Science News

THE REFRESH RATE OF REALITY

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There is something essential about the "now" which is outside the realm of science. – Albert Einstein

No phenomenon is a physical phenomenon until it is an observed phenomenon. – John Wheeler

Introduction

In this paper, the word "monitored" is taken to mean that an event is either observed at the time of its occurrence, or it is electronically recorded or filmed, to be observed at a later time.

It seems just common sense, to state that in a series of linearly related events, each one appears to be logically consistent with the immediately previous one in the sequence. It is only at the quantum level of tiny particles that we discover that the word monitored needs to be included.

The statement now reads, "In a series of linearly related events, each one will appear to be logically consistent with the immediately previous one in the sequence"—if and only if—that one was monitored.

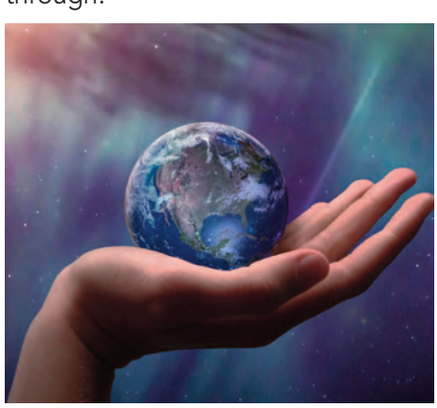
We might call this a *narrative rule*.

This was the main conclusion of the previous paper, "The Reality Narrative". It was suggested that this might also be true beyond the quantum level—but that we would never know.

At the level of tiny particles, such as electrons, photons or atoms, we are looking more deeply, and discover that an event we expected to be solid and concrete is nothing of the sort—because it was not observed and not recorded, evidencing that our commonsense view of how reality works is profoundly mistaken.

In the case of the two-slit experiment, if which slit a particle passes through is not checked, it's not even an event!

The only truly observed event preceding the particle's arrival at the target screen is the instant of projection itself, where there is an equal chance of which of the two slits the particle seemingly goes through.



And with the slit event itself now not existing (or being indefinite) the pattern of hits is equally indefinite, but remains consistent with the instant of projection. Hence the wave evidence.

This suggests that cause and effect may not be related in the way we think—which accords with the view of the great mathematician and philosopher, Gottfried Wilhelm Leibniz. As Professor Andrew Truscott puts it (in relation to his practical implementation of Wheeler's famous Delayed Choice Quantum Eraser Gedanken Experiment), "The atoms did not travel from A to B. It was only when they were measured at the end of the journey that their wave-like or particle-like behaviour was brought into existence".[1] As to where they might be emerging from... that is the subject of this article.

Of course, they *seem* to travel, but they actually *emerge* into the concrete world of our experience in a manner consistent with our expectation. Yes, they are certainly obeying a sequencing, or narrative rule—but that is all it is!

It is proposed that our commonsense understanding of time and reality, whilst practical in everyday life, is profoundly incorrect. An alternative paradigm is advanced. One that has astonishing implications for our understanding of the deep nature of reality.

Time and Time Capsules

In his book *The End of Time*, Julian Barbour advances the controversial idea that time, as we perceive it, does not exist as anything other than an illusion, and that a number of problems in physics arise from assuming that it does. The philosopher J.M.E. McTaggart arrived at the same conclusion, in his 1908 book, *The Unreality of Time*.

Barbour suggests that we have no evidence of the past other than our memory of it, and no evidence of the future other than our belief in it.

"Change merely creates an illusion of time, with each individual moment existing in its own right, complete and whole." He calls these moments "Nows", and argues that adopting this idea enables quantum mechanics to be reconciled with general relativity.

In the Wheeler–DeWitt equation, an important step towards a theory of quantum gravity, time becomes redundant (cancels out in the deriving mathematics). Another bonus of the timeless model is that it removes the need to include initial and boundary conditions, as pertaining at the instant of the Big Bang, from the mathematics. After all, why would any single state exist initially, in preference to any other? That idea is so arbitrary.

