SUMMARY OF BIG-BANG CREATION STORY

By Ashby L. Camp

I. Introduction

A. The creation story of modern western culture is that the universe, including the earth and all its life forms, is the product of natural processes operating over time. Physical laws operating over time on matter/energy explains everything. Now, if you "personally believe" that God somehow was involved in creation, that's okay, as long as you never invoke his existence to explain anything about the universe. As soon as you claim that the evidence of nature suggests the existence of God (or even an unidentified "intelligence"), you'll be ruled out of court and attacked as an enemy of science.

B. Here's the *Reader's Digest* version of the scientific establishment's story for the origin of the cosmos. This, according to our culture, is how it *really* happened. I relied heavily (but not exclusively) on Danny Faulkner's *Universe By Design* (Green Forest, AR: Master Books, 2004) and Alex Williams and John Hartnett's *Dismantling the Big Bang* (Green Forest, AR: Master Books, 2005).

II. Origin of the Cosmos

A. SINGULARITY: The creation story of modern western culture begins with all the matter, energy, space, and time of the universe contained in an infinitesimal point called a singularity. There is no explanation for the origin of this singularity. Its existence is deduced from the fact the universe appears (based on redshifts of galaxies) to be expanding. If the observed expansion is *extrapolated* backward, it follows from current gravitational theory that there must have been a "beginning" in a singularity.

B. "BIG BANG": Some 13-17 billion years ago, the hypothesized singularity allegedly "exploded" -- the so-called "big bang" -- but there is no known reason for that to have occurred.

1. The big bang is not an explosion as we normally think of it, as there was no space into which it could expand. Rather, it is a very rapid expansion of space (and time) from the infinitesimal singularity. As space itself expands, the energy/matter in the singularity is carried along with it.

2. The laws of physics are thought not to apply inside of what is called Planck time, which is 10^{-43} seconds after the big bang. In other words, not only is there no explanation for the existence of the singularity itself, there is no explanation for how the singularity could have erupted. The tools of physics cannot reach into that state to say anything about how it would act.

a. As Stephen Hawking stated in *A Brief History of Time* (p. 122):

> At the [primordial] singularity, general relativity and all other physical laws would break down: one couldn't predict what will come out of the singularity. . . . This means that one might as well cut the big bang, and any events before it, out of the theory, because they can have no effect on what we observe.

b. After quoting this, physicist John Hartnett says (p. 120-121);

> Once you accept a singularity, you must let go of your tools (the laws of physics) for predicting how a universe might come out of it because those tools no longer work. If the tools don't work, and the "explosion" is hypothetical, then the beginning scenario in big-bang theory is indistinguishable from a miracle.

C. INFLATION: At 10^{-43} seconds after the hypothesized singularity for some unknown reason began to explode, subatomic particles began to form out of energy. A tiny fraction of a second later (around 10^{-36} seconds after the bang), the explosion for some unknown reason experienced a split second of "super expansion" called inflation where in an instant its size increased a thousand billion billion billion times (say from the size of an atomic particle to the size of a grapefruit).

1. This inflation is postulated to solve several problems that would exist with the big bang scenario if it didn't occur. Astrophysicist Jason Lisle comments (writing under the pseudonym Robert Newton):

> There are many different inflation models, each with its set of difficulties. Moreover, there is no consensus on which (if any) inflation model is correct. A physical mechanism that could cause the inflation is not known, though there are many speculations. There are also difficulties on how to turn off the inflation once it starts—the 'graceful exit' problem.

2. The universe that emerged from this inflation was incredibly fine tuned.

a. For example, the four fundamental forces of physics (gravity, electromagnetic force, the strong nuclear force, and the weak nuclear force) are thought to have stabilized at their current values after the end of the inflation era. The two nuclear forces hold atoms together (strong holds protons together and weak holds neutrons together), the electromagnetic force holds molecules together, and gravity holds solar systems and galaxies together. If any of these forces was just a tiny fraction stronger or weaker, the resulting universe would have been incapable of supporting any imaginable form of life.

b. The same goes for the expansion rate of the universe. If that rate varied more than a billionth of a billionth from what it's alleged to have been, life would have been impossible (because the right kind of star could not have formed). As internationally known theoretical physicist Paul Davies wrote:

> If at time I S (by which time the pattern of expansion was already firmly established) the expansion rate had differed from its actual value by more than 10^{-36}, it would have been sufficient to throw the delicate balance out. The explosive vigour of the universe is thus matched with almost unbelievable accuracy to its gravitating power. The big bang was not, evidently, any old bang, but an explosion of exquisitely arranged magnitude.

