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## Reflections on the Reflexive Universe

By Seth Miller

## Introduction

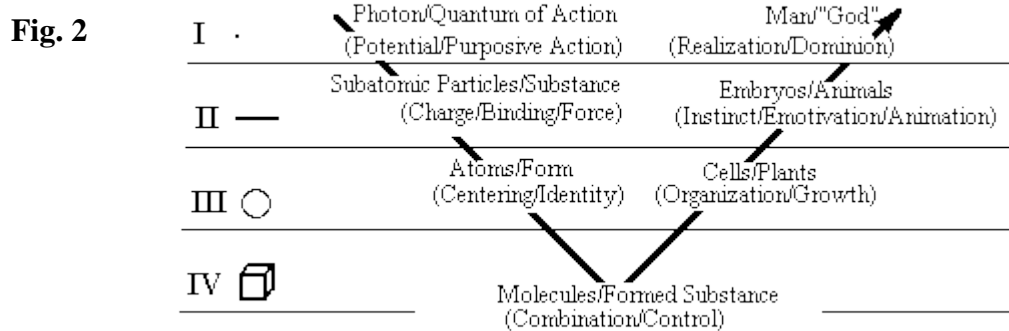
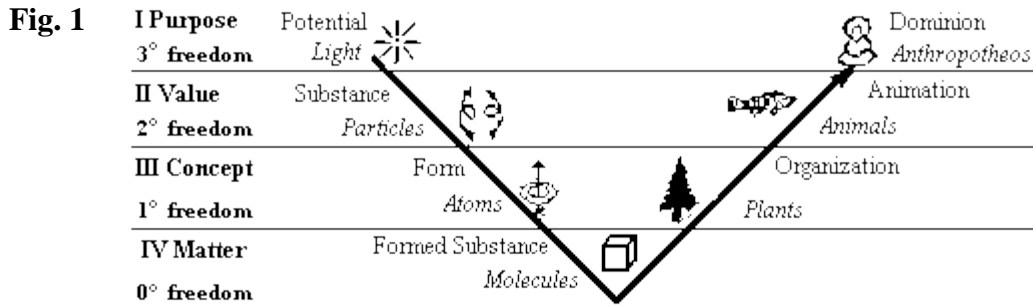
Arthur Young, in his book *The Reflexive Universe*, aims to “develop a theory of the evolution of the ‘universe’, and by universe we are referring principally to the one of which man is a part.” (Young, 1976, p. xv). In doing so, he endeavors for an inclusiveness that spans the entire gamut of human experience and knowledge. Particularly, Young seems interested in finding an explanatory model that brings together insights from both the contemporary scientific tradition as well as the myriad profound wisdom traditions of the world<sup>1</sup>. What Young primarily inherits from these traditions (including the scientific tradition, which he sees as entirely congruent with the wisdom traditions (Young, 1976, p.xvi)) is the idea that the universe is *purposely evolving through a fractally-structured hierarchical process*. The method that Young takes in this work is one of correspondences – he shows how the data available to a modern person familiar with some mild details of scientific knowledge correspond to the different stages of his cosmological evolutionary process model.

Young was, in a sense, primarily an engineer, who after 19 years of work, invented the Bell helicopter, partly in order to better understand the physical aspects of the world through testable problems (Young, 1976, p.xviii). It is with an engineer’s mind that Young tackles evolutionary cosmology, and *The Reflexive Universe* reveals this tendency throughout. Each concept or fact is examined and evaluated with respect to its potential placement within the reflexive model. These facts and concepts seem to be primarily viewed from the outside as pieces of a magnificent puzzle, to be properly oriented and joined with its neighbors to complete a unitary picture. The resulting evolutionary landscape that Young paints offers much to be considered. In this paper I will endeavor to illuminate what I believe to be the most promising

aspects of this landscape, along with some suggestions for areas in which Young’s model needs further development or revision.

