

APPENDICES

Appendices are added from time to time to take into account new developments since the publishing of "The Origin and Its Meaning"

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APPENDIX A

The “Cosmic Egg” and the 21st Century Cosmology “Big Bang” Initial “Inflation”

1 - THE 21ST CENTURY “BIG BANG” COSMOLOGY

21st Century cosmology hypothesizes the idea of a “Big Bang” in which the present observable universe came into being from a single, small inflationary “Hubble Volume” [for this purpose “Hubble Volume” here means the present observable universe as originally compacted into the start of the Big Bang]. By “inflationary” is meant that the initial volume greatly expanded [by a factor of 10^{26} or more] in an extremely brief amount of time [that is on the order of 10^{-33} seconds] after which the then universe pursued its general, relatively slow, long term expansion.

That hypothesis resolves the several problems of 20th and 21st Century cosmology: why does the universe appear flat, homogeneous, and isotropic when, on the basis of the physics of the Big Bang, a curved, inhomogeneous universe would be expected. It does so by postulating that all of the observable universe originated in a small “causally connected” region, that is a region small enough so that everything within it could affect everything else within it even within the limitation of the speed of light. That hypothesis also includes explanation of the origin of the large scale structure of the universe based upon inflation’s expansion to cosmically significant size of minute quantum fluctuations in the small starting volume.

That cosmology fails to treat the problem of the universe starting from a singularity, a dimensionless point, substituting the small, but finite, “Hubble Volume”, the origin of which is not accounted for. It also lacks the detailed physics to explain the cause of the inflation.

Of course, that cosmology also fails to address the problems that the universe had to come into existence from a prior absolute nothing or else the cause of a starting non-nothing must be supplied. Further unaddressed are the problems of a universe originating from absolute nothing without an infinite rate of change, at least initially, and without violating conservation.

The cosmology of *The Origin and Its Meaning* properly treats and resolves all of those issues.

2 - THE “COSMIC EGG” OF THE ORIGIN

[This analysis refers to the discussion titled *SPACE: ITS ANALYSIS ONE MORE TIME: F AND τ* on pages 452 to 462 of the main text of *The Origin and Its Meaning*].

The "Cosmic Egg", the original, primal center-of-oscillation's core has two different aspects depending on whether viewed externally or internally. The fundamental constant, F , reflects that duality per equations 21-56, repeated below.

$$(21-56a) \quad F = \frac{\text{Core Medium Supply}}{\text{Core Volume}}$$

$$(21-56b) \quad F = \frac{\text{Volume Equivalent of Core Medium Supply}}{\text{Core Volume}}$$

F , addresses the relationship between the apparent volume of the core (as viewed from space external to it) and the amount of space that it can realize by propagation of its contents, the relationship between its conception as a volume and as an amount of medium.

That amount of medium constitutes a singularity by virtue of its occupying zero volume as medium in the core. That is, within the core is only pure uniformity, no differences that would give meaning to a length dimension, to volume; it is the same place everywhere within the core; it is a singularity.

As viewed externally, per equation 21-66 the radius of the "Cosmic Egg" was $4 \cdot 10^7$ meters. The universe began, in a sense, "already inflated". Because that $4 \cdot 10^7$ meter core was a singularity it was totally "causally connected" and therefore produced a flat, homogeneous, isotropic universe.

The large scale structure of the universe comes about as follows. The flow of medium outward from the core of a fundamental particle is a flow of smooth, non-particulate medium in all directions outward. But such a flow was not what happened to the core of the "Cosmic Egg". Rather, the "Cosmic Egg" immediately radioactively exploded in an immense shower of particles outward in all directions. While, so to speak, the concentration of particles overall was uniform in all directions, individually it was impossible for the particles to be exactly uniformly spaced apart.

Consider a sphere emitting 6 particles outward. They can be uniformly spaced as up-down-right-left-in-out. Now require a 7th particle and there is no way for the spacings to all be equal. For the exploding "Cosmic Egg" core that limitation was immense because of the immense number of emitted particles.

The non-uniformity of emitted particle spacing and its effect on the gravitational attraction between particles provided the differences that produced the large scale cosmic structure.

APPENDIX B

Entanglement and Quantum Mechanics

I – REVIEW OF RESULTS FROM THE EARLIER SECTIONS 11 - 19

Particles

1. All four fundamental particles [protons, electrons, anti-protons, and anti-electrons also called positrons] are centers-of-oscillation, oscillating spherically in a pure, simple, single frequency of $[1 - \text{Cosine}]$ form.