One of the key ideas discussed in Barbour's book is the notion of "time capsules". He defines these as any static configuration of the Universe that includes mutually consistent records of processes that took place in a (seeming) past, in accordance with certain laws. Less formally, any fixed pattern that creates or encodes the appearance of motion, change or history.

The continuity we observe, as our awareness traverses these states, being determined by the principle of least action. That is, the tremendous similarity of the consecutive time capsules we experience. A sort of best match rule. Effectively, this amounts to the existence of static, timeless, parallel realities in which we seamlessly experience sequence, in (what we interpret as) time.

To picture this view of reality, he envisages a vast, static, timeless realm, consisting of every possible configuration of the Universe, in association with a wave function which gives probabilities to each.

To represent this idea mathematically, he imagines a vast multidimensional coordinate system (which he names "Platonia"). In this space, each distinct possible configuration of the Universe is represented by a single point, a wave function, associated with each point, hanging like a probability mist over the landscape.

Scattered sparsely amongst these points, are those which correspond to configurations which are almost identical to each other—and which also contain evidence of events that occurred in a (seeming) past. These are the time capsules, defined above.

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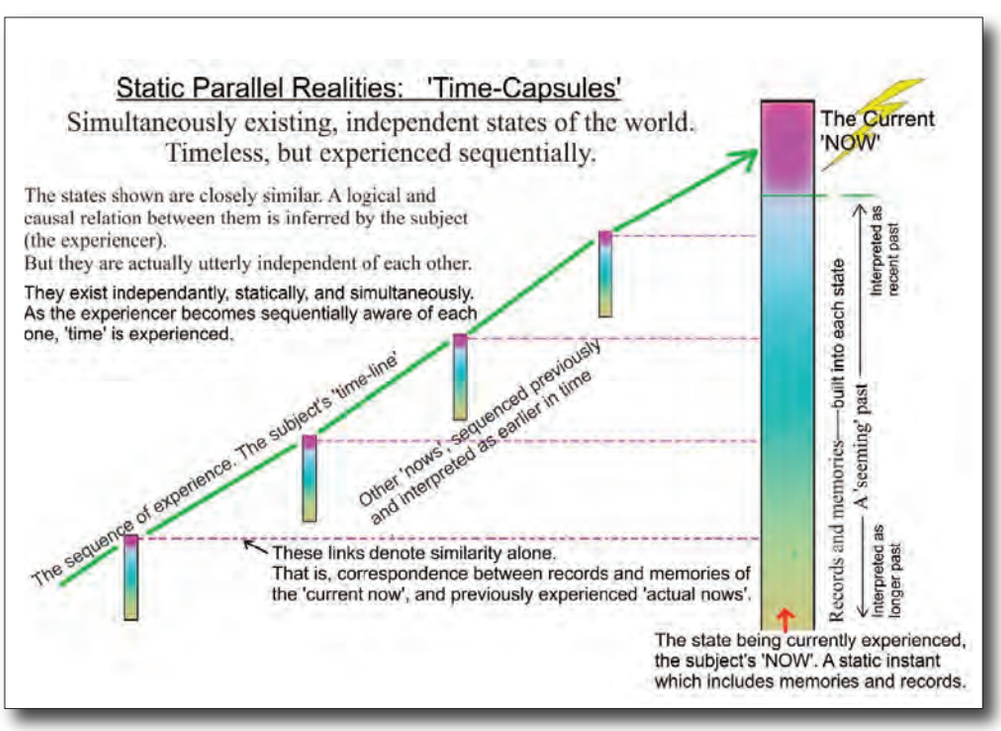
Since the publication of *The End of Time*, Barbour's ideas have developed through the creation of Shape Dynamics, which distinguishes strictly between the size and shape of the configurations in Platonia. For example, the size of a triangle is clearly something different from its shape. In his researches, difference of size now plays a role somewhat analogous to the intuitive notion of difference of time. But the notion of time capsules remains central. Currently his researches are concerned with classical insights into time's arrow. He remains a materialist, but with a holistic viewpoint.

