Quantum Field Theory, Particles, Thoughts, GGU-model Secrets and Final Theological Conclusions.

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23 MAY 2014

Abstract: Descriptive quantum theory is the intuitive motivation for the mathematical models employed. Due to contrary physical assumptions accepted by different science communities, it is established that descriptions for certain quantum physical entities and descriptions for their claimed behavior have not been accepted as factual descriptions. Being only indirectly verifiable, no such theory can be proved as factual based upon observed predictions. The actual intuitive foundations for the General Grand Unification Model (GGU-model) and their relation to quantum theory and all other physical science theories are revealed. The final major theological GGU-model conclusions are detailed.

1. Quantum Fields or Particles?

1.1. Descriptive Quantum Field Theory.

After many, many years of trying there has not been found any evidence for the possible existence of any secular physical-science entities that are, as far as the quantum field theorists are concerned, more fundamental then the quantum field. On the other hand, one also has the concept of the "particle" as a possible foundation.

For this article, a "physical primitive" is an assumed physical entity, where the language of a theory does not permit a description for any entities that comprise the entity. The notion of the "primitive" is used to prevent the occurrence of a "logical regress." A "logical regress" is an argument or, in this case, a definition that sequentially continues without termination. For physical science, a logical regress can occur in the following manner. One begins with the quantum field. Then defines its constituents as x-tons and gives them properties. Then one defines the constituents of x-tons as xx-tons and gives them properties, then one defines the constituents of xx-tons as xxx-tons and gives them properties. Then by induction we have for each natural number n there is the defined x^n-ton with its properties. When one accepts these x^n-tons as a physical reality, then there would be no single type of fundamental physical entity. It is not well known but a few scientists actually accept this none terminating notion as a physical reality. Such a problem is eliminated by limiting the language used to describe a physical theory.

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There exists a large list of entities that secular scientists claim are **physical material entities**. Among this list are the entities to which human or machine sensors react. These are (physical) **observable entities** or (physical) **observable behavior (actions)**. Other members of this list are termed as (physical) **unobservable entities** or (physical) **unobservable behavior (actions)**. Is the term "quantum field" a member of this list?

> The most fascinating application of these rules are, however, not to any material substance but to immaterial fields, the excitation of which appears to us as elementary particles (Henley, 1962, p. 154).

Thus, for this article, a quantum field is considered as a 3-dimensional physical primitive which does not exactly correspond to any material entity with which we can have any experience. Quantum fields cannot be exhibited to exist physically as independent entities. The machines we construct only react to defined material entities. Thus, quantum fields are invisible to any form of observation; to any form of human or machine sensory information. They are "assumed" to exist. Any evidence for their existence is indirect. Using a vast amount of mathematical machinery, their assumed fundamental properties lead to predictions as to the behavior of gross matter that is observable via human or machine sensors.

1.2. Particles.

One also needs to understand what the term "particle" signifies. A dictionary definition states: "Particle - a minute part or portion of matter, the aggregation of which parts constitutes the whole." But, then the definition for matter is "Matter - what a thing is made of." Thus, combining these two terms we have that "Particles are what a thing is made of." But, then the term "thing" needs to be further defined. On the other hand, one can be more scientific and, for the notion of the "elementary particle," simply state that *it is a physical object that is characterized by a specific set of numerical characteristics and, if necessary, additional strictly defined descriptive statements.* Except for the photon and gluon, which have no mass or charge, accepted fundamental particles differ relative to a comparison of their mass and charge. The photon and gluon differ relative to their interactions. Of course, if they exist, these elementary particles also have other behavioral properties but such additional properties are not necessary in other to differentiate one from another.

In Wikipedia (2014a), we find the statement:

> In QFT (quantum field theory) photons are not thought of as 'little billiard balls', they are considered to be field quanta - necessarily clunked ripples in a field, or 'excitations', that 'look like' particles. Fermions, like the electron, can also be described as ripples/excitations in a field. In summary, the classical, visualization of everything is 'particles and fields',

> in quantum field theory, resolves into 'everything is particles', which resolves into 'everything is fields'.

Rather than simply stating that we have endowed the field with certain properties, other phrases are employed for the descriptive bases of this theory. Note that there are descriptions that seem to imply particles may yield fields. ". . . the massive boson responsible for carrying the Higgs field" (Smolin, 2007, p. 69). Of course, one needs to have some idea as to what the term "carry" means in this context.

Writers of this Wikipedia (2014a) article state that **actions** termed as "ripples in a field" should be considered as producing the particle-like properties. Does "considered" simply mean "thought of as"? But, since everything is fields, then, for quantum fields, each of the fundamental particles is caused by a rippling field action. That is, particles do not actually exist but are just a way we have of comprehending, of imagining, this quantum field behavior.

At this very moment, within our entire universe, there is a quantum field that yields photon behavior. There is a vast number, maybe even infinitely many, non-interacting ripples that some-how-or-other behavior like particles. As the universe develops from this moment, these ripples and their particle-like behaving some-how-or-other also "appear" as if they are moving. Although they can suddenly change into other particles under certain restricted conditions and then suddenly change back to a particle-like photon, the photons do not individually interact with each other according to Feynman (1985). Different quantum fields do interact with each other. But, for this popular Wikipedia quantum field description for photons, apparently there are 3-dimensional ripples that do not interact with each other. The popularizing Wikipedia description states that what we only have "appears" to be particle behavior. So, although we cannot imagine a quantum field as composed of material stuff, we are supposed to imagine a rippling action that appears like a particle.

Obviously, the quantum field most be endowed with properties that are not particle-like or it would not differ from a particle. Whether or not there are sufficient ripples present, apparently the basic notion of a field being "located" everywhere is such a property.

1.3. Some Numerical Relations.

On the other hand, Planck's constant h has the unit "joule-second." So, if one merely multiplies this number by a "frequency" number ν that is in units "a number of something per second," than one gets $h\nu$ joules of energy. To get a measure of energy one might simply consider, for purely pictorial reasons, that "something" is "vibrating." This need not be the actual case, however, since its the units used for Planck's constant that leads to this and what we can have is merely an appropriate relation. If one divides h by a length number λ, one gets a measure for momentum. Indeed, this is one reason Feynman states that photons exist as particles since they

have momentum. But this is an endowed property. One can simply postulate that in the list of characterizations for the category termed "Particles," each particle has associated with it the property that its total energy can be calculated using h and a ν and its momentum is related to a λ. Indeed, this is exactly what de Broglie did in 1924.