- They propagate a corresponding, wave field radially outward in the form of a spherical oscillation, at the speed of light, c , at the frequency of their center-of-oscillation's frequency.
- A particles' motion changes its oscillation's purely spherically symmetrical form so as to somewhat "point" in the direction of motion, but the shift is relative to the particle's "home", "at rest" fundamental frequency and to its purely spherically symmetrical form.
- That fundamental frequency is the same for all protons and anti-protons and is the same, at a different value, for all electrons and anti-electrons.

The only difference between particles and their anti-particles is that their oscillations are the negative of each other. That is, the oscillation of the proton is of the $+ [1 - \text{Cosine}]$ form and that of the anti-proton is of the $- [1 - \text{Cosine}]$ form resulting in the two forms being 180° out of phase with each other and similarly for the positron and the electron.

The other particles are of several types:

- Composite particles = the neutron and anti-neutron and the various atomic nuclei and their anti-particles.
 - These are all various combinations of the above fundamental particles in complex, composite centers-of-oscillation, spherically oscillating in a complex composite waveform; and propagating a complex, composite wave field.
- Non-rest mass [pure propagating wave] particles = photons and neutrinos.
 - These all result from changes in fundamental or composite particles.
 - These are not centers-of-oscillation; rather each is a piece of the wave field propagated by its particle source.
- Fragment particles = the product of smashing apart the fundamental or composite particles.
 - These are all unstable with very short lives.
 - They are not normal centers-of-oscillation; rather each is a fragment of the center-of-oscillation of the fundamental or

composite smashed particle source and / or of the wave field that was propagated by the fundamental or composite smashed particle source.

The Common Origin of Particles

2. At the origin of the universe the “home”, “at rest” fundamental frequency of the four fundamental particles was established, creating the same “home”, “at rest” frequency of all protons and anti-protons and the same but different value “home”, “at rest” frequency of all electrons and anti-electrons.

- That resulted in all composite particles each having for its type [e.g. neutron, oxygen atom, etc.] the same composite, complex, “home”, “at rest” spherical oscillation and propagated waveform.
- Therefore all of today’s particles, throughout the universe, fundamental and composite, oscillate and propagate relative to the same, identical “home”, “at rest” composite waveforms for the particular particle’s type.
- They all share and are relative to the same original birth no matter where they have traveled and no matter what speeds, directions, and interactions they have experienced since that original birth.

Motion and Particles

3. All motion is absolute, that is it is relative to the one single universal frame of reference which is the frame in which the “Big Bang” took place. Being “at rest” is being without motion relative to the absolute frame. Being in motion is having motion relative to that frame.

4. The effect of motion on the oscillation of a center-of-oscillation and the effect on its propagated wave field are as follows.

- The action is on the single frequency of a fundamental particle and on the single frequency of the composing fundamental particles of a composite particle.

- The frequency of the oscillation decreases by the factor:

$$[1 - v^2/c^2]^{1/2}$$

- In the direction of the motion of the center-of-oscillation [0°] the wave field wavelength decreases by the factor:

$$[[(c - v) / (c + v)]]^{1/2}$$

- In the opposite direction [180°] the wave field wavelength increases by the factor:

$$[[(c + v) / (c - v)]]^{1/2}$$

- In the directions directly to the side [90°] the wave field wavelength is unchanged.

- In all of the directions in between the above the wave field wavelength is the vector resultant of the nearest pair of the above [0° and 90°] or [180° and 90°].

5. In consequence of the above particle motion behavior, motion of matter at or in excess of the speed of light, c , is impossible.

6. In consequence of the above particle oscillation propagation wave field at speed c , communication at other than the speed of light, c , is impossible.

II – Quantum Mechanics and Entanglement

Quantum Mechanics

Quantum mechanics postulates that the *state* of every elementary particle can be described by a *wavefunction*, a mathematical representation used to calculate the probability that the particle is found to be in a location or a state of motion; and that the act of *measurement / observation* of the particle causes the calculated set of probabilities to *collapse* to the value defined by the measurement.

The condition that, until *measurement / observation*, the specific *state* of the particle is deemed unknown, consisting of various probabilities of various states according to the *wavefunction*, is also described as that the particle is in a *superposition* of all of its possible states.

Centers-of-Oscillation and Quantum Mechanics

Because centers-of-oscillation oscillate over a cyclic range of instantaneous values per the particular waveform of each case, the Quantum Mechanics “*state*” of the particle continuously varies.

The Quantum Mechanics “*state*” of the particle is the particular instantaneous position in the waveform that its center-of-oscillation is at a particular moment.