**The Reflexive Arc**

As mentioned above, the essence of Young’s model is one that views the universe as *purposely evolving through a fractally-structured hierarchical process*. Here, a few diagrams<sup>2</sup> of Young’s *reflexive arc* will provide us with the basic foundation of his model:



The first thing to notice about Young’s model is that it is an evolutionary model (notice that the dark line – the arc – has an arrow, a direction). This model proceeds through four ‘levels’ in a descent/ascent, a process of involution (levels I through IV) whereupon a turn occurs

(in level IV), with further evolution back up through the levels (from level IV to I). This gives a total of seven different ‘stages’ of reality. The involution proceeds from pure potential, down, into, and through matter, then back up to pure potential, which now has a different kind of character by virtue of having gone through the evolutionary process. The pure potential of the first stage purposefully gives up some of its freedom in order to evolve through a descent or involution into the second stage, thereby constraining itself by one dimension for every stage it passes through until the fourth. But this sacrifice of freedom results in the gaining of a ‘power’ at each stage as well. Then at stage four the ‘densest’ part of the arc is reached, that of the molecular kingdom (before any life has evolved), at which point a turn takes place, and the molecular universe beings to self-organize in a way that leads it now upward on the path, transforming the constricting sacrifice of the previous stages into a new-found freedoms.

**Arthur Young's Reflexive Arc**

**The Seven Stages**

	<b>Kingdom</b>	<b>Keyword</b>	<b>Power</b>	<b>Degree Freedom</b>	<b>Degree Constraint</b>	<b>Degree Symmetry</b>	<b>Dimensions</b>	<b>Will</b>
1	Light	Purpose	Potential	3	0	0	0 - point	Involuntary
2	Nuclear Particles	Binding	Substance	2	1	1	1 - line (time)	Involuntary
3	Atomic	Identity	Form	1	2	2	2 - plane (space)	Involuntary
4	Molecular	Combination	Formation	0	3	3	3 - cube	The Turn
5	Vegetable	Growth	Organization	1	2	2		Voluntary
6	Animal	Mobility	Animation	2	1	1		Voluntary
7	Dominion	Knowledge	Dominion	3	0	0		Voluntary

Young has pointed out how, within each of the seven stages, a fractal self-similarity to the whole is embedded, so that each stage has seven sub-stages which follow the same sevenfold process of descent (3 stages), turn (1 stage), and ascent (3 stages). This gives rise to  $7 \times 7 = 49$  total stages of the evolutionary arc. However, if we take the primary esoteric maxim “as above, so below; as below, so above” seriously, there is no reason to expect that this seven-fold fractal

self-similarity does not also occur at even finer divisions. This is particularly true if, as Young stresses (Young, 1976, p.xvii), his model is process-based rather than structure-based, and all the manifest elements of the universe are a result of the seven-fold process indicated. The process-based division of the universe gives the most hope for any predictive power the model may have, although it is unclear if or how the model could be made rigorous in a mathematical sense.

Nevertheless, those who take the model seriously and wish to discover the extent of its truthfulness as well as its applicability would do best to research the particular, predictable ways in which the seven-fold arc manifests in a given discipline.<sup>3</sup>

### **The Fundamental Photon**

Rather than limiting his model to external, manifest forms, like the Darwinian model of biological evolution or the Big Bang model of cosmic evolution, Young desired to include an *internal* component that co-evolves with the external. This recognition of the ‘inner’ aspect of reality is fundamental to almost all wisdom traditions, but has generally been anathema to the modern scientific paradigm. It is Young’s devotion to the reconciliation of the inner evolution of the wisdom traditions and the external evolution of science that is the source of inspiration for the most fruitful parts of his theory. Yet it is precisely here that we see something of the way in which Young is a product of his time, and maintains aspects of the modern scientific paradigm which may ultimately hinder his overall goal.

In particular, Young, in his effort to incorporate modern scientific knowledge, resorts to a view of the universe which is as reductionistic towards the inner aspect of evolution as the standard scientific view (the Big Bang, the Standard Model) is towards the external. This is seen in Young’s identification of the smallest possible unit of interiority with (in his perspective) the

smallest possible unit of exteriority in the form of what he calls the *fundamental photon*. For Young, the fundamental photon is a *quantum of action*<sup>4</sup>, and as such, has the normal “exterior” characteristics of light as recognized by modern physics (no mass, speed = c, spin = 1, etc.). But in addition to this, Young postulates an “interior” to this quantum, which he associates with the word “action”, and states that the fundamental photon is both energetic and purposeful.

This argument is supported by the idea that the quantum of action is, in contemporary physics, recognized as a probabilistic quantity, which is undetermined according to the precise relation  $energy \times time \geq \hbar$  (see endnote 3). What looks like indeterminacy to science, viewing the photon from the outside, is always experienced *from within* as a freedom. Thus, evolution begins with the fundamental photon, the indeterminate but purposeful quantum of action, which can be described as the least constrained entity of the universe. Hence the keyword for this level is “potential”.