Although it may not be needed, there are well known ways to alter units of measure via the notion of something simply being "directly related" to something else. The Newtonian force of gravity is directly related to the product of the mass of two bodies and inversely proportional to the square of the distance between their centers of mass. To set up the usual equation for $F \propto Mn/r^2$, the constant of proportionality G carries the appropriate units so that the units on the left hand side of $F = G(Mn/r^2)$ match those on the right hand side.

Consider an interpretation for the wave-property for the Maxwell proposed classical electromagnetic field. Visible light is deemed electromagnetic radiation. Let $\mathcal{E}$ be the "strength" of an electromagnetic field associated with a point-like source of weak monochromatic light. Let ϵ_0 be the measurable "electric permittivity." Let c be the well known speed of light. Consider a portion of a spherical surface at a fixed distance from the approximate point source of light and the surface is composed of insulated one square centimeter pieces of photoelectric metal (the anodes) that originate a process that is continued by individual photomultiplers. The general geometric pattern presented by this pattern of squares is reproduced on a flat TV monitor in such a way that small flashes appear. The monitor images appear at the rate of 30 "frames" per second and the images are recorded on a DVD for future analysis.

The basic assumption is that the very weak light is composed of some sort of individual bundles of stuff - the photons - and they individually interact with the anodes and this amplified interaction produces the flashes on the monitor. Further, the photons also are assumed to have electromagnetic properties. So, there is the $\mathcal{E}$ and as the photons pass through space the ϵ_0 and, of course, the c. This yields the intensity I, in the units of [watts = joules/sec]/m^2 = [joules/m^2]/sec, as

$$I = \epsilon_0 \mathcal{E}^2 c.$$

Let N is the number of these energy bundles striking a one square meter of this object over a period of one second. Now let ν be the known frequency property for the light. Let each of the bundles of energy have the numerical energy value of $h\nu$ joules. Now additionally consider the intensity I as being the amount of energy interacting with this portion of the object. Then the photon flux should satisfy the expression

$$I = (h\nu)N.$$

Using the first relation that is believed to hold, this yields

$$I = (h\nu)N = \epsilon_0 \mathcal{E}^2 c \text{ and}$$

$$N = (\epsilon_0 \mathcal{E}^2 c)/(h\nu).$$

Dividing by 1000 yields the predicted number that strick one square centimeter during a one second period.

Now "strange" behavior occurs when experiments are run. There are 10 one centimeter square anodes on the surface. Experiments are conducted that record the flashes over a six second period. By examining each frame of the DVD recording, a table is recorded for the number of flashes that occur each second for the entire array of ten anodes. For experiment 1, the counts are

$$170, 60, 72, 152, 95, 180.$$

This is an average of 12.15 per cm^2 over one second. A second, third, and forth experiment is conducted. These yield averages of 7.2, 10.24, 17.9. Now an experiment is conducted over an hour. Using a special computer controlled counting technique for the 3600 seconds that had passed, it is concluded that an average 12.45 flashes occur at an anode over one second of lapsed time. A second hour experiment is conducted, and this yields a value of 12.52, a third hour experiment is conducted and this yields a value of 12.5. The calculated $N = (\epsilon_0 \mathcal{E}^2 c)/(h\nu) = 12.5$. Note that for this to have meaning there must exist "beforehand," at least, one measuring device - a clock. Further, the concept of "counting" is necessary.

You do not actually get the number N. We are told that N is but the "average" number. But, averaged over what? As the monitor flashes, it seems that an observer cannot use N to rationally predict where and when a flash will occur. Hence, the observer might use the term "random" to indicted his inability to predict such behavior. But, as time increases, keep a chart of the total number of flashes that have occurred and the number that do occur at each location. Then a convergence of numbers occur that only yields an average. We are told that *the photon flux does not give precise information on the location of any one photon, but gives only the probability of finding a photon* (Weidner, 1960, p. 148).

If ϵ_0 is fixed and the intensity changes, then the number N is shown to change. Hence, one can write that ($\propto$ = proportional to)

$$N \propto \mathcal{E}^2. \text{ Or}$$

$$N \propto \text{probability of finding a photon at a particular anode, or}$$

$$\text{probability of finding a photon at a particular anode} \propto \mathcal{E}^2.$$

Hence, "the electric field is, from the point of view of the quantum nature of electromagnetic radiation, not merely a quantity which gives the electric force per unit electric charge; it is in addition that quantity, or function, whose square gives the

probability of finding a photon at any given place" (Weider, 1960, p. 149). Nothing actually needs to be "vibrating" for this statement to hold. All one needs is that there are these wave "properties" associated with a photon.

So, we have that N is proportional to the probability of finding a photon. But, what does the word "probability" signify in this context? If we know that over a one second period of time M photons were emitted from the source, then on average 12.5 interact with each individual anode. Under this exact experimental scenario, the probability for a photon to interact with an anode is 12.5/M.

As mentioned, in 1924, de Broglie postulated that original matter also had such a wave property. In particular, relative to an objects mass m and speed v, a "wave-length" λ can be associated with it just as done with a photon. The relation is $\lambda = h/mv$. The mv is the momentum. For the objects (usually total) energy $E = h\nu$, where ν is the "frequency." In 1926, Schrödinger developed his famous equation which, when solved, yields a "wave function" ψ. The ψ is directly related to the λ and ν. The amplitude of the de Broglie wave is represented by the ψ. In the simplest linear motion form, the value of ψ^2 is proportional to the infinitesimal probability of finding the (infinitesimal) object (particle) between x and $x + dx$. Of course, if one can actually think of "infinitesimal" pieces of an object, then this needs to be "integrated" to get a suitable prediction. Or, maybe this is but relative to "numerical measures" for behavior.