- The waveform of the center-of-oscillation is the “*wavefunction*” of Quantum Mechanics.
- The center-of-oscillation’s oscillation over a range of instantaneous values is the Quantum Mechanics described behavior that particles are in a *superposition of all possible states* until a *measurement / observation* causes the *superposition* to *collapse* to the state *measured / observed*.
- The *collapse* is the selection of that particular instantaneous position of the waveform of the center-of-oscillation that it happens to occupy at the instant of the *measurement / observation*.

Quantum Mechanics is defective in that it neither has, nor offers, any causality, any mechanism for its contentions. Thus it lacks one of the fundamental requisites for truth¹.

“Entanglement”

If two or more identical fundamental particles or composite particles of the same type are located near each other and are caused to be traveling in the same direction at the same speed, then they have identical oscillations in their centers-of-oscillation and identical wavefields propagated outward.

- In Quantum Mechanics they are said to be *entangled*.

If two or more photons and / or neutrinos are generated by identical energy changes in a corresponding two and / or more *entangled* particles,

- Then in Quantum Mechanics the two or more photons and / or neutrinos are said to be *entangled*.

The Effect of Entanglement

If a pair of *entangled* particles are *measured / observed* at the same instant of time, regardless of their location and distance of separation, the *measured / observed state* of each of the particles will be the same because of the synchronization effect of the requisite condition for their *entanglement*.

- However, the above is theoretical and the practical fact is that the particles need to initially be near enough to each other to establish their traveling in the same direction at the same speed, and any subsequent motion of either particle not matched by corresponding motion of the other(s) destroys the entanglement because not matching motion results in their oscillation and propagated wave forms becoming different.

If a pair of entangled photons or neutrinos are *measured / observed* at the same instant of time, regardless of their location and distance of separation, the *measured / observed state* of each of the photons or neutrinos will be the same because of the synchronization effect of the requisite condition for their *entanglement*.

- This is practical because the location and motion of photons can change without changing their “state”, without causing their “untangling” because change of each photon cannot affect its originating particle. The two are immediately and permanently independent once the photon is emitted.

Centers-of-Oscillation and Quantum Mechanics’ “Uncertainty”

In view of the overall above presented nature of particles and their centers-of-oscillation the *state* of a particle is always definite and determined. The particle is where it is and it is going where and how it is going, both so long as it is independent of any interfering, disturbing action by an observer or another particle or particles or wavefield.

There is no actual *uncertainty* about the *state* of the particle; its *state* is certain and definite

However, it is impossible to observe the location or motion of a particle without disturbing it. The act of observation changes the particle’s location and / or motion so that while data can be obtained indicating what the location and / or motion of the particle was immediately prior to the observation, those data will no longer be currently valid because the disturbing effect of the observation has resulted in the particle having a new, different location and / or motion.

Therefore, observer knowledge of the *state* of a particle is always *uncertain*.

The reason for this is that for data about the particle to be obtained information must travel from the particle to the observer and that transmission / communication results in its source, the particle, undergoing change.

III – Cause, Mechanism, and Quantum Entanglement Effects

The Over-riding Fundamental Principle Governing all of Physics

Every action, every effect, and every event must have a cause and a mechanism by which it takes place. A theory lacking cause and mechanism cannot be considered valid until that defect is cured.

Quantum Mechanics has no cause or mechanism supporting its contentions.

For theoretical validity it must be possible for the requisite cause and mechanism to exist and it must exist and, therefore, be subject to discovery.

If a cause or mechanism for a contended action, effect or event is absolutely, irrevocably impossible then the contention is not valid.

The Fundamental Principle Applied to Quantum Entanglement

Both communication and change of location instantly or at a speed greater than the speed of light are impossible. They are impossible by virtue of the nature of matter and light and because violating that principle requires an actual infinity, which is impossible.

Therefore the contended instantaneous communication between separated photons as in the Bell's Inequality experiments and opposed in the Einstein, Podolsky and Rosen *Gedanken* [thought] Experiment is an invalid contention.

Furthermore Quantum Mechanics violates one of the basic principles of reasoning and logic. One of the most effective ways of defeating a proposed contention or hypothesis has been to show that it inevitably leads to an impossibility, an absurd outcome, the so called *reductio ad absurdum*.

Quantum Mechanics leads to such an absurd result, contains such a *reductio ad absurdum* – instantaneous communication over vast distances with no proffered mechanism. Quantum Mechanics' unquestioning acceptance of that as reality is a result of mathematical *hubris* – because the mathematical details are mathematically correct the physical result is deemed correct when its absurdness actually means that the hypothesis or the model or the manner of application of the mathematics to the actual physical situation is in error.

