

A side dish of interesting matters

Georgina Woodward 2017

This isn't meant as the 'main course'. The 'main course' is what time has to be, and what kind of universe fits with the necessary kinds of time to allow physics as we know it, without contradiction of the models that are used to represent it and without paradox. In addition to allowing quantum and classical physics to be non contradictory; providing explanations for arrows of time, providing temporally 'uni-directional' causality and temporally 'unidirectional' perception of events, as well as non-simultaneity of events for different observers/ viewpoints.

Mains

<http://vixra.org/abs/1608.0049> Reality in the Context of Physics (Ricp): an Explanatory Framework: Bridging the Pitfalls of Category Error, Dispelling Paradox and Excluding Magic from Physics 2016

<http://vixra.org/abs/1612.0389> Uni-Temporalism, the Relation of Human Beings to Time and the 'future' of Time in Physics 2016

<http://vixra.org/abs/1701.0509> Paradox and Category Error 2017

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Complexity Arising

If a second colour is poured into a tin of paint and then gradually stirred, a pattern will emerge that becomes more and more complex over time. Until it has become so complex it is indistinguishable from homogeneity. There is progression from simplicity to complexity to chaos and back to simplicity. At no point does the paint have a goal to produce the pattern that is formed by the stirring. Yet it can be observed as a trend of increasing complexity tending to simplicity of homogeneity.

There is no authority dictating the overall pattern. (Though the person holding the stirrer can affect the pattern by altering their movement they are not in complete control of how all the parts of the paint respond.) The pattern is the sum of local changes. The high complexity state mid stir is no more a plan of the paint than the homogeneity of the mixed paint. Can the pattern be said to be accidental? Not if accident is defined as "an event that happens by chance or that is without apparent or deliberate cause." (Oxford dictionaries). There is identifiable cause of the complex pattern including the physical properties of paint, such as viscosity, properties of the stirring stick such as blade dimensions, energy input to stirring, the motion input by the person that stirs.

The Game of life,¹ 'life' was developed by John Horton Conway. It is a cellular automaton with very simple rules. An initial pattern is input. The rules are enacted upon it giving a next generation, and the rules are reiterated on each new generation. Each one is a function of the previous. Despite it's simplicity it shows evolution giving spontaneous emergence and complexity. It illustrates that complexity does not need to be input initially, nor does there need to be complex guidance for emergence and complexity to arise. The development of the cellular automaton like all processes in nature requires sequential passage of time/change of configuration.

Thinking about mixing the paint colours, from adding a single blob of colour into another colour of paint to the final blend. As the paint is stirred (energy input /change happening) a pattern is formed. The more it is stirred the more complex the pattern becomes. However after a level of **complexity** of pattern is reached further stirring tends towards increasing simplicity. That may be why nature is patterned as it is. The patterns reflecting the energy of the system. Little energy and there is a pattern on the low complexity side, a lot of available energy or a lot of time leads to more change and a pattern closer to simplicity on the more complex side of the balance.

If the energy is dissipated through collapse, then a structure might go to the sort of simplicity it came from, a reversal. Like a tower of bricks collapsing back to the sort of pile it was built from. However if energy is input, above that needed to maintain the pattern as is, a system could be pushed to a new kind of simplicity. I see it like continuing to stir the paint until fully mixed. More and more complex until a new simplicity is formed, not a reversal but something entirely new that did not exist before. Very hard to un-mix it then, back to separate colours. Unless they have different densities and will in time form separate layers of paint. For example, this does happen in nature as different solids, liquids and gases do have different densities. Deposition of the heavies solid particles can happen first and then the lighter ones so layers form. Also Oil and water will separate into different layers.

Rather than being surprised at the existence of patterns, and complex structures we could regard them as the equilibrium between maximum simplicity and

maximum complexity, which tends towards simplicity.

Collapse isn't inevitable if there is change to a new norm that is as stable as the previous. Even though complex systems can have vulnerabilities that might cause them to collapse, even more complexity is closer to simplicity after a particular ⁴ level is reached. This is seen in human behaviour en masse or flocking of birds such as starlings. Track one human's behaviour and it might seem very complex. Follow the behaviour of a whole city of humans and the behaviours seems far simpler. Also following the path of a single bird and its behaviour might seem very complex, follow the behaviour of a whole flock, such as a flock of starlings, and the behaviour seems far simpler. Its as if the whole flock is a single simpler organism.

The murmuration of starlings is fascinating and awe inspiring.² Huge flocks move as if a single organism. Researchers (Dan Pearce et al, 2014)³ have found that the starlings maintain a density allowing them to always be able to see out if the flock. Researchers, (A. Attanasi et al 2013)⁴ have found that each starling is responding to the turning of neighboring starlings, adjusting its own flight angle. The change is rapidly transmitted through the flock allowing it to respond as a whole without breaking apart. Staying grouped while being able to respond rapidly to predators is important for survival of the individual birds.