Thus, to obtain the above energy and momentum results no actual vibrating anything is necessary if one only considers the wave notion as an additional property. That is, that our universe is constructed in a special way so that, as it develops, physical behavior satisfies statistical models and symbolic expressions as mathematically presented. No physical entity needs to be actually rippling. This immediately removes the need for the quantum field as a real entity and turns it into an analogue model. But, then this leaves various invisible "particles" that yield our visible universe. The notion of quantum fields would be but a convenient fiction. The mathematics to which this notion corresponds is a mere "machine" used to predict behavior and nothing more. Note that the hypothesis that quantum fields exist and only display particle-like properties or the hypothesis that only particles exist and they display probabilistic properties determined by a wave notion, if combined, yield a logical contradiction.

`What one might need to accepted is that actual physical behavior does not directly correspond to such humanly imagined or described behavior.`

The linguistic forms of expression are simply the only way we can predict observable behavior and we cannot otherwise comprehend how this behavior exactly comes about. *This does not preclude the possibility that there are some exact but general ways to imagine certain processes and these imaginations do reasonably correspond to actual events that do lead to better mental comprehension.*

1.4. Feynman's Descriptive Particle Approach.

As to the particle concept, relative to the classical electromagnetic field properties developed by Maxwell and used to predict observed behavior, Feynman, for his general-audience lectures, claims that particle language correctly describes, via quantum electrodynamics, photon behavior and how photons interact with other particles. At the beginning of his lectures, he apparently assumes his audience has a basic idea as to the meaning of the term "particle."

> . . . photons - particles of light - . . . (Feynman, 1985, p. 9). [W]e know that light is made of particles (p. 14). I want to emphasize that light comes in the form of particles. (But then he states:) It is important to know that light behaves like particles, especially for those of you who have gone to school, where you were probably told something about light behaving like waves. I'm telling you the way it *does* behave - like particles (p. 15). (But, why does he use the phrase "like particles" in this statement?)

He states during Lecture 2 (p. 37):

> Quantum electrodynamics "resolves" this wave-particle duality by saying that light is made up of particles (as Newton originally thought) but the price of this great advancement of science is a retreat by physics to the position of being able to calculate only the *probability* that a photon will hit a detector, without offering a good model of how it actually happens. (So, again they are particles and not just "like particles.")

The "how" idea is relative to a mechanism that yields this probabilistic behavior from a more fundamental point of view. One of the first to suggest such a mechanism, which, of course, was not accepted, was Bohm (1957). (Then there is the Herrmann (2001) "how" approach.) As far as Feynman is concerned, the status of Quantum Electrodymanics (QED) as physical fact is confirmed. (I note that he did win a Noble Prize for his contributions to this "theory.")

> The theory of quantum electrodynamics has now lasted for more than fifty years, and has been tested more and more accurately over a wider and wider range of conditions. At the present time, I can proudly say that there is *no significant difference* between experiment and theory! (p. 7)

Bring an editor for Wikipedia, if I were to add the probability interpretation to the Quantum Fields article as the "correct" interpretation and reject the field notion, I am sure, it would be immediately removed by those who seem to have nothing better to do than to monitor material that in any way might appear counter to the writer's intentions. Indeed, the Wikipedia article explicitly states that there is no particle for Feynman's major QED treatment. Feynman states that electrons are "matter"

(Feynman, 1985, p. 4). He states that "Electrons were discovered in 1895 as particles: you could count them; you could put one of them on an oil drop and measure its electric charge. It gradually became apparent that the motion of these particles account for electricity in wires" (Feynman, 1985. p. 84). By-the-way, Feynman is very direct as to the basic meanings for these statements.

After all of this, Feynman finely states what he means by the term "particles." This he does, not just relative to photons, but for all other elementary particles, where the electron is his major example.

> It is rather interesting to note that electrons looked like particles at first, and then their wavish character was later discovered. On the other hand, apart from Newton making a mistake and thinking that light was "corpuscular," light looked like waves at first, and its characteristics as a particle were discovered later. In fact both objects behavior somewhat like waves, and somewhat like particles. In order to save ourselves from inventing a new word such as "wavicles," we have chosen to call these objects "particles," . . . . it appears that *all* the "particles" in Nature - quarks, gluons, neutrinos, and so forth . . . - behave in this quantum mechanical way (Feynman, 1985. p. 85).

The Wikipedia article also states that the term "particle" is a *generic term for any discrete quantum mechanical entity, such an electron or photon, which can behave like classical particles or classical waves under different experimental conditions. . . .*

Thus, we have a list of **behavioral properties** and they are what govern these fundamental objects rather than some imagery that is but a partial analogue model for what we cannot otherwise comprehend. These particles do **not** behave like little rubber balls or anything that we directly observe. They can rather suddenly completely change their form. How does Feynman describe such behavior for certain interactions?

Once again certain **actions** take place. A photon is "absorbed" by an electron or an electron performs the action of "emitting" a photon. Then a photon is emitted and "it makes a positron-electron pair" (Feynman, (1985, p. 116)) (and disappears it seems). This is the action. Then "the electron and positron annihilate, creating a new photon that is ultimately absorbed by the electron" (Feynman (1985, p. 117). During his lectures he never mentions any additional mechanism that allows for such actions. (The GGU-model and propertons supply a "mechanism.") There does exist in the literature partial descriptions that add some additional features to the absorbing and emitting notions. (These are other imagined descriptions such as a point electron with maybe infinite change being surrounded by a cloud of photons.) However, what is the actual practice?

> As previously demonstrated, properties correspond to mathematical statements. These statements, via an interpretation, predict other behav-

> ioral properties that lead to actual human or machine sensory observations that verify the mathematics. One need not assume that they verify anything else but the mentally produced predictions obtained from a set of formal rules applied to a special language.

Feynman does appear to accept the basic particle concept as primary with additional behavior, where the wave properties yield the probabilistic behavior. However, the probabilistic behavior only appears, not for a single particle, but for a collection of particles. Some consider this an emerging property. Apparently, Feynman is convinced that he knows how Nature works, how it acts.

> [W]hile I am describing to you how Nature works, you won't understand why Nature works that way. But, you see nobody understands that (Feynman, 1985, p. 99). (The last sentence of this quotation is not factual (Herrmann (2001)).)

Feynman's approach is relative to his famous Feynman diagrams. These are line-type diagrams in terms of two coordinates, one for "time" and the second for "space." The wavy lines represents photon motions and the solid lines particle movements. He states three basic rules.