Also therefore, the contention that a particle has no specific location until specifically observed / measured, that the particle only exists in a superposition of all possible locations for it, is not valid because it requires that the act of observation / measurement cause the particle to instantaneously change its location from the contended various locations in the superposition to the single specific location observed / measured.

[1] R. Ellman, *The Philosophic Principles of Rational Being*, Section 1, The-Origin Foundation, Inc., <http://www.The-Origin.org>, 2007. [The book may be downloaded in .pdf files from <http://www.the-origin.org/loaddown.htm>].

APPENDIX C

"BLACK HOLES"

The focus of attention in this investigation and analysis of gravitation has been on the behavior of the waves from the source center and their affect upon the encountered center. If that focus of attention is now changed to be on the response of the encountered center a new result develops.

The initial response of the encountered center has already been treated. That is, the local speed of propagation toward the source center of the encountered center's waves is reduced by the effect of the incoming source waves. That local speed, called c_{grav} (see Figure 19-5) varies with the oscillation of the incoming source waves. That is, the allowed encountered center speed of propagation toward the source center varies from c_0 to lesser values according to the incoming source waves.

The encountered center must take on an increment of velocity equal to the difference between the current allowed speed of propagation of its waves, c_{grav} , and the speed at which its instantaneously earlier preceding wave propagation increment is moving away from it, the c_{grav} of the time, an instant earlier, when those waves were propagated. The encountered center velocity change is necessary to maintain the continuity of medium flow and of space.

But, the encountered center's very act of increasing its velocity changes its forward and rearward propagation behavior as discussed in section 13 - *A Model for the Universe (3) - Motion and Relativity*. A center-of-oscillation at velocity, v , must propagate forward relative to itself at propagation speed $[c - v]$ so that with the addition of its forward velocity, v , its forward waves are traveling, relative to at rest, at $[c - v] + v = c$. The change in the encountered center's velocity which is its initial response to the arriving source center waves requires just such a propagation change.

The reduction in the encountered center's forward speed of wave propagation means that to that extent there is less medium propagation forward. That means that continuity of medium flow forward is threatened. The result is that the decrease in the encountered center's forward medium flow, which decrease was a necessary consequence of the center's having to increase its velocity, then results in a need for a further increase in the velocity, and so on ad infinitum. This is set out in equation 19-54, below.

(19-54)

(1) The initial effect of a wave arriving from the source center is to require the encountered center to take on additional velocity, " $v_{initial}$ ".	$v_{initial} = \Delta C_{initial}$
	$\equiv \Delta C_1$
	$\equiv v_1$

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(2) In taking on velocity v_1 the encountered center must reduce its forward propagation.

$$U_{fwd} = \frac{c - v_1}{c} \cdot U_c$$

(3) But that then requires a yet further velocity increase to a total velocity of Δc_2 so that the encountered center must take on a larger velocity, v_2 .

$$\begin{aligned} \Delta c_2 &= \frac{c}{c - v_1} \cdot \Delta c_1 \\ &= v_2 \end{aligned}$$

(4) Steps (1) - (3) repeat for the now new higher velocity per equation 19-55, below.

$$v_{i+1} = \frac{c}{c - v_i} \cdot v_i$$

(19-55)

$$\begin{array}{cccc} \text{(a)} & \text{(b)} & \text{(c)} & \text{(d)} \\ v_{ultimate} = \left[\frac{c \cdot v}{c - v} \right] & v_{ult} = \left[\frac{c \cdot \left[\frac{c \cdot v}{c - v} \right]}{c - \left[\frac{c \cdot v}{c - v} \right]} \right] & v_{ult} = \left[\frac{c \cdot \left[\frac{c \cdot \left[\frac{c \cdot v}{c - v} \right]}{c - \left[\frac{c \cdot v}{c - v} \right]} \right]}{c - \left[\frac{c \cdot \left[\frac{c \cdot v}{c - v} \right]}{c - \left[\frac{c \cdot v}{c - v} \right]} \right]} \right] & \dots \end{array}$$

["v" = $v_{initial}$]

and so on.

This infinite structure is identical to the infinite series of equation 19-56, below.

$$(19-56) \quad v_{ultimate} = v \cdot \left[1 + \left[4 \cdot \frac{v}{c} \right] + \left[4 \cdot \frac{v}{c} \right]^2 + \left[4 \cdot \frac{v}{c} \right]^3 + \dots \right]$$

[where "v" = $v_{initial}$]

The encountered center velocity change, $v_{ultimate}$, that ultimately results from these actions is the infinite "end" of the progression of equation 19-55, that is the sum to ∞ of equation 19-56.