Seeing the current array of speciation and complexity of highly evolved species and their ecology, we cannot say that that is achievement, by nature, of a plan, fulfilling a goal. This can be likened to the paint mid stir; Simplicity, speciation, extinction, simplicity. Another cycle in which it can't be said that any stage is fulfillment of a goal of Nature is; Simplicity, embryology, growth, death, decomposition, simplicity. The recycling of material and energy availability enables continuation of change. To consider the maturity of an organism or a complex product of evolution or rich specialization as Nature's plan is to attribute

Nature with ambition using a human perspective. Humans may prefer a world of rich diversity and complex life forms but the geology, climate and astronomic environment do not have the goal of sustaining its continuance or its demise. Death and mass extinction are just other states returning configurations of matter to relative simplicity.

The images of vast astronomic structures too should not make us think that maximum complexity is a cosmic goal or desired end. There are all stages of development and deconstruction /destruction; Dust and gas as well as galaxies. That the complex structures are better is a human judgment. Nor should we think that cosmic and local conditions were made ideally to suit us but rather, local and cosmic conditions being what they were, we have been a viable configuration. And should conditions change significantly we will be non-viable.

It is important when considering cause and effect to be aware of, and avoid where possible, many relevant biases, including anthropomorphism. Inanimate things and processes, and simple organisms do not have the ability or means to imagine goals (/ have aims and intentions). There does not have to be a program or pattern separate from the existing configuration of material universe, and relations within it, to account for complexity and organization of matter. The development of complexity including organized configurations that are highly evolved species, is not a pre-conceived goal, or program of the forces of nature but a stage, arising from continual change, between stages of relative simplicity.

About change

Every material thing is in continual motion even if it 'appears' or is calculated to be stationary relative to another object or to an observer. Whether deemed to be in motion or stationary has depended on the relative motion of the reference object, I.e. 'moving or stationary relative to this', as speed and velocity are variables and therefore relational not just properties of the subject of

consideration alone. From this premise of measurables being relational, it can be said that motion is, therefore, in Object reality, relative to all other constituents of the Object universe. A whole profile of changing relations and **not** a singular speed or velocity. A material object can not be stationary relative to *everything* else. Nor can phenomena be stationary as they necessarily involve change.

Motion occurs over many scales not just at the single scale in which it may appear stationary to an observer. Even a substance at absolute zero in a laboratory will have energy associated with the Earth's universal movement.

Rather than thinking of the Object universe as one isolated system it can be thought of as very many systems that are not isolated. Nothing can be isolated from the Object universe. Also it is known from chaos theory that small changes can develop into large changes and vice versa. This is also seen in nature for example in weather systems. It isn't a one way street of increasing entropy. Throughout the Object universe structures are built by deposition and/or growth and dismantled by erosion, decay or destruction. This is seen across scales from atomic to galactic. Due to recycling of matter and structures and transformation of energy rather than it being used up it is not unreasonable to consider the Object universes continual change of configuration, and hence foundational passage of time to be eternal.

The so called expansion of the universe comes from observation relying on receipt of electromagnetic radiation (EMr) signals. EMr signals from distant galaxies being red shifted but not radiation from the local group galaxies indicates a difference *in the relation* of the Earth or near Earth observatory *to the radiation* emitted from the different spatial/temporal origins. The very distant red shifted starlight originating in configurations of the Object universe that were the uni-temporal Now vastly, earlier; the nearer 'local' starlight from configurations closer to the

Now existent uni-temporal-Now. Images process-able from the received radiation should not be confused with material objects.

Emergence

Biology can be looked at in a reductionist way as chemistry and the chemistry can be reduced to physics. The biology, chemistry and physics are dealing with different scales of the same phenomena. Reductionism, expecting answers from breaking systems down into their components overlooks emergence from complexity and emergence from scale. What an organism or other complex system does isn't ultimately explicable by sub atomic particle interactions alone.

Though the energy for biochemical processes comes from the breaking of energy rich bonds (in ATP), which were formed during another (respiratory) biochemical process. That bond making and breaking could be considered at the sub atomic scale. Yet that does not explain life.

Imagine two separate collections of the same type and quantity of ions. One group has a random arrangement, the other has a specific arrangement forming an enzyme. The enzyme group now has a catalytic function not possessed by the other group, despite them both containing the same type and quantity of ions. The catalytic functionality comes from the topology of the arrangement not merely the ions present. No new rule just a different arrangement, giving an emergent function. The function of the enzyme has not appeared from nothing it is a consequence of *the sequence of assembly* of the protein molecule, that leads to its 'packing' itself into a particular shape due to the forces between the constituent particles. All that is required is that the configuration of material reality, the Object universe, changes sequentially. That allows such a process with a necessary sequence of steps to occur. (Imagine threading beads on a string.)

