspective of the individual, the protagonist in the dynamics. Plato and Aristotle are both correct, on the outside and inside views respectively. This is the first conceptual revolution. The physical domain is ontologically fundamental as understood in the current paradigm, but the field of information defining the inside view is ontologically fundamental also.

3 Multisolipsism

The second conceptual revolution is the nature of the universe at the second level of logical type. As stated in QBism:

This means that reality differs from one agent to another. This is not as strange as it may sound. What is real for an agent rests entirely on what that agent experiences, and different agents have different experiences. (Fuchs et al., 2013, p. 3)

In other words, the universe defines personal, physical, parallel realities. In each physical reality the individual is the only person fully defined and real in this world because others are mostly indeterminate. This is therefore akin to solipsism. This is true for all individuals, hence multisolipsism.

Everett shows that the standard formulation of quantum mechanics as physical process is untenable, and then names solipsism as an obvious, fully working explanation of the experimental facts of physics:

It is now clear that the interpretation of quantum mechanics with which we began is untenable if we are to consider a universe containing more than one observer.¹ ... We must therefore seek a suitable modification of this scheme, or an entirely different system of interpretation.

Alternative 1: To postulate the existence of only one observer in the universe. This is the solipsist position, in which each of us must hold the view that he alone is the only valid observer, with the rest of the universe and its inhabitants obeying at all times [the linear dynamics] except when under his observation.

This view is quite consistent, but one must feel uneasy when, for example, writing textbooks on quantum mechanics, describing Process 1, for the consumption of other persons to whom it does not apply. (1973, p. 6)

The beauty of multisolipsism is that it reaps the benefit of consistency with standard quantum mechanics that Everett demonstrates, and it also applies to everyone. The solipsist frame of reference resolves the paradoxes, as the epistemological interpretations demonstrate very clearly, but the textbooks *do* apply to everyone because everyone is in their own 'universe', their world superposition, their class-of-worlds-as-a-world.

This is of the same logical structure as the many-minds concept. As Donald states:

Many-minds interpretations of quantum theory are many-worlds interpretations in which it is argued that the distinction between worlds should be made at the level of the structure of the individual observer. (2014)

Here the distinction between worlds is made specifically at the level of the world hologram, thus using the same basis as Lockwood (1989) who makes the distinction at the level of the record of observations. What is novel is the physical ontology, namely the world superposition. The world encountered is literally a many-worlds reality. This is the quantum-mechanical frame of reference. The physical reality of this world is indeterminate except where observed; in other words Schrödinger's cat is retrodicted.

1 Everett does not use different words for the entities defined here as the observer and the individual. He clarifies a little in a footnote in the later paper (1973) but otherwise the meaning has to be derived from the context.

The extraordinary implication is that the individual, the world hologram, is what defines the determinacy of the world encountered, the many-worlds reality. The individual is the reality. As stated by Mitra: "... each element of this multiverse is an observer, not some universe." (2012, p. 2). Multisolipsism gives the ontology in a simple logic: the individual is defined by the world hologram, the integrated synthesis of experiences recorded, and this defines the determinacy of the physical reality encountered, the world superposition.

4 Interactive Destiny

It is the physical reality at this second level of logical type that embodies certain great myths. As above so below is a real operational principle. This is inside-view physics. The original Hermetic text is technically correct in scientific terms:

That which is Below corresponds to that which is Above, and that which is Above corresponds to that which is Below (Scully, 2003, p. 321)

The Hermetic idea is of course nonsensical with respect to the objective quasi-classical world, but with respect to the many-worlds reality of the protagonist it is simply true. As shown in Part 2, the Bayesian probabilities defining the likelihood of future events in the world are defined solely by the record of observations, which is the same thing as the world hologram defining the individual. This is the type of world encountered by all conscious individuals.

It is not of course that the real world is all in the mind, as has been proposed in various philosophies. The real world is utterly, physically and objectively real. What it does mean is that the observations made by the individual are of extraordinary significance. Not only is this what defines the effective physical environment of this individual, the many-worlds reality, change of the observations alters which version of the physical world, which 'snapshot' in the quantum concept of time, is encountered.

As shown by Mitra, the deletion of an observation from memory causes the individual to exist in a different version of the quasi-classical world, a different: "... sector of the multiverse" (2008). In other words, this is a parallel version of physical reality, one in which the observed events did not take place. He describes the case where an individual observes a planet-destroying asteroid inbound, but then deletes the observation, and thus exists in a different version of the world, one in which such imminent catastrophe is of ordinary, very low probability.