The parameter, v/c , is normally extremely small. The v is the Δc of equation 19-17, the Δc_{wave} of Figure 19-5, for one source wave oscillation cycle, a time of less than 10^{-23} seconds for a source proton, for example. An acceleration as large as a million meters per second per second would involve a velocity change of 10^6 meters in a full second. That divided by 10^{23} gives on the order of 10^{-17} meters in one proton oscillation cycle, and a value of v/c of about $3 \cdot 10^{-26}$. Thus, normally, none of the terms in equation 19-56

has any effect except the first term, the "1", so that normally $v_{ultimate} = v_{initial}$.

However in the case of the gravitational affect of a very large concentrated mass it might be possible for it to impose on an encountered center a value of v/c large enough to have a significant effect in equation 19-56. That equation is a geometric progression and its sum for ∞ terms (with the term factor $4 \cdot [v/c]$ of value less than one) is equation 19-57.

$$(19-57) \quad v_{ultimate} = \frac{1}{1 - 4 \cdot \frac{v_{initial}}{c}}$$

Table 19-6, below, illustrates how such an effect would appear.

v/c	$\frac{\text{Apparent Mass}}{\text{Actual Mass}} = \frac{\text{Actual Gravitation}}{\text{Newtonian Gravitation}}$
0.0001	1.0004
0.0010	1.0040
0.0100	1.0417
0.1000	1.6667
0.2000	5.0000
0.2400	25.0000
0.2490	250.0000
0.2499	2500.0000

*Table 19-6
Non-Linear Gravitation*

The effect of the non-linearity for the case of large masses is quite pronounced. The effect would operate in exactly the type situations as are termed black holes. That is, a black hole is a region of space in which the mass concentration has become large enough that the gravitational effect goes radically non-linear as above, producing actual gravitation and apparent amounts of mass far in excess of the actual (Newtonian, linear) mass present and the "normal" gravitation that it would exert.

EPILOGUE 1

*So, now, here we have reality,
a natural universe that came from nothing
and, eventually, will so disperse itself
as to return to, essentially, nothing.*

*And which, during its brief, but glorious
transit from nothing ... to nothing,
evolves rational Life.*

*Life, magnificent in potential and capability,
dreadfully fettered by its natural origin;
what will become of it ?*

*Will the society of social love evolve
and crown natural reality
with its beauty and magnificence ?*

*Perhaps.
One can dream.*

The path is understanding:

*understanding our origin,
understanding our natural nature,
using the unavoidable facts that so fetter us
-- the now innate personal survival
and dominant self interest --
to construct, even from these,
the civilization of mankind,
of Life.*

*But, is there no objective standard of good and bad,
of right and wrong ?*

It would seem not ... yet ...

There are, and have always been

*Truth and Beauty,
Love and Compassion,
Justice and Equity,
Rationality, Culture and Humanism.*

*But they exist not in realization
but only as ideals.*

*They have always existed
because they are universal.
Their existence does not depend upon implementation.
They exist in and of themselves as natural principles.*

*They are the only permanent reality,
the only infinite reality.*

They ... they are God.

*They cause ?
Yes, they cause events, behavior.*

*They judge ?
They are the judge of all that we do.*

*They think ?
Yes, but not in our searching, learning sense. Rather,
they know.*

*They create, not imperatively but by urging.
They tend-urge all to form to their model.*

*Do they have power ?
They have more power than anything else,
They have supreme power.*

*Do they love ?
They Are love.*

*Can we communicate with God ?
Yes, by our thought, intent, behavior.*

*Can we participate in God ?
Yes, to the extent that we, also, become:*

*Truth and Beauty,
Love and Compassion,
Justice and Equity,
Rationality, Culture, and Humanism.*

EPILOGUE 2

*The greatest good
is love,
and the greatest bad, death.*

*Love is giving, sharing, being.
Death is taking, denying -- termination.*

*It is not life and death which are opposites
but love and death.
One can be "alive" but dead;
but, one cannot have loved and be dead
even though "dead".
Love surpasses even the end of life.*

*The end of life is assured all of us,
but of love none is assured.*

*But love is within our power;
we can create it,
bring it into being,
give and share it
at will.*

*Likewise death, but -- living should be love.
We opt for that and,
in so doing
create life
and survive even beyond death.*

A

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