Organization and structure does not make sense without sequential time allowing ordered construction and ordered processes/ function. When the steps in a

biochemical process occur, in foundational Object reality, can not be a matter of opinion. As each next step requires the preceding step.

There is also no reason for cycles such as the Krebs citric acid cycle that provides ATP for biochemistry in a fully existent space time universe (as THE universe) where everything *is* without the necessity for processes to maintain existence/life.

Emergence isn't just the emergence of a structure from the relations and interaction of smaller parts or behaviours of simpler entities but is something new (in its own right), that is not predictable from the individual parts alone.

Termite mound

How the temperate control properties of a termite mound have arisen, for example, can not be ascertained from watching the behaviour of individual isolated termites; Or merely from the properties of the mud it is built from. But the mound and hence its properties as a whole, are the result of behaviours of individual termites that built it and the mud and its properties, from which it is constructed.

Egg shell

The shell of a birds egg is an emergent structure (no pun intended). The shape can not be attributed to the calcium carbonate of the shell alone, from which it is constructed. Calcium carbonate from ground up oyster shell or cuttle fish bone may be input to a bird (organized structure) and a beautifully formed eggshell is output. (Birds eat small stones and shell which grinds up their food in their gizzard, they do not have teeth to do that.) That egg form would not occur without the complex bird organism. It is a product of the organization of the bird and sequential process of egg production, from ingestion of raw material to laying, not just self assembly of atoms. Taking the egg shell on its own, ignoring bird behaviour, reproduction and anatomy, its form can not be satisfactorily explained. There isn't a good reductionist explanation.

There seems to be organization at whatever scale is investigated, from atoms to the cosmos. There can be many levels of emergence. Emergence shows that not all answers can be found using reduction-ism. Reduction-ism has been very widely used in science but is not the answer for everything. Reductionism has and can still be useful for gaining understanding of the components of the 'mechanism' of a system but that there are limits to what can be learned with that approach. Not only are some things not explicable from the smallest scales up, reductionism does not work with chaos. That is to say the idea that something can be precisely, certainly known if looked at in the tiniest detail. Many natural systems are chaotic. They are scale invariant and small scale differences in variable values potentially lead to different outcome effects at a large scale. As is found with climate modeling, approximation has to be made and chaos 'is in' the unmeasured detail. The small difference between approximation and actual values for a measurable could give a big divergence in predicted and actual outcome.

Self organization

Evolution doesn't fit the term self organization well because the self would have to be the species which is a category of exclusively interbreeding individuals. Embryo-genesis, growth and development, metamorphosis do seem to fit the bill. They are possible because the individual has the ability to provide the energy to drive the processes. That energy provision however does not require new laws of physics as it is just complex biochemical cycles. Such processes become possible at a certain level of complexity and that is emergence. Though self organization might be being considered 'on the grand scheme' of the material object universe whole; in which case it is a form of self organization. As the selection pressure of the environment is a part of the universe 'self', by that way of thinking. If by definition the Object universe is all existent things and there is continual motion, there is no *additional* responsible existence.

Consider the abstract concept of a morphogenic field that shapes a developing embryo. A religious person might have as their personal criterion for potential validity correspondence with scripture and creed. That the morphogenic field is God's spirit would provide the necessary correspondence and sufficient cause, making it logical. A biologist would have a different criterion for validity, correspondence. The morphogenic field can be described as the spatial/ temporal distribution and concentration of chemical factors, such as growth factors affecting a local area of cells, which interact with each other, as well as responding to the chemical stimuli; co-ordinating development, for example to form an organ, such as a limb. The 'messages' giving 'instructions' are the chemicals. Samples can be taken from the embryo at different stages and analyzed and chemical can be added altering timing and concentrations and the effect on development observed. For the biologist the biochemical model provides the necessary and sufficient cause to be logical.

Chemicals and other factors such as temperature can have an epigenetic, DNA folding, effect that affects gene expression. Though constraint of developmental possibilities might be thought of by some as creative choice of a designing force, it is demonstrably executed via effects on the DNA folding (chemistry and physics) and hence gene expression, and consequent development of phenotype (the expressed form and function.) Exposed genes are able to be transcribed into mRNA and from transcription of the mRNA decoded into proteins. Genes that are not exposed due to folding can not be transcribed. (B. Leith, 1982) ⁵

The concept of an epigenetic 'landscape' can be used as a visual analogy showing how some phenotypes are disallowed and others preferred. The landscape is an abstract representation of the constraints and possibilities of development brought about by the epigenetic factors. Impossible outcomes are imaginable as high peaks and most likely outcomes deep troughs. The imagined developmental route taken visualized like a ball rolling across the landscape.