Clearly this requires a very different concept of the world to the current paradigm, but this is what is provided by world superposition. His action means he exists in all the worlds in which no such observation has been made. In at least one of these, of course, there is still an Armageddon asteroid, but the Bayesian probabilities of the future observations of such an asteroid are now of ordinary, very small value.

As with collapse on observation, there is only the appearance of the change of the world, brought about as the frame of reference moves to a different snapshot in the quantum concept of time: a version of the world with a different quantum state. In the quantum jump this is version of the world where the observation has been determinately made. In the 'Mitra jump' this is the version of the world where an observation was not made.

Such specific memory erasure is not possible in the human neural system with its holistic and redundant nature, but a related phenomenon is at work. Expectations give rise to confirmation bias (Lord et al., 1979) resulting in observations being filtered and edited before being added to the record of observations. In the many-worlds reality, with the determinacy defined solely by the record of observations, this means the individual becomes defined as existing in a different version of the world than would have been the case if the observation had not been modified.² In other words, bias on observations results in bias on the trajectory of the time evolution of the quantum state of the effective physical environment of the individual. Bizarrely, as a result of the bias, the individual lives in a version of the world where the biased observation represents the events of the decoherent history of this physical world. The trajectory of the frame of reference of the individual, in the quantum concept of time described in Part 2, is altered. Consequently, the Bayesian probabilistic is altered. As with the asteroid, the world of the unmodified observation is included in the world superposition, but the probabilities of future observations may be greatly changed.

Since the bias is induced to fulfil expectation, and the observation is modified to give confirmation, this version of the world is one in which some kind of confirmation of the expectation has just been given. As a result, given the Bayesian definition of the many-worlds reality as described in Part 1, the expectations are more likely to be experienced as being fulfilled in the future. Expectation is also reinforced, increasing the likelihood of further confirmation bias. Thus expectations act as strange attractors in the system. The probabilistic destiny is altered. This is effectively the trim tab in the human psyche that alters the path taken through the infinite possibilities of the quantum concept of time. This is inside-view physics.

5 Solid State

This phenomenon is of course deeply at odds with our natural intuitions about the world in the current paradigm. The essential point is that in terms of logical type the system is isomorphic to a solid-state computer system, where a sequence of addresses in memory is accessed by altering the memory-address pointer. The basic unit is the quasi-classical world. In the quantum concept of time, each instant is the view of a specific snapshot, a specific point in Hilbert space. Correlations are of the logical type of pointers, or references, to a structure of data in information technology.

² Naturally, discovery of having made a mistake is also a future possibility.

The alteration of the 'pointer' defined by the integrated synthesis of correlations, the record of observations, here the world hologram, results in a different point in Hilbert space being addressed, one at which a different quantum state of the effective physical environment is defined: a different snapshot in the quantum concept of time.

As a result the frame of reference passes from one snapshot to the next. This is experienced as the events of a specific instant happening. The analogy clarifies the logical types ideally. The address pointer is of the logical type of the class of all addresses, and the system of which the movement of the pointer is a property is of the logical type of the class of all possible pointers. The third-logical-type phenomenon is inherent.

In an information technology system, the dereferencing operation on the pointer returns the value at the memory address to which it points. The experience of the Now is the state of the inside view in each snapshot. Thus the experiencing of the snapshot may be considered in logical terms as the experience of the dereferencing operation that returns the state of the inside view defined by that snapshot. This is the view of a specific instant at a specific point in Hilbert space.³ In other words, the inside view is the experience of the wave function itself. This is why the inside view is the experience of the wave function in action, thus effecting the linear dynamics and the experience of the passage of time. The Now is the dereferencing pointer. The process of referencing changes the pointer, which thus points to a different snapshot. Thus the dynamics are enacted in the solid state system. As each observation is made collapse occurs.

The definition of each snapshot is of course physical, but the interconnecting dynamics that links one snapshot to the next is an information process. *That* is what is experienced on each inside view, generating transtemporal reality. The information process is operated as the moving frame of reference passes from one snapshot to the next, thus enacting the computation of the next state of the world hologram, *effectively* adding the observation to the record. As Everett states there is the *appearance* of collapse. The result is a real physical world – that works like a virtual reality.