> So now, I present you the three basic actions, from which all the phenomena of light and electrons arise.
>
> -Action # 1: A photon goes from place to place.
>
> -Action # 2: An electron goes from place to place.
>
> -Action # 3: An electron emits or absorbs a photon (Feynman, 1985, p.85)

Obviously, there is no doubt being expressed by Feynman. These "actions" and the corresponding diagrams express "how" Nature does it. Of course, I doubt that even Feynman accepts that Nature actually has "some place in the universe" an actual collection of diagrams She uses to accomplish Her goals. (Feynman uses female pronouns for Nature and expresses them in capitalized form.) I suppose that his diagrams should be considered as analogue models for what we cannot otherwise comprehend. The diagram notion of "backwards in time" is most likely a modeling artifact produced by attemtping to present a two-dimensional analogue for four-dimensional behavior.

The actual mathematics used to predict such particle behavior uses the language of quantum fields. This, of course, need not be the case if one wishes to alter the terms employed and as stated in Wikipedia (2014b):

> We do not know how these things happen, but the theory tells us the probabilities of these things happing . . . . QED is based upon the assumption that complex interactions of many electrons and photons can be represented by fitting together a suitable collection of these building blocks and then using the probability quantities to calculate the probability of any such complex interaction.

Indeed, is there a good standard mathematical approach to QED? According to Feynman, in 1985, the answer is no. In particular, this has to do with such notions as "renormalization" the concept for which he won his Noble Prize. But, he states:

> It's surprising that the theory still hasn't been proved self-consistent one way or the other by now; I suspect that renormalization is not mathematically legitimate. What is certain is that we do not have a good (standard) mathematical way to describe the theory of quantum electrodynamics: . . . . (Feynman, 1985, p. 128).

Further, we have: "From a modern perspective, we say that QED is not well defined as a QFT to arbitrary high energy" (Wikipedia, (2014b)). Such possibilities were also expressed by Patton and Wheeler in 1974.

> It is difficult to avoid the impression that every law of physics is "mutable" under conditions sufficiently extreme . . . . (Patton and Wheeler, (1974, pp. 568-569)).

These statements do not affect properton formation. They only affect our ability to predict behavior. Propertons are not cosmology dependent and, hence, if we have the consistent collection of correct physical laws and theories, then these are used to predict specific behavior.

Is it possible that what Feynman states is not true, that She does not actually work the way he is describing? That is, that, at the least, certain particles are not the actual fundamental objects. Since Feynman died prior to the formation of Wikipedia, I have no way of truly knowing whether Feynman would actually accept the following Wikipedia (2014a) statement.

> Thus the question "Why are all electrons identical?" arises from mistakenly regarding individual electrons as fundamental objects, when in fact it is only the electron field that is fundamental.

In properton theory, they simply have the same physical properties, but they can have distinct non-physical substratum identifiers.

1.5. Molasses, Energy and Thoughts.

The now rather famous unobservable Higgs particle, that actually may not have been detected, and that carries the Higgs field (or conversely) appears necessary in the Standard (Quantum Theory = QT) Model for Particle Physics (SMPP) so as to "give" mass to the assumed original entities needed for the standard "Big Bang" Theory. (Of course, the standard Big Bang theory may not be correct.) One way this "mass sharing notion" has been described is that the field is "like" molasses. The original particles (the quantum field ripples) interact with the Higgs field and "pick up" mass. To "pick up" must be the action that yields mass for this description. It "sticks to" an original particle or its field, I suppose. But, mass is a property. So, what has actually

occurred is that an additional property is being adjoined, but no "mass things" have been attached, no "mass things" have been "picked up."

There are various forms of "energy" within physical science. In Wikipedia, it is defined, in general, as a **property** of objects. You also have that it is "the ability to do work." In QT, one has an "energy operator" within the mathematical theory used. A mathematical operator is a symbolic form that represents processes or **actions** that produce something. So, what does it mean when one reads a description for a photon as an "isolated bundle of energy"? Certainly one can think of a fuzzy looking bunch of stuff isolated from other fuzzy looking bunches of stuff. But, in our physical universe, no pure energy stuff has ever been explicitly found nor been convincing shown to exist indirectly.

I see no reason to discuss another highly imaginative entity the "string" since there has not been indirect verification that they exist. Indeed, probably there cannot be any such verification even if they did exist. Such a theory would actually counter the scientific method as to an acceptable theoretical construct. Recall that the GGU-model is a properly constructed and falsiable explanatory theory that "predicts" the behavior of all known physical entities. Indeed, it satisfies the entier predictive power of $\bigvee_w \mathcal{A}$, the unification of all physical laws and accepted physical theories

For the pure quantum field theorists, quantum fields, via mathematical rules, produce properties. These properties are represented by the linguistically described behavior of the "imagined fundamental particles." Particle behavior is visualized by other means as well as diagrams and other action terms (Feynman, 1985). We might comprehend our universe visually by first considering fundamental particles that, when gathered together, eventually yield the observable universe and its observable behavior. This entire chain of, often only assumed real physical behavior, is ultimately comprehended via the medium of the human mind.

That is, electro-chemical brain activity yields two aspects of human thought - mentally "hearing" a language or mentally "visualizing" images. For the language presentations, often an additional level of comprehension is necessary, a level that may not correspond to any known physical entities.

The particle concept is very useful. It is not necessary to be particularly concerned with whether some do or some do not exist in physical reality. Most definitely, quantum fields need not exist as real objects and can simply be human mental constructs used to predict behavior.

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    Humanly constructed theories and the models they
produce, whether analogue or physically real, demonstrate
remarkable human mental abilities.  They are highly
significant in that they allow us to predict future
behavior.  Under no condition, should an individual reject
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> any successful predictive model simply based upon an individual's personal philosophic stance that the model may uphold. An individual can, of course, replace such models with others that also successfully predict observation and that uphold a contrary philosophic stance.

From what is described above, there may be some problems with the rationality of combined statements. So, one needs to be careful as to what hypotheses one accepts. Even then comprehension can suffer when analogies are employed. Notice that many times various statements have been phrased as "actions" that yield physical entities or physical behavior. These are **cause and effect statements**. That is, an action is the cause or one of the causes for the described effect. Different groups of scientists emphasize or even state that their quantum physical model is actual fact while others contend that a contrary or even contradictory model is fact and, of course, their descriptive models predict the same observable results. **In summary, being only indirectly verifiable neither QFT nor QED can be demonstrated as observable fact. And neither descriptive theory has been accepted as factual for the entire quantum physical world.**

There is, at least, one radical way to eliminate any philosophic choice as to what in QT is or is not physical fact.