Evolution

One complaint often given by intelligent design supporters is that complex forms or functions can not arise by random chance. The complex form or function outcome is *not chance* but a consequence of the function of the organization that already exists and physics, chemistry and biology occurring that makes the organism viable, and reproductively successful in a particular environment and social context. Chance is a part of providing variation through mutation but is only a small part player in subsequent selection. There can be chance events such as flooding or burning of a habitat. 'Chance' selection that kills an individual, or offspring, well suited to that habitat. However that is more unusual than being removed from the gene pool by predation, disease, injury or being at a competitive disadvantage for resource (including mate/s) acquisition.

Selection is not of the best adapted to survive and reproduce but selection by elimination of the least capable of surviving and reproducing, the less "well adapted". Evolution is not well suited to the analogy of a clay worker sculpting a desirable design but more suited to the stone mason or wood carver chipping away and discarding the parts that will not contribute to the later product. The most able not to be eliminated from the gene pool have not been specially chosen according to a plan or designed for a purpose but are the latest in a line of configurations of matter that have been able to avoid elimination from the gene pool and so are able to continue the replication of their characteristics via their genes, and the epigenetic 'plasticity' of expression of the genome that carries them. Epigenetics is important in evolution because selection pressures act on phenotypes.

It can be argued that physical systems do not pursue the goal of reproduction as a rule. Simple organisms are incapable of imagining goals and merely reproduce in an automatic way via the physics and biochemistry and material reality of the situation as it happens. It is unfortunate that 'function' is sometimes used

interchangeably with 'purpose', with connotation of purposefulness or intention; the why or reason for its being, leading to its becoming. It would be better to keep 'function' to mean merely, how something is working Now. E.g. A washing machine drum can function as a holder of hot coals but that is not the reason for its being. The term 'function' will be used here denote what something does Now, not an imagined purposeful development or becoming. Reproduction is a function of certain processes, what happens in the Now of the physics and biochemistry. That is not product of an 'upfront' goal (imagined future) of the physics and biochemistry, that can be looked back on as purposeful.

Though reproductive success is necessary for the passing on of genetic code to the next generation, it is questionable whether most higher organisms too achieve reproduction with that intentional goal. It is, I would venture, more to do with the chemistry of lust and arousal and opportunity. That reproduction happens is not so much goal or accident but incidental to the necessary behavior, for the individuals of most species. (Beware of personal bias and anthropomorphism.) Being able to imagine a future goal has survival advantages, it facilitates planning of necessary tasks. It does enable there to be a goal of reproduction and successful rearing of offspring, though there is much evidence that not all reproduction is reproduction goal directed. Reproduction happens due to behaviors that enable it to happen, and that produces new generations.

Through selective breeding (using individuals with desired characteristics and culling, or otherwise removing from the breeding population, those individuals with undesired or insufficient traits) human's have been able to produce crops and livestock with a characteristics that have been enhanced. That that can be done need not be extended to arguing a 'designing' role for Nature. An adapted form and function is the product of culling by the environment of forms and functions that are unsuited for survival and reproduction in that environment, without prior intent.

The evolution of consciousness

With regard to evolution. Characteristics can occur, due to mutation or epigenetic change, which are either beneficial, are no advantage or disadvantage or are detrimental. Advantageous ones are more likely to aid replication of the genes and gene expression of the organism, that produced that characteristic, disadvantageous ones less likely to be replicated and no advantage or disadvantage will endure or be lost by "chance" events, or because of other advantageous or disadvantageous characteristics also possessed by the organism.

Evidence for the possibility of producing different outcomes is the conscious ability to come to decisions. Energy balance is a matter of life and death (and reproductive success) for an organism -so wasting energy (for no advantage in finding resources, escaping harm, and obtaining reproductive success) is a distinct disadvantage. For that awareness and decision making ability to evolve it should have a survival advantage, otherwise there would be no cost benefit. Brains use a lot of energy especially large ones. Use of resources on providing energy for a brain with the ability to consciously think is not advantageous but detrimental if there is no survival /reproductive success benefit to the expenditure of that energy in that way. [From the perspective of continuance of the organisms genes within the gene pool]. Consciously thinking organisms would be at a significant energy cost disadvantage if it did not have any benefit.

If there was no benefit to a consciously thinking brain but waste of resources on it, it would not be expected to persist and evolve into brains with even greater reasoning and decision making ability over time. In that case, all actions could be automatic as in simple life forms, life support functions, reflexes and much of our motor activity, saving energy. A fully automated 'zombie' version of a human would function as well in terms of survival and reproductive success if conscious awareness and decision making, on the basis of that awareness, was no advantage.