D. FROM ENERGY TO MATTER: About one second after the big bang (and its inflationary bigger bang), stable atomic nuclei develop. These are mainly nuclei of hydrogen (1 proton only), with smaller amounts of helium nuclei (2 protons and 1 or 2 neutrons), and some lithium nuclei (4 protons and 3 neutrons) and deuterium nuclei (1 proton and 1 neutron).

1. At this stage, no complete atoms form because as soon as any electrons link up with these nuclei, they are stripped away by the intense radiation. For the next 100,000 years or so, the expansion continues, the temperature drops, and the electrons begin to match up with the protons so that normal atomic structures are developed.

2. Now, when particles of matter are created from energy in a laboratory, they always appear in matter/anti-matter pairs. If an electron is created, you also get an anti-electron (called a positron). If a proton is created, you also get an anti-proton; if a neutrino is created, you also get an anti-neutrino, and so on. When the matter and anti-matter particles come together again, they annihilate one another and revert back to energy.

3. So if the matter of the universe formed as claimed by the big bang theory, you'd expect there to be an equal amount of antimatter, but that's not the case. As far as we know, our universe consists only of matter. To get around this problem, it is proposed that there was a huge bout of annihilation in the early stages of the big bang and somehow there was a residue of matter after all the antimatter was eliminated.

E. DECOUPLING AND THE CMBR: At about 300,000 years after the bang, as a result of normal atomic structures being formed (through electrons coupling with atomic nuclei), radiation is able to escape the matter, which leaves its imprint as cosmic microwave background radiation. The universe is now a transparent mass of expanding hydrogen gas with lesser amounts of helium and traces of lithium and deuterium. The momentum of the expansion continues and the glow of the intense radiation remains.

1. The discovery in the mid 1960s of near uniform CMBR of 2.7 degrees Kelvin is taken as strong evidence for the Big Bang model, but that evidence is less impressive given the play the theory allowed for temperature differences. The Big Bang model could be tweaked to account for 2.7 K, but the 1961 estimate of George Gamow,

the cosmologist who predicted the existence of such background radiation, was that it would be 51 degrees Kelvin. In 1926, Sir Arthur Eddington argued that interstellar space would have a temperature of about 3 K because everything is constantly bathed in starlight.

2. Nevertheless, the model did predict CMBR, and that was subsequently found. That's a point in its favor from a scientific standpoint. Also, in 2003 the WMAP (Wilkinson Microwave Anisotropy Probe) satellite found slight variations in the temperatures, which is what would be expected in a big bang scenario because some slight inhomogeneity in the early universe would be necessary to serve as gravitational seeds for matter ultimately to clump together. But even here, some model tweaking was employed, and there were some anomalies from a big-bang perspective. (Specifically, the variations indicated the existence of a cosmic north and south pole and a cosmic equator.)

F. ORIGIN OF THE GALAXIES: About one billion years after the bang, the expanding mass of gas for some unknown reason started contracting in localized regions so as to enable stars and galaxies to form. The question is how to get an expanding mass of gas (that has been homogenized by inflation) to start contracting in localized regions and how to prevent the collapsing gas from disappearing into a singularity again. This is a more difficult problem for cosmologists than you probably realize.

1. In 1988, physicist James Trefil stated in his book *The Dark Side of the Universe*, "There shouldn't be galaxies out there at all, and even if there are galaxies, they shouldn't be grouped together the way they are. . . . [it] is one of the thorniest problems in cosmology. . . . It's hard to convey the depth of frustration that this simple fact induces among scientists."

2. In 1991, John Horgan, a senior staff writer for *Scientific American*, noted that one of the big questions unanswered by the big bang theory is "How and when did galaxies form?"

