

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.