Causal order of consciousness's effect on external reality

Consciousness does not give us power over causality such that a thought can change or actualize what the external reality *had to have been* prior to the thought in order to match it. When the flow of information from external source to internal model and not from internal model to external reality is mentioned, it does not exclude scenarios such as an architect conceiving a design and drafting plans that builders then construct; or a sculptor imagining a work and then fashioning a material to resemble his imagining. The difference is interaction with the external material reality necessary to actualize plans. There has to be motor activity to transform the arrangement of physical, material reality. There is a temporal order, such that the external outcome of the thought is at a later -Now, not a concurrent or preceding -Now. We don't have power over reality but can work with it.

Freewill, Fate and determinism

For there to be even the possibility of semi-free will the material future must be open I.e. unwritten. That is possible if the theoretical space-time continuum is related to the information content of uni-temporal Object reality and products of its processing rather than material reality. That is to say if the space time continuum is not the physical material universe but a 'justified misinformed belief'. The uni-temporal Object universe has an open/ unwritten future. Even so, what has already happened can not be made to have not happened, so there may be *inevitable* consequences not yet known (fate). That is not the same as a future that is already pre-made but not yet encountered such as in a block time model. With the uni-temporal model some things are inevitable and some things are not.

Evidence for the possibility of producing different outcomes is the conscious ability to come to decisions. Consciously thinking organisms would be at a

significant energy cost disadvantage if it did not have any benefit. In that case, all actions should be automatic as in simple life forms, life support functions, reflexes and much of our motor activity, saving energy. We have to work within the constraints and possibilities. Technology though alters what those constraints and possibilities are. It is evident that people have altered materials and states of matter and combined and constructed, to do things previously impossible. We can work with material reality in new ways, to the benefit or detriment of natural systems.

There is required brain anatomy and function for will rather than just response. Will or desire to act in a certain way requires a functional nervous system, neurotransmitters and receptors. In particular dopamine and dopamine receptors. Without sufficient dopamine, or necessary nerve pathway or motor anatomy the will can not be personally translated into action to achieve the desired outcome. Will is therefore facilitated by or impeded by anatomy and biochemistry. There are many ways in which achievement of a goal can be frustrated. We do not act in isolation but within an interconnected World. There are environmental factors, social factors, economic factors, personal factors that can affect the outcome. Outcomes are not the product of our will alone.

With respect to climate change a question hangs over whether irreversible changes have been set in motion, making devastating consequences inevitable or whether we still have the ability to 'steer the future' to a less catastrophic outcome. What has already happened can not be made not to have happened in a uni-temporal material universe. There can be no time travel, time reversal or retro-causality (re-writting the physics of what has occurred). Therefore we have to deal with the consequences, which might be called fate. However as the future is unwritten it open to different possibilities that can occur despite, or emerge from, the consequences.

Causality, storytelling and world view

Causal stories tend to be linear sequences of events in time from one narrator or 3rd person perspective. Certain actions are considered as entirely causal and no account is made of the large-scale pattern of multiple influences on outcomes. Someone might attribute their success to their personal characteristics yet it is the economic conditions, not under their control, that helped their investments. Those economic conditions may have been to do with government policy decisions, which may have been to do with drop in agricultural production, which was to do with the weather conditions. Daniel Kahnman's theory (Kahnman, D. 2011)⁶ explaining overconfidence is that the mind comes to conclusions, and makes decisions dealing primarily with Known Knowns, phenomena already within conscious awareness. Known Unknowns, phenomena known to be of relevance but on which there is no available information are rarely considered. The possibility of Unknown Unknowns, unknown phenomena of unknown relevance do not even come to mind. Otherwise known as 'What you see is all there is bias' (WYSIATI). Also, the conscious mind also only processes a limited sub set of information that has been received by the sensory system and central nervous system. Dealing only with known knowns, a small set of possibly unrepresentative information, a situation may seem far less complex and controllable than it is; Leading to erroneous conclusions.

It might be tempting to see the simple chain of events imagined as fulfillment of a purpose, "that was meant to happen for this reason...". Rather than thinking of the complex of known knowns and known unknowns and unknown unknowns of variable influence that combined to produce the configurations of matter and interactions that happened when they did. The idea that if we had perfect *local* information we could make predictions with certainty fails when it is seen that it is large scale emergent complexity too that influences local events. A person considering only what comes to mind from their local interaction with the world may wrongly consider their actions the cause of the outcomes. For example a decision made many miles away, to send containers of discarded clothing across

the world, for sale at a fraction of the price of locally made fabrics at the destination, could lead to a local textile manufacturer, of great skill, experience creativity and diligence being driven to poverty.

Different world views, different cultures or even just differently experienced individuals, can see the same events in different ways, as having different causes forming a different linear sequence to the same outcome. Things can happen contrary to goals and expectations because we live in a world of complexity. Variables in Object reality consist of multiple relations of an object to other reference objects rather than being singular, as regarded by an individual. There are too many co-existent known, unconsidered and unknown variables and parameters to fully understand the absolute causation and make infallible predictions. This together with an open future may be how complete determinism fails, as a model of causality. A complex of relational influences on each variable can be imagined. Including influences over different scales, and levels of complexity; acting bottom up and top down. So causality isn't as easy as a simple singular viewpoint step by step cause and effect chain of events.