This explains how a physically impossible dynamics operates in a real physical world, particularly collapse of the wave function. The definition of the world is the physical definition, but the change of the physical world is the iteration of already-existent states, simply a movement of the frame of reference. It is logically identical to a movie or a virtual reality running on a solid state system. The system that operates the collapse dynamics is analogous to a universal DVD in which all possible frames, the snapshots, are defined. This is the constantly branching structure to which Everett (1957, p. 460) refers.

3 The analogy for time-evolution in relativity is similar. Each moment is specific point in space-time, subjectively the fleeting three-dimensional image in space. Movement of the 'pointer' defined by the inertial frame of reference results in movement of the view along the world-line. Here, however, a better metaphor is an analog computer process where the function is operated in a smooth linear manner rather than incrementally.

The transition from one snapshot to the next is defined by the change required to produce the next one, a process logically identical to the inter-frame compression of ordinary movies. In the effective change of frame of reference from one snapshot to the next, the change is the addition of a new observation. In Everett's terms this effectively changes the physical state of the system because this is the addition of a new correlation with the physical environment. The moving frame of reference is an absolute requirement to effect the dynamics.

The resulting processes are logically analogous to information processing in a solid state system, but the result is the effective updating of the determinacy of the effective physical environment of the individual, such that the observed events are determinately the case. This is what Everett's formulation demonstrates. It means this is a physical world that operates like a virtual reality, making it very challenging to see what the physics means.

6 Providence

In this context, modification of the critical data in the system will inevitably alter the unfolding dynamic pathway of the collapse dynamics. Not, however, by changing anything in the objective physical world: the physical reality does not change. What is changed is which path the moving frame of reference is likely to take through the branching possibilities of the space of all possible worlds. In this type of system, alteration of the observation alters which snapshot is the next to become the quantum-mechanical frame of reference of the protagonist.

The vital learning is that the individual is not entirely irrelevant to which version of events is likely to be experienced as taking place in the world at large, in the physical reality of the world superposition of this individual. The expectations held are strange attractors, constantly directing the trajectory of the individual world in the quantum concept of time. Thus beliefs and expectations are significant in a manner hitherto unbelievable.

The key point is that by visualising objectives and desired outcomes, expectations are deliberately induced. As has been confirmed in medical research: "... positive verbal suggestion and imagery successfully induced positive expectations" (Peerdeman et al., 2015). In consequence new strange attractors are produced in the world of the inside view. Self-talk induces interactive destiny. In becoming aware of this deep invisible tendency, a degree of enfranchisement is effectively possible in the personal world. Certain modern myths are potentially given credence. Effectively, the infamous 'law of attraction' actually works. More mundanely, strong attention to negative, potential, world scenarios is revealed as deeply counterproductive. Contemplating worst-case outcomes is liable to generate strange attractors that would result in such outcomes being more likely to be encountered in reality. To the degree that worrying about negative futures is a powerful trait in standard human psychology, awareness of

this principle could lead to much better experiences in life by eschewing negative mental habituation. Nonetheless, modern cultures seem to crave representations of highly negative events and outcomes in terms of health and prosperity.

In this context, one would also expect to see a phenomenon in operation which would enact the principle known as karma. The observations of the actions the individual performs tend to become increasingly powerful unconscious expectations, generating strange attractors, and thus leading toward versions of the world in which actions of this nature are increasingly likely to be encountered. No mysterious agency is involved. It is just that in effect, in the personal world, expectations, conscious or otherwise, produce strange attractors that bias the version of events likely to be encountered. The potential for positive transformation is nicely illustrated by Murray:

... the moment one definitely commits oneself, then Providence moves too. ... A whole stream of events issues from the decision, raising in one's favor all manner of unforeseen incidents and meetings and material assistance, which no man could have dreamed would have come his way. Whatever you can do, or dream you can do, begin it. Boldness has genius, power, and magic in it. Begin it now. (1951)

This Providence is the strange attractor in action. When such a commitment is made to an outcome it becomes increasingly anticipated, and thus strange attractors operate. In consequence it becomes more and more likely to be experienced happening in physical reality. This is not to discount actions taken by the individual, and the increased motivation from the decision. The Providence, however, operates nonlocally: in the personal reality effects may be global.