The discovery that the quantum of action comes in *whole units* seemed to Young to fit perfectly with the idea that any action is always a whole: “We cannot have 1 ½ or 1.42 actions. We cannot decide to get up, vote, jump out the window, call a friend, speak or *do* anything one-and-a-half times. *Wholeness* is inherent in the nature of action, of decision, of purposive activity.” (Young, 1976, p. 20) But Young’s insistence that the quantum of action is the whole out of which *all* parts originate is somewhat paradoxical in light of his equal insistence that the quantum of action *is* the photon as considered by contemporary science. This is because the photon, and the quantum of action, although they come in *irreducible* ‘packets’ with specific energies, are still *packets*, they are still *units*, and are somehow identifiably different from other similar units (by virtue of their particular placement in the spacetime continuum and their particular energy signature). On the face of it, this seems to be a form of reductionism pure and

simple: the universe is made up of <insert favorite entity here: atom, subatomic particle, photon, quantum of action, spirits, actual occasions, pink bunny rabbits>, which is indivisible and therefore necessarily a *unit*, which is always also a *whole*, although not *THE* whole; i.e. the universe itself in its entirety. But if Young wishes to explain *the entire universe* in its evolution as arising from ‘the fundamental photon’, he runs into the problem that there appear to be many – actually infinitely many – photons in the universe<sup>5</sup>. If each photon *individually* is a whole, Young has to find some way of reconciling this apparent multiplicity with the proposed wholeness and unity of the universe at its primordial level of ‘THE fundamental photon’. With respect to Young’s quote above, it would be as if he is saying that all of the different manifest actions are somehow the same action, simply because action itself is viewed to be a whole. Although it is true that actions come in wholes, this just points out that individual manifest actions have the characteristic of being indivisible, and says nothing about relations between actions, nor does it indicate that there is some sort of primordial, singular ‘action’ from which all other actions originate, for example.

Now this situation may not be uniquely problematic to Young’s theory, as this paradox necessarily arises from the consideration of the nature of light from the perspective of the present situation of the universe, in which *individual* photons seem to appear (for example in the quantum leap of a *particular* electron from a higher to lower orbital) and travel in a particular direction until it interacts with any charged particle. This is an overly simplified version of what the photon *looks like to us*. But what would it look like from the perspective of the photon itself? When we include the insights of Einstein, we notice that some strange behaviors apply to photons because of relativistic considerations (i.e. that from our perspective, the speed of any and all photons is equal to  $c$ , the speed of light). In particular, according to relativity theory

(which has yet to fail *any* of its tested predictions!), from the perspective of the photon *all lengths in the direction of travel become equal to zero*, and *it takes no time whatsoever to travel an infinite length*. In other words, both time and space are essentially reduced to a point *in the direction of travel* of the photon. Thus everywhere and anywhere in the universe is equally *here* and *now* for the photon, if it simply ‘points’ itself in the proper direction.

This element of the point-like and directional or line-like aspect to light seems to echo some of Young’s explanatory attempts to work out the differing dimensional correlates to each of his four stages. Specifically, Young identifies the dimensions themselves as created (evolved) aspects of the fundamental unit of the photon/quantum of action. The photon/quantum of action is itself a dimensionless entity (geometrically abstracted in thought as a point), which, through some kind of a purposeful willing process, becomes ‘smeared out’, forming a line: this is the creation of the dimension of time through a kind of self-experiencing (or ‘memory’) of the quantum of action. Thus, the photon, considered from its own perspective, is somehow point-like (just as the *entire* universe is point-like to the photon). But, considered from the manifested higher dimensions, the photon is experienced as traveling in a line<sup>6</sup> through time. The question “where did the manifest dimensionality of the universe come from?” is a fascinating one, and it seems somewhat reasonable to examine the consequences of taking on the assumption (unlike the Cartesian/Newtonian/Kantian view) that the dimensions are not pre-existing categories in which all phenomena occur, but rather are experiential consequences of different modes of relationship of the universe to itself in the form of ‘parts’ such as photons, electrons, etc.