2. Theological Positivism.

Various contrary indirectly verifiable quantum physical models predict the same observable conclusions. The mathematics is used to predict the appearance of the fundamental particle-like objects, generally termed as "particles" and their combinations, at the least, relative to statistical behavior. That is, under certain quantum physical laws, certain behavior of the fundamental particles is predicted. Interpreted mathematics can be accepted as merely predicting the probability that an event will occur. Other mathematical calculations, via the operators concept, represent the formation of particles in spacetime. Further mathematical analysis yields behavioral characteristics as revealed via numerical information. Numerical information as related to measuring devices, allowing us to transfer the numerical quantities into observable or imagined physical behavior. For the imagined behavior, we then transfer this information into human or machine observable sensory information. Interpreted mathematical calculations relevant to observed entities and observed behavior also allow us to predict future physical events under the hypothesis of the uniformity of Nature.

Taken together, this mathematics is but a machine. It is merely used to calculate what is the only necessary physical behavior we use for our existence, the observed behavior. The intermediate aspects that employ various terms can merely refer to the mathematics itself. The notions of the quantum fields, the fundamental particles and even the unobservable combinations need not be considered at all. Indeed, no mention

needs to be made as to whether one believes that such stuff actual exists. These ideas form the bases of various types of **positivism**, where, generally, positivism is mostly rejected today by the secular scientists who would rather rely upon imagined schemes that may or may not depict reality. For the original positivists, unobserved entities and unobserved behavior is not accepted as of any scientific value. One can picture an absolute positivist as merely a computer that gives no additional meanings to the objects it uses to calculate observable human or machine sensory information.

The original positivists also reject any other means by which physical entities and physical actions come about. But, **Christian theological positivism** under no circumstances rejects other sources or agents that produce observed entities or behavior. There are degrees of Christian theological positivism as there are with positivism. Such a theological positivist need not be concerned with the reality of postulated unobserved physical entities or behavior and does not denigrate those that do accept such realities.

> I accept the GGU-model relative to the necessary concept of changing thoughts into physical reality. The GGU-model satisfies all of the corresponding Biblical statements. Further, any theory restricted to defined physical entities and behavior and that predicts observable reality that I accept must also satisfy all corresponding Biblical statements as they are strictly interpreted.

Distinct from the GGU-model form of theological positivism, there are individuals who first accept a physical theory as fact and then attempt to Biblically justify the theory by often employing altered or obscure forms of interpretation.

3. The Revealed General Grand Unification Model Secrets.

First, there is the very significant fact that each physical-system that exists and its behavior is indirect evidence for the existence of the GGU-model entities and processes. And, as mentioned, the model has the important property that it can be falsified. That is, observed data can falsify the basic requirements that observed physical behavior follows, at the least, certain forms of rational thought. Examples of this are given in Herrmann (2002, p. 73-74) and in Herrmann (2007).

When various concepts are necessary, using our imagination to comprehend completely what is claimed as invisible physical behavior can be problematic. As to strings of symbols used to communicate, consider a building with literally thousands of small rooms. Above each entrance is a string of symbols - the room's "name." Inside the room is another string of symbols that is supposed to "define" the string the appears above the entrance. Someone has just made the statement to you, "Surely you know what I mean?"

You go to the room named "to mean." You enter and read the phrase marked as number (1), "to have in mind." You then go to the room with the name "to have in

mind." You enter and read the phrase marked as number (1), "to think." So, you go to the room with the name "to think." You enter and read the phrase marked as number (1), "to form or have in the mind." You could go back and forth between the "have in mind" and "to think" rooms for the remainder of your life and you will not find out what the "to mean" signifies. This illustrates that a dictionary, in this case a College Edition of Webster's New World Dictionary, is a circular document in its actual contents when it attempts to define certain "concepts."

How do I "think"? I consciously think in but two ways. I have a mental voice, so to speak, that states words. It is always of the same type and may be similar in tone to my own oral voice. It is, however, very different from the audio sounds I "hear." These two types of "sounds" are often superimposed over each other without producing any significant alterations in each. Of course, there are times when they do interfere. Then I have a method to "image" mentally what is considered as a type of "visualization." But, the images need not have any relation to what I actually perceive via my eyes and corresponding mental processes. Indeed, I can easily superimpose the mental image over a visual image and the two do not interfere with each other. It is as if one has two independent brains at work. I assume that these two methods are the common methods used by humankind to "think."

But, distinct from the above illustration, a string of symbols is given that names a concept. I read a string of symbols that describe aspects of the named concept, a concept that is not of a visual nature. Then suddenly I feel, some-how-other, that I "understand" the concept at some "deeper level" within my brain, an area many call the mind. I can even describe additional aspects of the concept, aspects that were not described to me, and others agree that I have grasped the idea. How is this all possible? What electro-chemical procedures has my brain gone through that uses a "non-language" and "non-image" approach to give additional meaning to a concept that carries that specific name?

Similar linguistic approaches to explain new and novel ideas and actual laboratory experiments have led Nobel Laurent Eccles and Robinson (1984) to conclude that there is an immaterial aspect to our ability to think, which stems from neither a quantum field nor any physical brain chemistry. For concepts that are not related to visual or imaginary presentations, only languages can aid ones comprehension.

The General Grand Unification Model (GGU-model) is a cosmogony that must not be presented as directly dependent upon such concepts as quantum fields, "small" particles nor, indeed, any of our perceived objects. It cannot depend upon any specific forms of physical entity or behavior as described by our modern day scientific theories. On the other hand, its properties can be predicted from **general forms** of human behavior as they are illustrated in Herrmann (2014c). These general forms are all related to human thought processes that produce observed human behavior and to models for these processes. This approach is entirely distinct from constructing a

theory from assumed hypotheses that cannot be observed. The GGU-model needs to be constructed using a minimal amount of experientially obtained imagery. But, experiences with how we mentally use language to construct our man-made environment can prove to be highly significant.