Unable to comprehend that we do not control the universe and things can happen to frustrate our goals or devastate us, there can be a tendency for human beings to think of the universe or higher power or destiny as being judgmentally involved. It may be thought of by the individual as justified judgment, punishment, wrath, karma as if the outcome was still causally connected to the individual in some way. "What did I do to deserve this?" The successful may attribute their success to their own endeavors and superior abilities (and convince others that that is so), as has been demonstrated by huge salaries and bonuses of successful/ lucky financial market traders, for example. The unfortunate, ignoring external factors such as competition and other dis-advantageous conditions, man made and natural, that have contributed to their misfortune, may blame themselves for their state.

A distorted sense of personal influence (positive or negative) on causality in the world, can be considered different aspects of the same characteristic of human beings. It might be called Self-importance bias. Some biases that can influence how we think of causality are; What you see is all there is bias, Survivor bias, Hindsight bias, Confirmation bias, Focusing effect, Framing effect, Selective perception, Self-importance bias and Anthropomorphism.

The laws of nature

Quote: "How can philosophy advance beyond the current disputes about laws of nature? Five issues are especially interesting and important ones. The first concerns the need for further work on whether laws govern the universe and how that affects our understanding of lawhood. The second concerns whether lawhood is a part of the content of scientific theories. This is a question often asked about causation, but less frequently addressed about lawhood. Roberts offers an analogy in support of the thought that it is not: It is a postulate of Euclidean geometry that two points determine a line. But it is not part of the content of Euclidean geometry that this proposition is a postulate. Euclidean geometry is not a theory about postulates; it is a theory about points, lines, and planes ...

Roberts draws the conclusion that lawhood is not part of scientific theories and goes on to describe what he thinks the role of lawhood in science is. (Carroll, J. W., 2016)⁷ There is much philosophical debate about laws of Nature and rather than delve further into the arguments a question can be asked Is it possible for a system to work without imposed rules and laws? Yes, with everything just doing what it does because that is its nature and the outcome of relations with other things doing what they do -but seeing it all work controlling laws (existing in addition, somehow/somewhere) might be supposed. More complex systems can do things simpler systems can't but what they do doesn't require extra laws of physics.

It isn't necessary to suppose that the universe is being controlled by laws, somehow separate from what it is and is doing? No

Rather we can characterize the observed consistency of some aspects of physics, chemistry or biology with rules and laws that express that. Rules are developed from observation of nature and over time some, having stood the test of time, are elevated to the status of Laws. The law is not the reason why something is as it is but the law is stating this is how it is (according to our observation and characterization; which may be simplification or approximation, a 'distillation' from 'noisier' nature.) Some laws apply to particular explanatory systems within physics and not all areas of physics.

Everything that happens does not have to be given a rule or a law. Perhaps a good analogy is the difference between a 20 page school rule book or one rule "be considerate of others and your environment". The latter, (much easier to remember than a rule for everything), works as well if not better because of its holistic relevance and simplicity.

Facetious Illustrations: you observe a community fish tank. Species A swims at the top of the tank eating from the water surface, species B hides in the water weeds and eats the food trapped in there, species c swims at the bottom eating the food from on and in the gravel. You decide to set up a community tank of your own but the pet shop has kept all its fish in single species tanks. So you get them home and say to your fish "now listen up, these are the rules, follow the rules and you will all get along". The mistake here is thinking that the fish need to be given the rules or know the rules, in order to behave naturally.

Now for the molecules, "molecule A, I have seen that your kind will bind with B molecules but not C molecules. So that is the rule -don't tell me about topological incompatibilities, the rule is the rule." Here it is showing the putting of the rule first, rather than the observed behaviour (that lead to the rule being identified.) That behaviour being a necessary outcome of what the particles are and how they are able to interact.

"Now sub atomic particles, I know you are tiny. That makes it hard to find some nice rules to deal with your misbehavior. Meanwhile, that's no excuse for carrying

on in weird and spooky ways.” This is wrong because it is assuming there is some necessary rule to *control* what the particles are doing.

The relationships of everything allow the Object universe to function and become, rather than just exist. The relationships are integral to the arrangement of the constituents, being the variables and parameters that produce force for change or the potential for change.

Physical possibilities and constraints control pattern generation. The generation of patterns can lead to complexity and organization. Mathematical rules, expressions of what happens to quantities, can be used to describe observed patterns and changes. Abstract representation or verbal description of the rules and controls are not required for their expression in Nature. The rules do not themselves control nature. The rules are descriptions of observed patterns, the rules are not necessary in addition to the components of the object universe doing what they do due to their own nature and relations with and interactions with other components doing what they do. It can function with autonomy, unsupervised.