The diagram below attempts to present and simplify the notion of time capsules. It is important to note that this is strictly my own take on the idea, and the diagram has not been considered, or reviewed by Professor Barbour.

Consciousness

In his book *The End of Time*, Barbour writes, "I should emphasise that I am not claiming consciousness plays some remarkable, novel, or extra physical role in the world."

Whilst accepting much of Barbour's ideas about the nature of time, this paper suggests the exact opposite. Evidenced by the starkly clear results of the two experiments outlined in the previous paper "The Reality Narrative", awareness does indeed impact the physical world,



and accepting this fact leads to a vastly simpler model of reality.

Further, by proposing the existence of an amorphous field, overarching physical reality—an idea put forward by a great many authors, including Lynne McTaggart (author of *The Field*)—we can substitute a best match rule with a narrative rule, as suggested in the introduction.

Also, since such a field holds information, we can also dispense with the need for a strictly material means of holding evidence of a seeming past within each time capsule—especially in the physical brain of the observer.

As the distinguished Australian neuroscientist and Nobel Prize winner, Sir John Eccles states, "... the human mystery is incredibly demeaned by scientific reductionism, with its claim in promissory materialism to account eventually for all of the spiritual world in terms of patterns of neuronal activity. This belief must be classed as a superstition...".[2]

The Unreality of Particles

As Niels Bohr said, "Everything we call real is made of things that cannot be regarded as real." Professor Meinard Kuhlmann ably demonstrated this, in his paper "What is Real?", published in *Scientific American* in August 2013.

Kuhlmann provides much evidence of the unreality of particles, and suggests that relationships and attributes may be more fundamental than matter. For example, seemingly abstract qualities, such as the redness, roundness, and feel of a child's red ball may be more fundamentally real than the object itself. Plato might agree.

Kuhlmann makes his case without any reference to the results of the two-slit experiment, or to Wheeler's delayed choice quantum eraser experiment—both of which strongly support his premise.

A Refresh Rate of Reality?

Some of those working on quantum gravity have argued that time, like energy, may be quantised (granular), by a figure derived from G (Newton's constant of gravity), h (Planck's constant) and c (the velocity of light), as around 5.39×10^{-44} s. That is, many trillions of intervals per second. In other words, there exists a minute but finite time interval, which cannot be further subdivided. Such quantisation already occurs in the case of energy levels of the atom etc.

La Reproduction Interdite (translation: Not to be Reproduced), René Magritte, 1937

If so, this might be viewed as a refresh rate of reality. Being the rate at which Barbour's pre-existent, static, configurations of the universe are sequentially, and seamlessly experienced by an observer.

Parallel Realities

Many respected scientists accept the idea of parallel universes as entirely plausible. There are many versions of this astonishing idea. To mention just one, Professor Howard Wiseman, Dr Michael Hall and Dr Dirk-Andre Deckert propose a modification of the Many-Worlds Interpretation (MWI) of Quantum Theory, which they call the Many-Interacting Worlds Interpretation (MIWI).

In Wiseman's model the indefiniteness preceding the collapse of the wave function (that is, the emerging of a concrete experimental result upon measurement or observation), is due to interaction with nearby parallel universes. Each of which, regarded in isolation, would be entirely classical. And as compared with MWI, no branching into further universes occurs, the number of universes being constant but vast.

Other theories have the Universe splitting into different versions whenever an experiment or event can have different possible outcomes.

In this paper, we remain with Barbour's idea of a virtual infinity of static and independent ones—because this corresponds closely to ideas from important philosophical, and religious sources. In particular, the doctrine of continual creation discussed below.

The Doctrine of Continual Creation

From the perspective of subjective experience, the most philosophical and intellectual wings of some of the major religions say something remarkably close to Barbour's time capsule idea. Namely, that the world is endlessly emerging into existence—coming into being afresh at every instant—with new and distinct configurations, which emerge smoothly and incredibly rapidly. Perhaps occurring trillions of times per second, as in the above refresh rate of reality, with each distinct state being utterly static. This is known as the doctrine of continual creation.