3. In 1998 the scientists at NASA admitted "We have no direct evidence of how galaxies were formed [or] how galaxies evolved, whether they were formed from aggregations of smaller units or from subdivisions of large ones."

4. Stephen Hawking, in his 2002 published lectures on *The Theory of Everything*, includes galaxy formation in his list of unsolved problems.

5. Some speculate that infinitesimal fluctuations in the early stage of the big bang (quantum era) lead to density fluctuations in the matter era that are amplified by gravitational attraction until galaxy collapse occurs. But the cosmic expansion from both the big bang and subsequent inflation has both a dampening and homogenizing effect on any fluctuations, so the source of the necessary amplification remains a mystery. And even if one grants that the expanding cloud of big-bang gases is permeated with galaxy-sized the density fluctuations and grants that these fluctuations eventually defy the

dampening effect of cosmic expansion so as to undergo gravitational collapse into galaxy-sized objects, something must be invoked to stop the cloud of gas from collapsing into a black hole.

6. Hartnett summarizes the situation this way:

> The universe is, by definition, the planets, stars, and galaxies that surround us. Insofar as big-bang theory does not explain the origin of these objects, then we can say that big-bang theory *does not even address the question* of the origin of the universe. It does not even get to first base. Big-bang theory produces, at best (given the benefit of every doubt), an expanding mass of gas. It does not produce even one solar system, let alone a whole galaxy of billions of solar systems.

7. Beyond that, 96% of the mass of the universe is thought to consist of dark energy (73%) and dark matter (23%; normal and "exotic"), which are hypothesized forms of matter/energy that either have not or cannot be detected. Their existence is suggested by a number of observations, but the point here is that even if a theory explained perfectly what we see, we have not explained the universe because the vast majority of it is thought to be beyond our perception.

G. ORIGIN OF STARS: Stars, of course, are glowing balls of gas (mostly hydrogen) held together by gravity. For stars to form within the galaxy-sized regions of contracting gas, something more than gravity is needed. Something other than gravity must compress the gas so that its collapse can be triggered by something else. That is, something is needed to prime the cloud for fragmentation into star-sized objects and then something is needed to trigger their collapse. The magic wand of "density fluctuations" is waved freely, but the state of uncertainty is evident from the 1998 remarks of Professor Abraham Loeb of Harvard's Center for Astrophysics: "We don't understand star formation at a fundamental level."

H. ORIGIN OF PLANETS: The first stars that formed, called Population III stars, were made exclusively of hydrogen and helium, with a trace of lithium and deuterium, because those were the only elements produced by the big bang itself. No one has ever seen a Population III star. The remainder of the 92 naturally occurring elements were created in the interior of stars and in supernova explosions and dispersed throughout the cosmos by those explosions. In other words, many generations of stars came and went, each exploding to produce and spread elements heavier than helium, which were then recycled into succeeding generations of stars and ultimately planets.

1. About five billion years ago, our sun allegedly formed by the gravitational collapse of a gas and dust cloud. The inner planets (Mercury, Venus, Earth, and Mars), which are made out of rock, are supposed to have formed by the accretion of the leftover microscopic dust granules. By some unknown means, these dust granules stuck together to form solid objects, "planetesimals," which continued to grow until self-gravitating bodies were formed. Impacts between planetesimals supposedly sped the

accretion process and began to melt the surface of the growing bodies. These bodies began to settle and cool down once the planetesimals were cleared from the solar system. The earth's crust solidified, but the inner core was kept molten by radioactive decay.

2. The amount of water on Earth greatly exceeds that known on or within any other planet in the solar system. Liquid water, which is essential for life and has unique and amazing properties, covers 70% of Earth's surface. The naturalistic scenario offers no reasonable answer for where this water came from. As stated by Ben Harder in the March 23, 2002 issue of Science News, "Earth has substantially more water than scientists would expect to find at a mere 93 million miles from the sun." Ben Harder, "Water for the Rock: Did Earth's Oceans Come from the Heavens?" *Science News*, Vol. 161, 23 March 2002, p. 184.