7 Consciousness Continues

As shown in Part 2, a moving frame of reference resolves the paradoxes of the passage of time, and the present moment, dubbed the Now by Einstein (Carnap, 1963, p. 37). This is the movement of the pointer in the solid-state computation analogy. According to Weyl's dictum this sentience, the experiencing consciousness, is the subjective attribute of this phenomenon:

The objective world simply *is*, it does not *happen*. Only to the gaze of my consciousness, crawling up the life-line of my body, does the world fleetingly come to life. (1949, p. 116)

As proposed by Chalmers it is:

... a fundamental feature of the world, alongside mass, charge, and space-time. (1995, p. 216)

As shown in Part 2 the provision of this moving frame of reference also implements all three major competing interpretations of time, presentism, eternalism and possibilism.

This understanding has a highly significant implication. Given that this consciousness is a property of the unitary system, the individual is effectively immortal. As stated by Moravec, when we die:

We lose our ties to physical reality, but, in the space of all possible worlds, that cannot be the end. Our consciousness continues to exist in some of those, and we will always find ourselves in worlds where we exist and never in ones where we don't. (1998)

In the universe of all possible worlds there is inevitably a version of the world in which there is a logical continuation of the individual's experience of reality. So the experience of death in this world leads straight on to the experience of life in the next world. It is a nice idea, but in the absence of an explanatory principle for *continuity* in consciousness it seems tenuous. Just because worlds exist in which the experience of the individual is duplicated, it seems a major leap to imagine that one of these will actually be experienced after death. Why should the experience of another world follow on from the last experience in this one, however similar the experiences might be? However, given that the experiencing consciousness is a property of the universe, contextual to physical reality, this follows automatically.

Applying Moravec's dictum to the world of Weyl's statement, continuity is automatically provided. As the gaze of consciousness arrives at the end of life-line of the body, it simply passes to another life-line somewhere in the space of all possible worlds, as a new observation is made in that context. The moving frame of reference is to the moments of the life-line as the virtual frame-gate of the hypothetical universal DVD is to the frames of the movie in sequence. When one chapter of the movie ends, the projector seamlessly begins the next one.

The whole conjecture follows logically from applying the concept of the moving frame of reference to the quantum concept of time. As stated by Deutsch (1997, p. 278), it is fundamental to the quantum concept of time that other times are just special cases of other worlds. We discovered other times thousands of years before other worlds because they are: "... especially closely related to ours by the laws of physics.", and notes that: "They are therefore the ones of whose existence our own snapshot holds the most evidence. Technically, therefore, the jump from one snapshot to the next that results in the effective changing of a specific world, is no different in kind to the jump to a snapshot of a different world, here the 'Moravec jump'. Thus in experience there is the transition from one life-line to another.

Given the enactment of the quantum concept of time Moravec's concept must be correct. Given that the progression through snapshots is a real phenomenon, as is constantly experienced, when the only possible next snapshot is in a different worldline that is what is encountered. The sequence in experience automatically jumps to a different life-line in the space of all possible worlds. Thus, given consciousness of this nature, death cannot be the end of conscious experiencing. The experience of life always continues. Immortality is real, and with no dogma.

8 Life After Death

The thought experiment makes more sense when arrival in a different worldline is given a feasible explanation. As Deutsch states, we will soon have the technology to make complete, functional human bodies:

Illness and old age are going to be cured soon – certainly within the next few lifetimes ... by creating backups of the states of brains, which could be uploaded into new, blank brains in identical bodies if a person should die. (2011, p. 455)

Whatever happens to our particular version of life on Earth, this must inevitably happen somewhere in the space of all possible worlds. Individuals are 're-sleeved' as portrayed in the Netflix drama *Altered Carbon*. Equally, in an infinite universe, the technology must at some point be used to create completely new people, new bodies complete with minds and characters initialized at random. In this case there is a version of this event in which the record of observations is identical to that of a dying individual in a different worldline. Since the initialisation is random, in the space of all possible worlds there has to be a version of this event that applies for every possible conscious individual.⁴

Naturally, the standard concept of quantum immortality also operates. As described by Standish this is "... quantum physics' dirty little secret" (2006, p. 6). At any moment where death is a possibility, there is a non-terminal next moment also, defined by the wave function. Since this is all there is to experience, this is what gets experienced. As Tegmark (1997) argues, given the many-worlds interpretation this must follow.

Obviously this cannot go on for ever, but another dynamics is waiting in the wings. As survival becomes increasingly improbable a point is reached where the Moravec jump becomes more likely, and in experience a new life begins.