> Repeating the basic requirement, as a cosmogony the GGU-model cannot be based upon any specific physical behavior such as that prescribed by QT or any physical theory that successfully describes the behavior of objects within our universe. It must be as universe independent as possible. On the other hand, for our use, it must be described in terms of "something" that is comprehensible on a human mental level. This is a necessary restriction in order to present, for us, a meaningful scientific cosmogony. Specific notions such as particles, quantum or classical fields, indeed, any of the specific mentally depicted images, diagrams and the like cannot be employed. This leaves only one descriptive possibility with which we have any experience. How we employ, **in a general way**, language to convey information and to convey actions is all that remains. The entire GGU-model is based upon this approach.

Hermann Weyl, who was a member of the Princeton Institute for Advanced Study from 1933-1955, is considered as one of the most influential mathematicians and theoretical physicists of the twentieth-century. After the fundamental notions for the GGU-model were constructed the following quotation, attributed to Weyl, was discovered.

> Is it conceivable that immaterial factors having the nature of images, ideas, "building plans," also intervene in the development of the world as a whole.

Let the term "material" mean the composition of a particular universe. Then the first most basic aspect of the GGU-model is the immaterial notion of "building plans" as described by a general language L. These are represented by the developmental paradigm, which is **analogue modeled** after a human "written" language and symbolic forms. This is extended to included images and even human sensory information. The important word here is "modeled." This means that, for us to have comprehension of this most basic idea, the behavior of such a language is model by how we construct such a language and mentally employ it for rational deduction. As shown in Herrmann (2002), the general rational process used to generate a developmental paradigm holds for how we mentally operator with images.

The results of this first basic procedure is the step-by-step development of a universe as depicted by a general description for each slice of an entire universe at each moment during its development. These are actually highly detailed but since they represent any universe such details cannot be presented. Relating this to the notion

of the "frame" as used for the old concept of motion-picture film or to the still-image one perceives when a DVD is paused, such a slice is termed as a **universe-wide frozen-frame**. The entire collection of such slices form a **developmental paradigm** (Herrmann, (2014a)).

We now come to a basic criticism one might have as to this approach. A written language as we know it is not immaterial. But, as discussed above such a language is mentally expressed by us as a mental voice or symbolic image. Remove the image and all we have is the mental voice. Then, as discussed, for this mental voice to have the greatest possible meaning it seems to be associated with something else that is not a product of electro-chemical brain activity. It appears to be associated with an immaterial aspect of human thought. Until otherwise demonstrated, this reasonable hypothesis is assumed and we can, indeed, consider such descriptions as associated with an immaterial form of information that is not necessarily part of our physical universe. **Further, these descriptions can be described in a very general way as thoughts.**

For the developmental paradigms, we are now at the highest level of human comprehension, the thoughts notion. The mathematics used to model the behavior of a language L and, hence, thoughts does predict a "higher" form of thought via comparative behavior. Except by using general terms such as "language elements," "words," "alphabet symbols," generic notions such as the "infinite" and the like in modified forms, such higher-thoughts cannot be described as composed of electro-chemical type entities that same consider the composition of our voice-like thoughts. The only finite human attribute that one can relate to the composition of higher-thoughts is the Eccles and Robinson immaterial aspect of human thought. Such immaterial aspects can also be related to the theological concept of the human immaterial spirit. It should be clear, however, that if the entity notion is appropriate when discussing the immaterial, then we have no comprehensible example for such entities.

The use of a special collection of terms to discuss the predicted "higher forms" of behavior is required since secular physical science is limited to entity descriptions, where the entities are listed in a table marked "material" entities or special QFT type objects termed as immaterial. For that science, all such objects are considered as contained within a physical universe. (Recall that a quantum field is considered a primitive by the theorist. There are no members of the entity list that denote its composition.)

However, using "mental" terminology, such thoughts can be considered as having operative properties. They can reveal universe creating behavior that can be mathematically modeled. This behavior takes place within a "substratum" world that carries various titles depending upon what is being described. No concern is given as to whether these universe creating processes and entities merely present an analogue model for what we cannot otherwise comprehend or present an actual new reality until the results are interpreted. This developmental paradigm concept has recently been

extended to include the building plans for each universe-wide frozen-frame (Herrmann (2014b)).

One aspect of the GGU-model is associated with the notion that the mathematical structure for quantum mechanics is but a type of machine that satisfies the step-by-step designed generation for our specific universe. This aspect, $\bigvee_w \mathcal{A}$, allows us to predict future physical behavior from the information gleaned from how observed physical objects behave within our present environment. Then the entire collection of GGU-model processes is described in the only remaining method allowed to us. They are linguistically described relative to mental processes.

A **property** is a linguistic form that assigns a specific attribute or characteristic to an object. We can only have knowledge from our universe as to how a comprehensible language is used to express such properties. *These forms of expression are used as a model for the general approach.* Intuitively an **ultra-properton** is the list of all known physical properties used to describe the behavior of objects that comprise a physical universe. But, the properties are represented in a special manner. Our guide for this concept are the properties physical science has assigned to entities that are claimed to comprise our physical universe.

The particle concept can be employed as the basic physical composition for the "physical-systems." However, what is the most fundamental level for the existence of particles is a matter of choice. Indeed, minimally all one needs are physical characteristics that yield observable systems. Ultra-propertons are modeled via the notion of coordinates (or components). Their properties are represented by numerical quantities or numerically encoded linguistic statements. The numerical values that appear in an ultra-properton representation are Robinson infinitesimals of but two types, $1/10^{\omega}$ and $-1/10^{\omega}$. The symbol ω is interpreted as a member of a higher-language that is not a member of a standard mathematical language. Hence, $1/10^{\omega}$ and $-1/10^{\omega}$ are also interpreted as higher-language strings of symbols. These languages are considered as members of the metamathematics employed to describe the set-theory being employed.

An entire single ultra-properton can be considered as a linguistic object that uses an object that is predicted to exist in the higher-language. In this case, a member of the predicted higher-language ${}^*\mathbf{L}$ (Herrmann, (2014b, p. 10)). This comes from considering n-tuples as sets of sets of sets of sets, etc, where the sets are of the form $\{\mathrm{A}, \{\mathrm{A}, \mathrm{B}\}\}$. The set notation has the linguistic form "A and; A and B." The semicolon is used so as to intuitively separate the second "A and B" from the first "A and" so that the phrase is not considered equivalent to "A and A and B." As mentioned, the actual statements for A and B involve symbols for special infinitesimals and these are not members of a standard language-element for physical characteristics. Relative to Mathematical Logic, the GGU-model is based upon syntactics and not semantics. Thus, technically these linguistic forms can be considered as yet another type of "ultraword" since they follow the methods we use to construct such linguistic objects we term as

"words."