Interestingly, the aspects of photons which give it the strange relativistic qualities noted above are not unique to photons, but apply to any massless particle. In the current situation, at least two other important ‘force-carrier’ particles (as photons are carriers of the electromagnetic



force) are thought to exist: the gluons (force carriers of the strong nuclear force between quarks), and gravitons (force carriers of the gravitational force). Each of these particles would be considered, like photons, to be point-like, massless, constrained to speed  $c$ , and therefore to experience the same qualitative situation as the photons, the only difference being the particles with which they interact. Photons interact with any particle with electric charge, gluons interact with any particle (such as quarks and other gluons) that have ‘color’ charge, while gravitons interact with any particle that has mass (or mass ‘charge’). What does this situation mean for Young’s insistence upon the photon as the fundamental ontological unit of the universe?

One possibility is that Young is simply wrong in thinking that photons are fundamental. However, it may be interesting to take the idea of the quantum of action (as distinct from the quanta of individual photons) as a more fundamental concept, which can be combined with the present theoretical possibility for a ‘unification’ of the forces in a “grand unified theory” or GUT. Electricity and magnetism have already been shown to be separate manifestations of the electromagnetic force, which has also been shown to be only one manifestation (along with the weak nuclear force, responsible for beta decay) of the electroweak force. At each successive integration, the energy level increases dramatically, but physicists speculate that the strong nuclear force and the gravitational force, along with the electroweak force, may all be lower-level manifestations of a single ‘super-force’ existing at extremely high energies. If this super-force still comes in quanta (as we think it must), then physicists would potentially agree with the basic idea that a quanta of the super-force would be the fundamental ontological unit of all *physical* reality, in concert with Young’s basic thrust.

In any cosmology, language, as well as conceptualization, has the necessarily impossible task of indicating that which it cannot indicate, and therefore must act more like a metaphor,

pointing at something else by pointing at itself. Therefore problems are to be expected when we make any attempt to bring fundamental or ultimate aspects of the universe into the light of language. Young recognizes this quandary and expresses it this way: “Light, because it is primary, must be unqualified – impossible to describe [accurately], because it is antecedent to the contrasts necessary to description.” (Young, 1976, p. 10) However, despite this difficulty, it is still possible and useful to work imaginatively with the metaphor within the realm of conceptualization and language, with the hope of making the least egregious errors while still saying something. It is my opinion that Young’s identification of light with the quantum of action is both his most problematic fundamental assumption, while also being one of the most intriguing.

### **Consciousness**

Young does bring one very interesting insight to the field: the idea that the inescapable element of randomness encountered by the physicist when describing any subatomic process is a necessary consequence of the freedom experienced by the process. This insight is powerful because it is both general and specific: general in that it applies to *any* process that appears to us as random, and specific in that it links two concepts (choice/freedom and randomness) in a definite, although perhaps not quantitatively testable way. The claim that what looks like randomness from the ‘outside’ is always a mask or cover for what from the ‘inside’ exists as choice is based on a fundamental observation of other human beings *as well as of ourselves*. The fact that we experience ourselves to have the capacity for choice necessitates an ontology which can reasonably accommodate this aspect of the universe. We can introspectively observe our own inner life, and see there the seeds of freedom *as well as* experience our own manifest

actions. When we turn our attention to the behaviors and actions of other humans, we notice something different; we only at first connect with the *outward* manifestations of other's actions, and do not experience the inward aspect of their arising ourselves. But because we experience the inward aspect of choice along with the actual manifest actions of our own selves, we make the reasonable assumption that a similar process must occur in the others, except that now what existed as an experience of choice in our own inner life is replaced by an inner experience of *randomness*. Randomness, then is always a companion to freedom. Therefore, when a process – *any* process – is identified as random (now going the other way, from outside to inside), the suggestion by Young is that there *must* exist some form of choice *for the process itself*.

Additionally, one can approach this insight from a purely logical standpoint. Assuming that distinct processes<sup>7</sup> exist in the universe (an assumption challenged by systems theory), the existence of the quality 'choice' in a process necessitates that for other processes, the outcome of the choice be essentially random – i.e. the particular outcome of the first process cannot be internally modeled by the second process in such a way that the outcome (or future state) of the first process be arbitrarily predictable by the second process. Randomness, then, is actually a measure of the unpredictability and hence freedom of a process. Just as choice and randomness are mutually exclusive *within* a single process<sup>8</sup>, they are mutually required *between* processes. If a process *could* predict with certainty the future states of a second process other than itself, it would render it qualitatively 'choiceless', as the second process would *necessarily* follow the dictates of the elements contained within the first process.<sup>9</sup>