Philosophical / Theological matters.

The theoretical fully existing space-time continuum, thought of as THE universe, is merciless. A universe in which created cruelty and atrocity, pain and suffering persists rather than ceases to be. When no longer seen or experienced by an observer it still is within the continuum unchanged. The Many Worlds Multi-verse, where everything that can happen does, is a terrifying fantasy when worse case scenarios are imagined. Worse than a singular, cruel and merciless, fully determined universe. The Object universe in which there is no material past enduring as the former configurations of the universe are subsumed and recycled into the Now existing is comparatively merciful. The former events, series of relations between configurations of matter, actually no longer exists *anywhere/when*, still happening. Neural connections in the brain storing memories, epigenetic changes, biochemical changes, developed in response to events, and

physical damage and records, such as reports, may remain; but memories, lasting effects and other kinds of record are not the represented or recorded material event. Even these will be eliminated with continuance of foundational passage of time; As individuals die, civilizations fall...and so on

The fully existing space-time continuum, thought of as THE universe, is a completely deterministic model. Complete determinism does not fit well with evolution of the ability to think and make decisions and choices, functional morality, altruism and selection through competition. All responses made and outcomes were inevitable. Therefore fully automatic, despite the strong feeling that this is not so. As the outcomes of the 'chosen' supposed choice is already within the continuum prior to the 'choice' being made.

The Object universe in comparison provides the conditions in which there is competitive selection (rather than all things pre existent in the space-time continuum) and the evolution of consciousness, choice, functional morality and altruism can occur.

Logic and truth values

There is a problem with applying the truth values [true or false] to relative perspectives. Different relations can produce contradictory statements that are both true from their own perspective but false from another perspective.

Examples

Analogy: A two sided jig saw (sandwiched between glass and each side seen by a different observer); There is a boat. A yes = true, B no = true. There is a cat. A no = true, B yes = true. There is a cat and a boat. {A, B} yes = true. |

The globe is spinning clockwise A yes = True, B no = true. The globe is spinning both clockwise and anti-clock wise {A, B} yes = True. |

From either side of a horizontal waveform: The wave is at the peak of its oscillation. A yes = true, B no (its at its trough) = true. The waveform is at both peak and trough {A, B} yes = true. |

The aggregation of the relative perspectives can give a truth outcome for what seems an illogical statement. This is because we are used to thinking about characteristics/properties as belonging to the objects and phenomena observed/measured and not to the relations between the object and a reference (relative to this) viewpoint. The individual viewpoint that gives a true truth value is not regarded as partial but true. However despite seeming contradictory and raising suspicion of being counterfactual that is what the amalgamation of different perspectives is, and that is a more complete truth than the partial analysis. Its only odd though because it is a different way of thinking about properties and variables.

The material Object universe, by the above reasoning, requires another kind of logic- the logic of aggregate (amalgamated but not added) viewpoints. It can be seen with that logic that even opposite, seemingly contradictory truth statements can be aggregated into a larger truth. For full truth there needs to be not one impartial objective view but all relational (relative perspective) views. Basing evaluation of truth on the 'reliable cognitive process' comes to difficulties when the cognitive process itself is selective with the truth, I.e. only limited signals and results are obtained, that can be further reducing in their processing. It also combines evidence together that did not co-exist in the Source reality and the 'evidence' can be 'tampered with', subject to distortions, interference and absorption. From this reasoning, the unknowable Object universe is the full truth as it is all existent things and all relations between them, not partial. It's history, that no longer exists but is imaginable, the sequence of former configurations were the full truth of all things in their time, unlike partial historical accounts and records that are limited viewpoints.

With the space-time continuum universe, 'The Creator' is redundant, since the job is done once and for all at the theorized 'big bang' and subsequent 'inflation'. The Object universe **is** the actively participating omnipotent, omnipresent creator, preserver and destroyer of all structures and patterns.

It is more akin to Heraclitus' river than Plato's perfect realm. It is the patterns and all of the processes that are occurring, including the continual generation of Potential sensory data. The continual change of the configuration of the Object universe can be likened to the flow of the Tao. The framework of a continuously changing uni-temporal Object universe brings physics closer to a number of theological ideas and overcomes many problems. The Object universe is the full (source) truth, electromagnetic radiation and the material universe itself; truth, light and world.

On the simulation hypothesis

Some theorists, such as Nick Bostram conclude that we must be living within a simulation.⁸ Possibly constructed by a higher intelligence. N. Bostram's simulation argument is that a technologically 'mature' post human civilization might be able to simulate ancestral life with such computing power it is indistinguishable, for the simulated, from reality. (This is not unthinkable as 'our own' virtual reality constructions are becoming more and more realistic or 'life like' with each passing year and AI becoming feasible.) Even if only a few simulations were run there would be the potential for far more simulated ancestors than 'real' ancestors. Making the likelihood of being within a simulation almost certain.