The **intermediate propertons** are constructed from "hyperfinitely" many ultra-propertons. They form a coherent collection and, although it is mathematically modeled as a single n-tuple, it can actually be consider as yet another single ultraword from a higher-language. This comes about in the following manner. Let A, B, C, etc. represent the ultrawords that represent the ultra-propertons. Then the hyperfinite set $\{\mathrm{A}, \mathrm{B}, \mathrm{C}, \ldots, \lambda\}$ can conceptually be considered as the ultraword $W_1 = \mathrm{A}|||\mathrm{and}|||\mathrm{B}|||\mathrm{and}|||\mathrm{C}||| \cdots |||\lambda$. The $|||$ is a special symbol used to indicate the "spacing" notion as used today for linguistic forms.

When physically realized, the intermediate propertons produce individual physical properties. For example, individual intermediate propertons can display the intrinsic mass property. Others can display but a "frequency" property, an energy property, etc. The best way intermediate propertons are conceived is that they are "thoughts." Notice, however, if one insists that there is a particle that only exhibits mass, then this is actually an intermediate properton if it is realized. Symbolically, the numerical values for these properties can also carry a symbol that corresponds to a pre-designed measuring instrument when realization occurs. What we may glean as physical laws are simply various relations that appear to exist between such properties (characteristics). These are usually represented by mathematical relations between coordinates. Further, all such relations satisfy the best possible unification $\bigvee_w \mathcal{A}$ for the actual collection of all verified physical laws and theories (Herrmann, 2003a, 2004, 2006).

The following question may not be answerable relative to the restricted particle physics language. Gravitons "carry" the force of gravity. Gravity seems to "hold stuff together." How does the notion of "to carry" do this? Gluons are "exchanged." How do they do this? For properton theory, there is no difficulty with how propertons are "held together" when gathered into collections if one considers certain aspects of the thoughts notion. They are held together intuitively in the same manner as one considers a word as a meaningfully "held together" collection of symbols, where such a word corresponds to the mental entity that we "hear." Then intermediate propertons are formed into ultrawords, and then these ultrawords are formed in ultrawords, and this process is continued until various systems are represented by ultrawords. There are mental instructions that lead to the original ultra-propertons that are combined in an ordered hyper-rational manner to form a physical-like system and then this is hyper-rationally continued to form an entire pre-realized universe-wide frozen-frame.

Notice how the modified terms do relate the "new" material to prior well known concepts. These new objects do have many similar characteristics, but they also have characteristics that are highly distinct from the original. The suffix part of the term is most often characterised in terms of the "finite" world. The "hyper, higher, ultra" prefix most often carries the notion of "infinite." (There are certain technical exceptions to this. For example, the symbol ${}^*\mathbf{L}$ represents a higher-language in its entirety. However,

the standard language $\mathbf{L}$ is an infinite object and $\mathbf{L} \subset {}^*\mathbf{L}$. But, intuitively the higher-language ${}^*\mathbf{L}$ is an exceptionally "greater" infinite object.)

The GGU-model "gathering" operator models the process of this ultraword formation. The complete collection of such ultrawords is called an "info-field." The symbol string "info" is intended to signify the "informational content" of the ultrawords. The term "field" is chosen in the classical sense in that it describes what are physical-like objects that comprise the entire universe-wide frozen-frame. The term "physical-like" in this context means an object with the same stated characteristics as a universe's physical objects but is an unrealized substratum object. What the substratum is depends upon the interpretation employed. *Of considerable significance is that an info-field can also be represented as an ultraword that rationally generates each physical-system with its internal structure.* This is symbolized by introducing the usual language element "If A, then B," there the A and B are the physical-system or internal structure ultrawords. Thus, from the thought viewpoint, **an info-field is a product of an ultraword.** It is considered as produced by a higher-form of deductive thought.

The final step is application of the realization operator `St` as defined and illustrated as an extension of a human being mental process. This yields actual physical reality. This, in general, yields the "hyles". A universe-wide frozen-frame is realized during the miniscule primitive time period the `St` is applied. When the `St` is applied to the next sequential ultraword, the previous, so to speak, ultraword is not lost but remains in a type of mental history file.

The rather obscure philosophic term just stated I now define in a more exact manner. It replaces the rather common term "stuff." Remember that this model is not just relative to our universe but for many other possibilities as well, universes that can be characterized via general languages.

> HYLE, (hī' lē). The physical realization of a combination (gathering) of intermediate propertons is a hyle. A physical realization of a combination of these combinations is a hyle. A sequence of physical realizations of combinations, of combinations, of combinations, . . . even an infinite sequence is a hyle. Depending upon the result of the combinations, a hyle can take on a more specific name relative to the properties that describe the combination. For our universe, hyles are most often called physical-systems.

A major aspect of the GGU-model as well as its GID-model interpretation is its solution to the participator problem. This is the fact that human choice, at the least, modifies the development of our universe. At any sequential moment t during the development of our universe, there is an ultraword representation for the entire collection of sequentially realized universe-wide frozen-frames $\{\ldots, E(t-1), E(t)\}$ (simplified notation). These correspond to a portion of an ultraword for a developmental paradigm and

a corresponding instruction paradigm. There exist a vast quantity of designed developmental paradigms and instruction paradigms that represent the allowed universe-wide frozen-frames that are added to this realized sequence for realization at primitive time moment $t+1$. These all correspond to a vast collection of identified info-fields.

The development either progresses relative to non-human choice in such a manner that the unification of all verified physical laws and accepted theories $\bigvee_w \mathcal{A}$ is satisfied, or by human choice and the method described in Herrmann (2002), the appropriate info-field is activated and $E(t+1)$ results. There, obviously, needs to be a vast collection of info-fields, and they are all designed so that this participator model rationally functions. This is not a difficult task for a higher-intelligence to accomplish.