But all this talk about choice and freedom begs the question: who is making the choice? Who exactly is free? Here is where Young's 'engineer's-mind' becomes apparent – the existence of the logical relationship between choice and randomness *as an abstract correlation* is

enough for Young, and he doesn't speculate beyond stating that the fact that the 'monad' (the quantum of action), 'has' purposiveness. Young wishes to find in his cosmology a place for consciousness (and therefore subjectivity and choice), in which it is not merely an epiphenomenal derivative of some complex organization of matter (a brain), but has an ontologically real basis from the beginning. Young also wishes to incorporate the major findings of physics, and he tries to weave these two desires together in the form of the purposeful quantum of action, which he identifies with the 'fundamental photon'. In the case of consciousness, even inasmuch as Young explicitly indicates he wishes to include consciousness in his model, he only does so from the 'outer' perspective characterized by modern science – he reduces consciousness to the 'fundamental photon' – abstracting all of what we, as free human beings, experience qualitatively as freedom and shoves it 'into' the quantum of action. In essence, Young seems to ignore the *real, inner* aspect of consciousness in favor of an interesting but limited correspondence with an outer phenomenon identified via physics. Any cosmology that wishes to include both consciousness and matter as fundamental will need to do more than simply ascribe consciousness to a fundamental unit of matter/energy (the photon) in a de-facto sense, but must also elucidate the nature of consciousness itself in relation to matter.

To simply state that "light is pure action" (Young, 1976, p.11) on the basis that it conveys a definite amount of energy from one point to another does not seem to be a sufficient basis for calling light purposive, and thereby of necessity attributing to it the qualities associated with purposiveness such as interiority and will. As the late Carl Sagan admonishes, "extraordinary claims require extraordinary evidence," and the interesting but tenuous correspondences pointed out by Young between light and purposiveness don't quite seem to fit the bill. Even when Young speaks of the accepted physical 'principle of least action', with a supporting quote of its

teleological (and hence purposive) nature from none other than Max Planck (Young, 1976, p. 18), this is not sufficient to demonstrate the purposiveness of light itself. This is true even more so given Feynman's 'sum over histories' approach to quantum theory, which shows how the principle of least action can be simply explained by taking the view that light travels *every possible path* from point A to point B, and that its manifest path (the path of least action, or the minimized path) is simply a consequence of the sum of all of the possible paths the light *did* take (Drummond). In other words, the whole phenomenon can be accounted for without any reference to purposiveness, which requires *selection* from a set of alternatives. Rather, *all the alternatives* are taken, and a fairly straightforward method of adding all the possible paths yields the observed effect. What appears to Planck as being "teleological in character" doesn't seem to require consciousness (in order to choose from a set of alternatives), but rather can be thought of as a result of a purely mechanical and statistical process. Certainly most contemporary physicists would not agree with the idea that any subatomic process is conscious.

## Choices

We wish to formulate a cosmology that accounts for consciousness and choice not because it would help explain how 'the world out there' works, but because each individual actually has the experience of consciousness and choice *as a manifest fact of reality*. In searching for a cosmology that can meaningfully deal with this experience, we should be careful of the way in which we project this insight beyond ourselves, onto what we experience as 'objects', precisely because we are ascribing something (subjectivity) which *we do not experience outside of our own selves*. Yet when we examine this experience of our own self consciousness, we are struck with the fact that, beyond any sensory or thought activity, we can

experience our own *being* as an “I” in a fundamental way, and that this “I-AM” experience is what provides and experiences the *capacity* for choice and purposiveness. In other words, inasmuch as I experience freedom, it is because *there is a being which is free*. I cannot take away the *being* from the freedom – freedom, and its consequence choice, requires a being that is free. Young simply ascribes the capacity of choice to the ‘fundamental photon’, which we experience as an object (exteriority), but makes no explicit recognition of the beings (which *are the interiority*) required in order for this capacity of choice to exist. In essence, I think what Young is doing is pointing out a *functional* relationship between consciousness and the world understood by science: matter. Young’s cosmology addresses the question of “how”; that is, how consciousness can relate to the world as understood by modern science without sacrificing something essential to consciousness by making it a derivative element, but in doing this, Young avoids the question of “who?”, and the important insight that actual beings must lie behind (or through) the fundamental unit of the physical world – we may call them spiritual beings.