Sometimes we are interacting with the material world external to our bodies. We are also being influenced in many ways by received sensory information of many kinds. E.g. EM affecting circadian rhythms, sudden loud sounds affecting hormone production, chemicals in food and air affecting appetite. We are not really "looking out". For much of our awake hours we are looking at images self generated from

received EM information and experiencing our internally generated perception, informed by prior knowledge, memory and received sensory input. So though we exist within a material universe we are also experiencing our self generated "virtual" representation of it. Also certainly human beings can have power over the perception of reality by others by control of information. It is the art of magicians and craft of propagandists. Animals that use mimicry rely on providing information that will mislead a predator. Animals that use camouflage do so avoiding detection. It is evident from neuroscience and what is known about how the senses function, that perception is not 'ground floor' reality. It is generated representations and understanding that are different from the input to the sense organs.

However, it can not be known with certainty that the inputs to form that perception are themselves originating from the ground floor reality. Although Potential sensory information in the environment is a part of Object reality it can also be thought of as 'once removed' from the 'ground floor' foundational 'Terrain'. Vision occurs by the processing of information obtained by transmission of electromagnetic radiation from source object to recipient photosensitive organs or device.

A photon is electromagnetic energy. The energy is transmitted as a wave. When a photon encounters a photo-receptor the measurable that is related to the amount of energy of the single photon [The one which is called frequency] causes an alteration to the photo-receptor, if the energy falls within the spectrum of energies, 'frequencies' as we say, to which it is sensitive. Different kinds of receptor and different kinds of retina and image sensor arrays have different spectra of 'frequency' sensitivity. So it is the energy of the photon, what the photon is, which is the information but there is a characteristic of the energy that allows firstly detection or not (which informs) and secondly possible discrimination within the detectable range of the retina or sensor array.

About measurement from which representations can be made; 1. Some measurable properties are relative attributes rather than intrinsic qualities, unknowable until the 'viewpoint' /relative to what, is imposed. 2. Measurement altering the reality so that the measurement product is not the same as the unmeasured. 3. The impossibility of simultaneously having a fixed variable and the same variable changing. These are about knowledge and descriptions, points of view, definition of observations, effects of interaction with the observed. They are not about the nature of unobserved external reality.

Sometimes the inputs to perception are not coming from the 'reality' the perceptions portray, such as when gaming or watching visual media. But is it more or less likely that the sensory inputs we receive are emitted from ground floor reality the majority of the time? It could only seem that they are because of the excellence of the simulation. However is it necessary to assume that it isn't? Is there evidence incompatible with it being foundational in origin? This is a question some physicists are investigating. What does seem likely is that there is a 'ground floor' otherwise there is unlikely infinite regress.

Takeaway

Complexity, emergence, development, evolution and the evolution of consciousness are all explicable as effects of natural sequential change, being about the formation of temporary states of order between much simpler states of being, temporally 'on either side'.

The space time continuum as THE universe is incompatible with free will, functional morality, selection through competition and altruism. It is a model that when considered philosophically is unmerciful and unforgiving.

The Object universe is a term for all existent things and relations between them. Its change in configuration is uni-temporal foundational passage of time. It is self sufficient and self organizing. As it is all existent things, and relations between them, everywhere, the Object universe is also omnipotent, omnipresent creator, maintainer and destroyer of all things. It is comparatively merciful, as material

events do not themselves persist within it. It contains/is complete truth as all relative relations are within it, rather than just partial perspectives. It is compatible with functional morality, altruism and competition, evolution, complexity, emergence, development and evolution of consciousness. There is the potential for free will because the future is open/ un-written.

The complexity of influences on variables in Object reality, multiple 'perspectives', scales and levels of complexity, may undermine the idea of simple step by step determinism as found in causal stories. An open future is necessary for free will. In a uni-temporal material universe there is still fate (inevitable consequences of former events) but this is different from the material future already being in existence but not yet experienced. Even in the environment, potential sensory information, not yet received, may be considered as potentially being pre-written future experience, as it has the potential to be decoded into the seen present of an observer. This also is different from the material future already being in existence.

Conscious awareness is not 'ground floor' reality but a generated representation. The information from which it is generated is obtained from sensory input. So it can be argued that we are always experiencing a simulation. Beyond that analysis there is the question of whether it could be that experienced reality is of an artificial simulation, rather than representation of external material reality. Evidence is required to show that that is necessary as an explanation, rather than just possible.

The framework of a continually changing uni-temporal Object universe brings together physics at macroscopic and quantum scales, brings physics closer to theological ideas and overcomes many physics and philosophy problems. With wider, considerate communication, rather than being esoteric and insignificant, perhaps the model has further unifying, and liberating potential for human kind.

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