That the two views are subjectively the same is clear if we consider the analogy of the frames of a film. Every frame is utterly static, and already exists prior to viewing. Projecting the story

corresponds to the time capsule idea. If the viewer is completely lost in the story, the images are sequentially emerging from his point of view, corresponding to continuous creation. Time itself can be viewed as the advancing of the reel, to bring up the next frame.

It is convenient to refer to either one of these theories as top-down reality, if only to differentiate it from the generally accepted commonsense view of physically linear cause, means and effect.

Religious Support for the Idea of Time Capsules

The doctrine of continual creation has featured prominently in Hinduism, Judaism, and Christian Neoplatonism in particular.

The great works of Jewish philosophy, such as Maimonides' *Guide for the Perplexed*, the Ramak's *Pardes Rimonim*, R. Isaiah Horowitz's *Shaloh* and R. Schneur Zalman of Liadi's *Tanya*—discuss the doctrine, and cite scriptural, logical and philosophical proofs that such is indeed the nature of existence.

Regarding Hinduism, the passage below is paraphrased from "Creation Theories and the Reality of the World", a chapter in *Be as You Are: The Teachings of Sri Ramana Maharishi,* edited by David Godman. The Vedanta says that the cosmos springs into view simultaneously with the observer and that there is no detailed process of creation. This is said to be instantaneous creation. It is similar to the creations in a dream, where the experiencer's awareness springs up simultaneously with the objects of experience.

But when this is told, some people are not satisfied, for they are deeply rooted in objective knowledge. They seek to find out how there can be sudden creation. They argue that an effect must be preceded by a cause. In short, they desire an explanation for the existence of the world which they see around them.

Then the scriptures try to satisfy their curiosity by theories of creation. This method of dealing with the subject is called krama-srishti (gradual creation). But—the truth is yugapat-srishti—instantaneous creation. Maharishi Ramana likens the consciousness, which views the sequence in the film analogy, to the light of the projection camera.

Gottfried Leibniz

The great mathematician and philosopher Gottfried Wilhelm Leibniz (1646-1716), who developed the calculus, concurrently with, but entirely independently from, Newton, developed a remarkable and detailed philosophical system to explain the deep nature of reality.

As Professor Soshichi Uchii (Kyoto University) has demonstrated in various papers, although Leibniz's system was developed three-hundred years ago, it has remarkable relevance to quantum mechanics, particularly as a means of reconciling quantum mechanics with general relativity. Professor Uchii also notes in his paper "Leibniz's Ultimate Theory" that some of Barbour's work shows a strong affinity with some of Leibniz's ideas.

To the modern mind, conditioned by materialist certainty, Leibniz's philosophical system will seem crazy. Nonetheless, it has gained great respect amongst philosophers. Papers are still being written analysing it, including those discussing quantum mechanics.

In this paper we cannot delve deeply into Leibniz's metaphysics, and not at all into his theory of monads, but briefly, it conjectures that our everyday physical reality, including time and space, is one of mere phenomena—a projection from a more truly real realm, where time and space do not exist.

Leibniz also makes clear that each distinct instant is not a part of time, and that time itself is simply the order of successively experienced instants. As Einstein also remarked, "There is something essential about the Now which [unlike duration] is outside the realm of science."

Leibniz accepted the doctrine of continual creation as a continual recreation of every substance and all its states. There are a great many passages in his writings which evidence this. To combine and paraphrase just a couple: the duration of things, or the multitude of instantaneous states, is the accumulation of an infinity of bursts, of which, at each instant, is a creation or reproduction of all things. Transition between states is not at all continuous.

If this model of reality is correct, how do we account for the similarity and logical relationship we see between cause, means, and effect, in everyday experience?

Leibniz accounts for it via a theory called *pre-established harmony*. Briefly, this states that changes in

one thing do not directly cause changes in another. Changes in anything are caused by the thing itself—but triggered by changes elsewhere, via a pre-established, but indirect concomitance or conjunction between cause and effect. When we observe A (apparently) causing B in the phenomenal world, they are not causally interacting. But their states will always accommodate each other as if this were the case.