3. Since the earth is thought to have formed from the residue of the gas and dust cloud that formed the sun, what happened to all the gas that must have surrounded the forming earth? The standard answer is that the solar wind blew it away. So why do we have gas giant planets like Jupiter and Saturn? Somehow they sucked up enough gas before the solar wind blew the rest away and the gas molecules were caused to stick together by the magic density fluctuations. The ice planets of Uranus, Neptune, and Pluto pose their own problems.

4. In 1996, Stephen G. Brush wrote the following in *A History of Modern Planetary Physics*, Vol. 3 (Cambridge, UK: Cambridge University Press, 1996), p. 91: "Attempts to find a plausible naturalistic explanation of the origin of the Solar System began about 350 years ago but have not yet been quantitatively successful, making this one of the oldest unsolved problems in modern science."

I. UNIQUENESS OF EARTH: Against all odds, a planet, Earth, developed with just the right requirements to allow the development and existence of life. You see, contrary to what you may have heard, the naturalistic scenario for the origin and development of advanced life requires a *very special* kind of planet. For that scenario to work, a planet must be in the right kind of galaxy, be in the right place in the galaxy, have the right kind of star, be the right distance from the sun, have a proper mass, have a proper spin, have a proper tilt, possess a magnetic field, have the right atmosphere, etc.

1. In 1991 astronomer Hugh Ross listed twenty such factors and stated:

> [T]he twenty listed in Table 12.1 in themselves lead safely to the conclusion that much fewer than a trillionth of a trillionth of a percent of all stars will have a planet capable of sustaining advanced life. Considering that the universe contains only about a trillion galaxies, each averaging a hundred billion stars, we can see that not even one planet would be expected, by natural processes alone, to possess the necessary conditions to sustain life.

2. As of April 2004, his probability estimate that a life-supporting planet would arise by purely natural processes was even worse. After listing scores of life-sensitive factors, Ross concludes:

> Thus, less than 1 chance in 10^{282} (million trillion) exists that even one such life-support body would occur anywhere in the universe without invoking divine miracles.

III. Dissent within the Scientific Establishment

A. The Big Bang definitely is the ruling theory and, despite its inability to explain many things, is considered robust and scientifically sound. There is, however, within the scientific establishment, a small group of dissenting cosmologists and physicists.

B. In May 2004, 34 such scientists published an open letter to the scientific community in *New Scientist.* That letter has since been signed by hundreds more scientists, engineers, and independent researchers. The letter included:

> The big bang today relies on a growing number of hypothetical entities, things that we have never observed-- inflation, dark matter and dark energy are the most prominent examples. Without them, there would be a fatal contradiction between the observations made by astronomers and the predictions of the big bang theory. In no other field of physics would this continual recourse to new hypothetical objects be accepted as a way of bridging the gap between theory and observation. It would, at the least, raise serious questions about the validity of the underlying theory. . . .
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> What is more, the big bang theory can boast of no quantitative predictions that have subsequently been validated by observation. The successes claimed by the theory's supporters consist of its ability to retrospectively fit observations with a steadily increasing array of adjustable parameters, just as the old Earth-centered cosmology of Ptolemy needed layer upon layer of epicycles. . . .
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> Supporters of the big bang theory may retort that these [alternative] theories do not explain every cosmological observation. But that is scarcely surprising, as their development has been severely hampered by a complete lack of funding. Indeed, such questions and alternatives cannot even now be freely discussed and examined. An open exchange of ideas is lacking in most mainstream conferences. Whereas Richard Feynman could say that "science is the culture of doubt", in cosmology today doubt and dissent are not tolerated, and young scientists learn to remain silent if they have something negative to say about the standard big bang model. Those who doubt the big bang fear that saying so will cost them their funding.

Even observations are now interpreted through this biased filter, judged right or wrong depending on whether or not they support the big bang. So discordant data on red shifts, lithium and helium abundances, and galaxy distribution, among other topics, are ignored or ridiculed. This reflects a growing dogmatic mindset that is alien to the spirit of free scientific inquiry.

Today, virtually all financial and experimental resources in cosmology are devoted to big bang studies. Funding comes from only a few sources, and all the peer-review committees that control them are dominated by supporters of the big bang. As a result, the dominance of the big bang within the field has become self-sustaining, irrespective of the scientific validity of the theory.