In this sense, then, Young’s contribution is interesting in that, if free spiritual beings exist and have manifestations in/as/through matter, then matter *must* exist in such a way as to allow for their free deeds – i.e. the material world *must* have an element of randomness, considered at the purely material (predictable) level. And where is the place where randomness is shown to be an inherent property of the material world? In the realm of quantum mechanics, which deals with the quantum of action as a fundamental unit! It may therefore be more reasonable to consider the idea that, rather than actually being the singular cosmological unit upon which all of reality is based, the fundamental photon is only fundamental in the sense that it serves as the rainbow bridge between the spiritual and material, but which is not itself the source of consciousness, freedom, choice, and creativity, which rather arise in *spiritual beings* whose

expressions, to the extent to which they manifest in the material world, do so through the inherently stochastic nature of quantum mechanical relations.

## Endnotes

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- <sup>1</sup> Interestingly, Young includes no official bibliography with *The Reflexive Universe*, but he states in the introduction (Young, 1976, p.xvi) that his sources include “cosmologies embodied in old myths.” He specifically mentions Genesis, Zoroastrianism, Japanese, Greek, Egyptian, and Hindu traditions. He also seems heavily influenced by the “perennial philosophy” as well.
- <sup>2</sup> These diagrams were taken from an essay by Frank Barr (see bibliography) and are almost identical to the diagrams in *The Reflexive Universe*.
- <sup>3</sup> For example, Frank Barr is currently working on a book in the realm of Young’s model as it applies to evolutionary biology. (<http://www.arthuryoung.com/barr.html>)
- <sup>4</sup> Young actually *equates* the photon with the quantum of action, so that the quantum of action is *always* a photon to Young. This is in contrast (in my understanding) to the presently accepted scientific view in which the quantum of action is another way of expressing the Heisenberg uncertainty relation between energy and time where  $energy \times time \geq \hbar$  where  $\hbar$  is Planck’s constant  $\frac{h}{2\pi}$ . Given a small enough time, the energy of any quantum system, or even a vacuum, is not well defined, and thus can have arbitrarily large values for its energy. This energy is not restricted to the electromagnetic spectrum (photons), but includes any “form” of energy allowed by the Standard Model, usually in the form of “virtual particles”, particles which are artifacts of perturbation theory and can never be observed directly. These virtual particles may be of any type: photons, gluons, quarks, etcetera. If external energy is added to the system, then the virtual particles may become real (by being separated apart) and thus become experimentally measurable. Perhaps it is because it is usually the energy added by an external (real) photon which separates the virtual particle pair that the photon can be considered “fundamental”? Or, if we consider the issue to be one of semantics, where the fundamental photon, defined as the quantum of action, is a more expansive concept than ‘photon’ as is normally considered in physics, then Young’s model essentially agrees with the contemporary scientific model in taking the quantum of action to be a fundamental ‘unit’ of reality.
- <sup>5</sup> Young recognizes this fact explicitly (Young, 1976, p. 11): “Even when a photon is partially annihilated, as in scattering of photons by electrons, what remains is not part of the old photon, but *a new photon*, of lower frequency, going in a different direction.” (italics added)
- <sup>6</sup> Technically, a geodesic curve formed according to the dictates of the warping of spacetime by nearby masses.
- <sup>7</sup> The term process is here used to include anything from pair-production in the quantum vacuum to human decisions.
- <sup>8</sup> In other words, choices cannot be experienced as random (purposeless), but require the element of selection. Whether or not the method of selection is experienced or known by the subject is a different question – in order to *be* choice, it must be selectively or creatively purposeful, and thus be (and be experienced as) directed *towards something from within* – i.e. there is *will* involved. This is the fundamental insight without which all choice could be ascribed to ignorance of deterministic facts.
- <sup>9</sup> Perhaps an example of this phenomenon would be in the correlation between ‘entangled’ and then separated pairs of subatomic entities such as photons or electrons – i.e. the spatially separated particles do not act *as separate* (with their own freedom), but rather are correlated within strict boundaries. The extent to which the two particles are correlated is a measure of their relative dependence on one another, i.e. their un-freedom, and hence predictability. Therefore, our measurement of one of the particles simultaneously (according the extent of correlation) acts as a measurement of the other particle, which means the other particle was not free with respect to this measurement. It may be more precise to say that the two particles, although spatially separated, constitute *one single process*. This gives an important clue in determining what it means to be an ‘independent’ process; the extent to which the outcome of a process is predictable by another correlates with the extent of the first process’ independence or freedom.



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