Esoteric Sources

Several of these are noteworthy because in spite of being somewhat way-out they do concur with hypotheses already discussed, and foreshadow Barbour's ideas on time, including the notion of time capsules.

Darryl Anka (an American new-age teacher) who channels an entity he calls Bashar, was proposing the non-existence of time, in conjunction with an idea fully equivalent to time capsules, long before Barbour's book *The End of Time* was published. He says, only the present instant (the Now) is real. There exists an infinity of different, and utterly static, states of the Universe, effectively static parallel universes, all equally real. Our awareness perceives these sequentially and (obviously) locally.

There is a ruleset, or default sequence, that maintains linearity. That is, a seeming relationship between consecutive states that makes them appear to be closely, logically, or causally related.

It is useful to call the sequential track of our awareness through these states a timeline. And, since we believe that we are witnessing one and the same world continuously, we naturally interpret the sequence as change and duration.

In Bashar's model of reality, the past leads sequentially to the present, but does not cause, or create it, except to the extent that deep-seated beliefs and fixations of the deep subconscious mind, conditioning, convention, and consensus, convinces people that it does. Several other new-age gurus are saying exactly the same thing. Among them, Bentinho Massaro. However unbelievable these ideas may seem, they are no more so than other theories about parallel universes, which some respected scientists do give credence to.

It has little to do with this paper, but these esoteric sources also conjecture that, since consciousness shifts along a (normally) linear sequence of nows, it is possible to shift more dramatically to another timeline, by dramatically changing our deeply held beliefs and expectancy. Hence the ubiquitous Law of Attraction which is spawning many books, such as *The Secret*.

New Thought

The above is in line with a philosophy prevalent during the late nineteenth century called *New Thought*, which was effectively a renaissance of Christian Neoplatonism. Neoplatonism is the term given to a school of philosophy founded by Plotinus (204-270 AD)—who brilliantly interpreted, revised and exceeded the philosophy of Plato and developed a mystical and spiritual version, which greatly impacted early Christianity and mystical (non-fundamentalist) Islam, although Plotinus himself was not a Christian.

Plotinus' essays, called the *Enneads*, have the following to say about "The One", the first cause, utterly beyond all understanding or definition. The ground of all existence, which is itself groundless. While *Nous* is the primary first emanation.

"For He [the One] exists in and by Himself without any attributes. Substance [physical reality] needs Him in order to exist: but He does not need [even] Himself, for He is Himself.

"The One is always perfect and produces everlastingly; and His emanation is less than Himself. Nothing can come from Him except that which is next greatest after Him. Nous is next to Him in greatness and second to Him; for Nous sees Him and needs Him alone; but He has no need [even] of Nous."

Note the implication of a one-way mechanism in the precipitation of reality—as in the doctrine of continual creation.

Along with Bashar, Ernest Holmes, author of the New Thought classic *The Science of Mind,* argues that each moment does not depend upon another, except to the extent we believe it does. And that reality operates entirely deductively (top down), though modifiable by deep-seated belief and intention.

Of course, belief in this context refers to fixations at the deepest levels of the subconscious mind. Most of which we hold in common—as the current, generally accepted, description of the world, sometimes referred to as consensus reality.

Even then, as Leibniz proposes, causality is not operating at the level of the physical world, but a ruleset ensures that events occur in a manner that gives that appearance.

In line with Plotinus, Holmes distinguishes real, or vertical, causation, from horizontal, or apparent causation. That is not to say that we have no power, or free will to affect events. Rather, that the way this occurs is far from what we instinctively assume.

Holmes also conjectures the existence of an immaterial, transcendent medium he calls the Universal Subjective Medium (USM), via which events manifest into everyday reality.

The USM is readily identifiable with the matrix referred to in several recently published books, such as those by Bruce Lipton, Gregg Braden, Joe Dispenza, Karl Dawson, and many others. And also with Lynne McTaggart's "field".

Resolution

By now it must be fairly clear that these disparate sources are all saying the same thing.