The essential component of the great myth is also found to have a definition in the physics. The world hologram provides a logical and scientific definition of the soul. The world hologram is effectively continuous not only in the transtemporal sequence of moments in everyday life, but also from one lifetime to the next. In the Moravec jump there is full continuity. As with the transtemporal identity passing from snapshot to snapshot in ordinary life, in the Moravec jump the world hologram is identically the same from snapshot to snapshot apart from one new observation made.

Given that the world hologram is the whole of the functional identity, this is true immortality. As described in Part 1, the world hologram defines and subsumes the functional identity. It is the sole determinant not only of all of the character, viz. values, beliefs and expectations, but also the algorithms for decisions, and the attributes of programs for rendering this world hologram. Thus the individual who

⁴ The full simulation of a viable but unspecified human being would presumably produce the same result.

wakes up in the new body is the whole person on the inside view. The immortal soul is simply the world hologram. A longstanding myth with religious overtones is found to have a simple scientific basis, again without any dogma.

9 Inherent Morality

In this light there is a powerful inherent morality. If the science is telling us that karma is effectively a real phenomenon, living at the expense of others is directly counter to the individual's own best interests. Clearly this is hardly supported by observation, there being no shortage of examples of people who do terrible things to others with apparent impunity. In the Moravec jump, however, the whole karma would take effect all at once. Absent the stasis of continuity, the reality matches the karma. Awareness of this destiny creates a very different concept of the future, producing the kind of sense of responsibility once induced by religions, without any dogma.

In the space of all possible worlds, every possible variation of a world in which a dying individual might experience reawakening must exist. In the absence of any other criteria, which world will be experienced must presumably be the one with the most precise fit with the world hologram. Going by Bayesian probabilities, the more the principles and tendencies in a given world match the world hologram of the individual, the more likely that world is to be experienced next at the point of death. This would mean all the tendencies in reality defined by the world hologram, the karma, are expressed in the way this world works, and the kinds of things that are likely to happen to this person. So another great myth would appear to have a foundation in an entirely natural and scientific phenomenon. Effectively, going to a heaven or a hell in the next life is based entirely on how the individual treats others in this one, thus generating expectations about how individuals operate. Again the effect requires no dogma.

For better or worse, this demonstrates that there are deep and direct benefits to a humanitarian way of life inherent in the structure of reality. In this light, not to live in accordance with this principle would be self-destructive, in the long term if not the short, thus a type of mental malady. Enlightened self-interest, as opposed to raw egoism, is the only rational life position. This, however, has none of the connotations of moral absolutism, an objective standard handed down from on high. Do as you would be done by is simply the practical approach to generating strange attractors that benefit the individual in every way. The opposite must be equally true.

In the current paradigm enlightened self-interest, meaning serving one's own interests by benefiting others, seems to be nothing but an ideal way to organise a cohesive culture: preferably exercised by others. In the personal, many-worlds reality, however, this is how to operate a scientific principle in the holistic maintenance and benefit of the life of this person. In the context of inside-view physics this is just karmic health and safety. On the inside view, life is the potentially endless time-evolution of the holographic field of information defining the world: the soul.

Benevolence is highly affordable because there is all the time in the world. The game of life is a considerably greater in scope than has been appreciated, and this realisation makes a mockery of overly mundane concerns and inconsiderate isolationist pursuits.

Simply comprehension of the different identity produces marked change. While fully realised examples are rare, they consistently demonstrate enlightened self-interest and eschew egoism.

10 Quantum Mysticism

Naturally the implications presented could be called quantum mysticism: they fit the description of truths that transcend ordinary understanding. This is usually a derogatory term in this context, but a new understanding emerges naturally from the implications of the physics. What emerge are myths and as Ryle states:

A myth is, of course, not a fairy story. It is the presentation of facts belonging to one category in the idioms appropriate to another. To explode a myth is accordingly not to deny the facts but to re-allocate them. (1949, p. 8)

As has been shown, a number of myths are readily reallocated to the idiom of the new physics, with a perfect match.

Ryle was addressing the dualism of mind and body. Nowadays this is readily exploded by allocating the facts about the capabilities of the mind to the computing power of the brain. The original principle behind the myth is however sound. Taking the mind to be the world hologram, there is indeed a profound dualism. As Everett describes, the body operates only the linear dynamics, and the world hologram operates only the collapse dynamics. The experiencing consciousness makes the system triune: which reveals the major challenge to unravelling the dualism.