I point out that even when human choice is applied $\bigvee_w \mathcal{A}$ is still satisfied. Further, as discussed previously, at present there apparently is behavior that is not as yet fully predictable via any known physical law. The operator $\bigvee_w \mathcal{A}$ is actually independent from the specific laws and theories that a developmental satisfies. Distinct collections of such generate different $\bigvee_w \mathcal{A}$.

I am a Christian theological positivist. I consider only the substratum as the actual area of activity. I do not concern myself with the reality or nonreality of unobservable entities, processes and their corresponding models. I use these models only to predict future behavior. Indeed. I have constructed a few of my own that seem to improve upon previous models (Herrmann, 2003b). Under this philosophy, the physical laws do not provide actual real cause and effect statements. However, for us to predict, even partially, future behavior of a physical-system, the concept is indispensable. From the pure GGU-model viewpoint, freeze a moment in the time development of our universe. The entire designed universe-wide frozen-frame, the ultraword, that results is denoted mathematically by $\mathbf{f}^q(i,j)$ in abbreviated notation. A "next" sequentially realized universe-wide frozen-frame is $\mathbf{f}^q(i,j+1)$. As previously stated, if a sequential design is altered in any manner, then it satisfies, to various degrees, what we accept as verified physical laws.

Our universe is designed in this manner so that we can follow specific Biblical directives and build man-made physical entities using this designed feature. Thus, one can state that the laws are true in that our universe is build so that they are satisfied. However, for any physical law neither its entities nor its processes actually cause any physical event to occur from the GGU-model viewpoint.

In 1979 when the basic aspects of the GGU-model were first considered, one and only one Biblical verse was noticed. The verse is Hebrews 1:3 and it has various and slightly different interpretations. Relative to God's creationary attributes some are "upholding all things by the word of his power," "He regulates the universe by the mighty power of his command." "himself the upholding power of all that is," "sustains the universe with his powerful word," "sustains all things by his powerful word." Using

the most ancient extant Greek manuscripts, the literal Greek states this as "carrying (on) all by His powerful declaration." This is the closest to the actual Greek meaning for this phrase. What is translated as "sustains" is the Greek $\phi\epsilon\rho\omega$, "I carry" or "carrying" relative to movement and the Greek $\rho\eta\mu\alpha$ for a "spoken" or, in this case, "thought" word. The word "on" is added relative to the interpretation but need not be so added. Thus, relative to movement, this strongly suggests a type of "step-by-step" process.

In Herrmann (2014b) are displayed GGU-model schemes that can be used for various purposes. But, which one of these most closely corresponds to the original Hebrews 1:3 phrase? I now reveal this final conclusion. It is scheme

$$\text{(M) } \mathtt{St}([\![(\,{}^{*}\underline{\mathcal{A}}((\Gamma^{(q,r)}(x,\lambda), IF_{\lambda}^{(q,r)}(a,b))))]\!]) \Rightarrow \mathcal{U} \text{ (page 28).}$$

The symbol string $\Gamma^{(q,r)}(x,\lambda)$ can be considered as a single ultraword written in a form so that a rule for deduction is applicable. This models the $\rho\eta\mu\alpha$ term as a "mental word." The info-field $IF_{\lambda}^{(q,r)}(a,b)$ determines the "first" info-field needed to produced the first realized univere-wise frozen-frame that, depending upon the type of universe, may actually be empty. The notation ${}^{*}\underline{\mathcal{A}}$ represents the actual step-by-step ordered hyper-deduction of an identified collection of info-fields for the complete development of a particular universe. The infinitely powerful deduction process denoted by ${}^{*}\underline{\mathcal{A}}$ models the Greek translated as "power(ful)" but is more directly related to "the ability to accomplish a task." This models the basic process that satisfies $\phi\epsilon\rho\omega$. Certainly, the display of such a "mental" process that yields the step-by-step ordered generation of His designed info-fields displays such an ability. It is a causal process that yields the $\phi\epsilon\rho\omega$ effect.

Then there is the realization operator $\mathtt{St}$. This is sequentially applied for a universe that has no need for participator alterations. When applied, its symbolic properties reveal a higher-intelligence signature. In the human participator case, it is applied either to the next sequential info-field or to the next one that corresponds to the info-field collection selected by the hyperfast properton that corresponds to a human mental intention. These intentions are transferred to the substratum via the immaterial aspect of human thought. Whether this process holds for other animals is not known.

In general, the following are rationally established theological statements relative to any universe.

(1) God designs all universe entities and their behavior patterns as modeled by the thoughts concept. (This rational statement follows from the design of the developmental paradigms, the instruction paradigms and their correspondence to the entities contained in a universe and their behavior within such a universe.)

(2) God produces all of the physical entities and physical behavior patterns as modeled by the concept of changing thoughts into various realities. (This rational

statement follows from scheme (M) stated in terms of ultrawords that correspond to higher-intelligence thoughts. The `St` carries a signature that implies that its application stems from an action taken by a higher-intelligence.)

Relative to human beings and our universe:

(3) As completely stated in (1), God designs all physical entities and physical behavior patterns as modeled by the thoughts concept.

(4) Human beings make choices.

(5) God activates the choices and produces the pre-designed physical patterns as stated in (2). He is the ultimate agent in all such matters.

(6) God designs all possible human life-paths (Herrmann, 2013). But, God does not originate the non-automatic patterns for human physical behavior. Human choice is the original agent that does so. It is when such human mental or physical behavior occurs that the associated ethical consequences are realized.

> In general, these six cause and effect statements appear to parallel those of the ancient Hebrews. Unfortunately, they will not be accepted today by the vast majority of mankind since mankind has been so well trained in the cause and effect methods of atheistic science. Further, the GGU-model, as theologically interpreted, will not be accepted by millions of individuals who accept theological doctrine that is contrary to any of the above six statements. Since one or more of these six statements is so easily obtained from the secular GGU-model, secular scientific communities will also not presently accept the GGU-model cosmogony.
>
> However, these facts do not alter the model's significance. This model rationally establishes the General Intelligent Design (GID) model that states that all aspects of our physical universe are designed by a higher-intelligence that exhibits the creationary attributes of God as they are Biblically described. The GGU-model counters all statements that imply that the strictest form of Biblical creation is irrational although there may be no presently known laws that predict all physical evidence that presently exists. QED. (Thus, ‘‘it (which) has been demonstrated.’’)

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