Time is a side effect of our locally observed sequence of timeless configurations of the whole Universe, configurations linked by their similarity to each other, and by a ruleset that makes consecutively experienced ones appear to be causally consistent. And at least appearing to have a physical basis, such as the laws of physics.

Part of the ruleset is one of consistency. Events in concrete reality rely on knowledge or records of prior states for the degree of their concreteness. Therefore, where such evidence is not available or incomplete, events are less concrete—as in the case of the target screens displaying a wave interference pattern instead of bullet-like groupings.

It is philosophically sound to accept such a ruleset as a given. After all, no one knows the deep reasons for the laws of physics being the way they are. Just as Leibniz does not give reasons for his notion of pre-established harmony—simply that it solves many philosophical problems. Just as Barbour's model reconciles quantum mechanics with general relativity.

Viewing Wheeler's experiment through the lens of Barbour's timeless model, the instant of the particle's arrival at the detector is a time capsule, which should include an inference of how the particle got there.

In the case of Wheeler's experiment, and with the scrambler in place, no definite path can be deduced. Hence the result must be as if both were used.

The static state the observer's witnessing awareness jumps to has to be the one that is closest to the one jumped from, and also include a record corresponding to the state jumped from.

This solves the central paradox of quantum mechanics, at the cost of surrendering our commonsense notion of the nature of time and reality.

It is as if reality operates top-down, but wishes to convince its observers that phenomena are linearly and causally related in physical reality. That this may not be so, is evidenced by the two key experiments discussed in the previous article.

A Wild Suggestion!

The concreteness, or seeming objectivity of a state is a function of conscious awareness of it, coupled with consistency, so that reality is effectively virtual, and we seem to have been taken in by a gigantic confidence trick.

There are many people, including serious philosophers, who do believe reality is entirely subjective—and that there is no objectively real Universe out there. For example, when we look into deep space, all we are observing is probability, only becoming reified (made real for us) when we go there.

As we travel, say to Mars, each view will become more and more definite, while always being consistent with earlier, more probabilistic views. When we jump on its surface, or record the surface with a robot, it is completely reified.

Therefore, the static, virtual infinity of timeless parallel worlds, representing every possible configuration of the whole universe exists, but in a ghost-like transcendent state of potential, or probability.

The notion of time capsules is

necessary because, with each configuration being utterly independent of any other, and with our awareness of each being instantaneous, each "now" needs to include built-in data (not necessarily material) evidencing a past, to preserve consistency with previously experienced states.

The states emerge into being as consciousness tracks through them. Alternatively, we could say conscious awareness is what is making them real, in sequence. This idea is not limited to potential configurations existing in probability space, but applies fully and equally to this world, and right here and now.

For example, imagine a beautiful scene, say a mountain or a forest, which we are viewing from a distance, and of which we are the only witness. The distance is enough to present a somewhat blurred and out-of-focus scene to our eyes. But it is a more profound indefiniteness that is meant here.

The forest's absolute concreteness is not a requirement where no conscious witness is observing it up close. This idea gels with the Vedantic view, that the cosmos emerges into being along with the observer's awareness.

The forest is there alright, but somewhat unfocussed: what we are seeing is probability, becoming increasingly actual as we approach. Just as the degree of actualisation at the target screen, in the two experiments, is greater, the closer we monitor preceding events.

Naturally, it will be asked, what about the animals and birds that live in the forest? However, their timelines are not ours. As regards only the aspects of the scene that appear sharply reified to human beings, it might be assumed that the creature's view is of a more indefinite environment, reified in relatively low definition compared with our own perception. Whilst aspects of which we are only vaguely aware might be incredibly sharper, and brightly coloured, to the forest creatures.

I said it was wild!

Endnotes

1. http://tinyurl.com/hqrfyhm
2. http://tinyurl.com/yb6he4qj

About the Author:

Robert Solomon, BSc Hons, CEng, agrees with Rupert Sheldrake that the mainstream scientific establishment is in denial. His articles on applied mathematics have been published in technical magazines and he authored "The Reality Narrative" in Science News last issue (see Nexus 26/01). Solomon can be contacted by email at rob1931284@gmail.com.