As has been shown, the great myths naturally exploded are phenomena operating at a different level of logical type to that of the objective physical world on which our scientific intuitions are based. Interactive destiny operates at the second level of logical type, as has been described. Immortality is a function of the third-logical-type phenomenon. These great myths are operational principles of the universe that have been clothed in the idiom of bygone times. As has been demonstrated, these are facts that belong in the category of physics, albeit the physics of the inside view.

The great difficulty is that the myths are generally understood to address imaginary beings and principles, phenomena that clearly have no reality in the physical world. This, however, is the whole point. The physically impossible phenomena are information processes, and operate solely in the context of the second-logical-type level of the system. These phenomena operate only on the inside view, in the transtemporal, effective physical reality of a specific individual. They are, however,

real. This is inside-view physics. The deeply counterintuitive revelation is that on the inside view these phenomena are not only real but effectively causal.

This is a severely challenging adjustment to the current worldview. An essential step is that these effects operate only in the personal, physical, parallel reality. As has been described, the explanatory principle is that the world encountered on the inside view is, of course, a real physical world, but dynamics of the time evolution of this world operates like a virtual reality. The definition of the physical world is the quantum state, but the dynamics in operation are brought about by the effective operation of the information processes effecting the sequential updating of the inside view.

Quantum mysticism is the way mystical worldviews are seen as related to the ideas of quantum mechanics and its interpretations. Some of the great myths are clearly of this nature. The Vedic concept of the universe being simply a field of infinite possibility is literally the wave function: the infinite quantum field of possibilities. In the light of inside-view physics a number of practical explanatory principles are also of this nature.

11 Racial Survival

The new paradigm not only enhances the lives of individuals but also greatly improves the prospects of the human race as a whole. The global culture is facing a number of self-induced global catastrophic risks, and they are not being well managed. As Holdren states, business as usual is likely racial suicide:

The way I like to put it is that we're driving in a car with bad brakes in a fog and heading for a cliff. We know for sure now that the cliff is out there, we just don't know exactly where it is. Prudence would suggest that we should start putting on the brakes. (Friedman, 2008, p. 160)

A decade later effective efforts have been minimal. A new solution is urgently needed. As Speth states:

I used to think that top environmental problems were biodiversity loss, ecosystem collapse and climate change. I thought that thirty years of good science could address these problems. I was wrong. The top environmental problems are selfishness, greed and apathy, and to deal with these we need a cultural and spiritual transformation. And we scientists don't know how to do that. (2016)

This is egoism in practice. Egoism here means the belief that acting in one's own best interests is the only criterion that matters. This is what it looks like in behavioural terms. In other words, egoism is wrecking the planet, and all too literally driving the human race over a cliff of self-destruction, the cliff edge of sustainability of the ecosphere.

This problem has been addressed very clearly by King:

On environmental issues "... the common enemy of humanity is man". I am ever-more convinced that this applies far beyond environmental deterioration to a vast number of ills from which we and our societies suffer. If this is true, the fundamental difficulty lies within the very nature of man. Any durable solution to his external and internal problems can only come from evolution beyond the egoism that motivates every individual. (2006)

Just as Speth states, however, not even the scientists in the modern world know how to do that. As King goes on to say, no real success has ever been achieved in this field:

All religions have, in their purest aspirations, attempted to induce such a change, with very little success. (ibid)

The good news is that the implications of inside-view physics provide a new and effective solution. This operates like a trim tab on the evolutionary direction of the global human culture. The egoism is still in full force, but it operates on a far wider agenda.

The mechanism is the alteration of the definition of the identity induced by the new paradigm. As above so below. As an immortal entity, and all actions effectively causal in the way of the cosmos, the orderly harmonious system, both without the option, enlightened self-interest is the only sane approach to life. To treat one's neighbour as oneself is to live in a personal world getting ever better.

This is exactly the kind of transformation King is talking about; but this is a very much more achievable effect because there is no requirement to transform the ego itself. Instead, the agenda on which the ego operates is transformed. The effect is the same but it is a much shorter journey. This produces the moral code encouraged by humanism and human-centred religions, but drastic transformation of the ego is not required. The ego is still central and fully operational; but the agenda is transformed because the identity is evolved.

This provides the moral foundation of human culture that has clearly been largely abandoned in the running of the modern world, again without any dogma. Taken up as the cultural norm this revitalises the human race. The general outlook is quite different, while the organisations of practical living and the methodologies of the modern world remain much the same. This offers a practical and effective evolution of human nature that will ensure a new racial intelligence. A new age of humankind is born, and it has a very much greater chance of survival. Whitmire argues from a statistical basis that:

... the typical technological species becomes extinct soon after attaining a modern technology and that this event results in the extinction of the planet's global biosphere. (2017)

Certainly the elements of such self-destruction are clear to see in the local instance. The seeds of various kinds of self-induced Armageddon are all too evident. Judging by

human history, the good of the collective inevitably takes second place to the drives of egoism as civilisation becomes highly atomised, leading to ever-increasing global catastrophic risks as advanced technology takes off. If Whitmire is correct, it would seem that the new paradigm is a unique key to the survival of the human race. To win the galactic jackpot the extraordinary necessity of enlightened self-interest needs to be generally understood as the only rational basis for a truly successful life.

12 Conclusion

As has been described in Parts 1 and 2 the missing piece of the puzzle that has made quantum theory quite impossible to understand is the nature of the protagonist of the dynamics. As Everett makes clear this is not the physical observer but the state of the memory, defined as the record of observations. In human observers this takes the form of a three-dimensional field of information, here the world hologram. As this defines the determinacy of the effective physical environment of this individual, the protagonist is extraordinarily significant in the physics.

Objective physical reality is an ordinary world, as is obvious, but the physical reality encountered is a world superposition, a class-of-worlds-as-a-world. The new paradigm simply subsumes the old. The missing explanatory principle is the nature of the protagonist. It is the world hologram, a field of information that exists simultaneously in all these worlds. The many-worlds reality is the result. This is the physical reality encountered, and on which experiments are performed. This is what gives rise to the apparently paradoxical results because the experimenter is always operating in a world superposition. Despite appearing to be an ordinary quasi-classical world it is a class-of-worlds-as-a-world; and it is indeterminate except where observed. Physically impossible phenomena such as Schrödinger's cat are retrodicted. This is simply the nature of this domain, the quantum-mechanical frame of reference.

As Everett states, a solipsism fits the physics perfectly. The effective physical environment is defined by the individual, the world hologram. The individual is the definition of the determinacy of the effective physical environment, the many-worlds reality. As has been shown, this means personal, physical, parallel realities, here multisolipsism. The Hermetic principle of as above so below follows automatically. In such a domain the expectations of the individual alter what is observed, and thus effectively influence what is likely to be encountered in the future with respect to events in physical reality; and the effect is global. This is deeply incongruous with the current paradigm but as has been shown, while the domain encountered is, of course, all real physical world, the time evolution of the quantum state operates the logic of a virtual reality computation.

The great benefit of the new paradigm is that it provides an effective counter to the culturally destructive imperatives of egoism, ever more unleashed from all the historic constraints of community. As Holdren states so clearly, the human race is headed for

self-induced Armageddon. As King describes, the only durable solution to the ever-perpetuating crises of humanity is the evolution beyond the egoism that motivates every individual. The new paradigm revealed by the full implications of the new physics brings about exactly this result. The principle of egoism is still every bit as central, but it operates on a different agenda. As above so below is the way of the world. The human race has a very much better chance of survival.

This understanding returns principles central to humanity to full rationality. This heals the rifts caused by the increasing atomisation and inequality of the modern human culture. Moreover, if Whitmire is correct and the human race is alone in the galaxy because advanced civilisations inevitably destroy their ecosphere, with unchecked egoism being the essential cause, this would appear to be the one and only possible avenue to survival. As stated by von Baeyer:

The deep confusion about the meaning of quantum theory will continue to add fuel to the perception that the deep things it is so urgently trying to tell us about our world are irrelevant to everyday life and too weird to matter. (2013, p. 47)

As has been shown, such perceptions are utterly false. These things certainly seem very weird, but they could not be more relevant. As has been shown, individuals are beings of eternity, living in worlds of inherent morality. No wonder classic hero myths echo the new paradigm. This is the new enlightenment.

This is a manifesto for taking the new physics at face value, although this flies in the face of central principles of general acceptance, and despite the negative connotations aroused by the implications forming precise explanations of certain major mythical principles. They are classical depictions of natural phenomena completely in accord with the new physics, and recognition can only assist in resolving the deep cultural problems in which the human world is mired. May we dare to know.

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