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Is the Big Bang a Bust?

The Big Bang Never Happened: A Startling Refutation of the Dominant Theory of the Origin of the Universe. By Eric Lerner New York: Random House, 1991, 466 pp. Cloth, \$21.95.

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Normally the refutation of a dominant scientific theory takes place on the pages of a scientific journal. But strange things are happening in science these days, as a Nobel laureate admits to publishing falsified data, great research universities are accused of misspending, and wacky claims like cold fusion are announced by press conference. News magazines proclaim that science is in trouble, so it must be so. The scientific establishment has been smug and complacent for too long. It's high time it was pulled down from its pedestal and told who's boss in a democratic society.

The big-bang theory is the standard framework within which most cosmologists operate, having assumed the same position held by evolution for biologists and quantum mechanics for physicists. Eric Lerner wishes to pull down not only that framework, but also what he perceives as the outdated mentality that built it.

Lerner's case against the big bang is composed of several different lines of argument. The first is conventional scientific criticism: The big-bang conjecture is said to be invalidated by the data. Cosmologists have a theory, the big bang, that makes specific quantitative and qualitative predictions that are tested against observations. They claim success for a significant majority of these tests, far exceeding all alternatives. The recent highly-publicized results from the Cosmic Background Explorer satellite (COBE) provide further evidence for the validity of the big-bang model. While admitting that a detailed, satisfactory explanation

Comment [GB1]: Although the Big Bang Theory (BBT) is such a great embarrassment to many scientists and much of the public, it persists within a philosophical milieu that has gotten, if anything, even more regressive during the 16 years since this critique of plasma cosmology was published. Papers that criticize Einstein's relativity or the BBT generally are rejected by mainstream "scientific journals" that commonly publish all sorts of nonsense (string theory, parallel universes, etc.) that does not contradict those theories directly. One needs to reread Kuhn's "The Structure of Scientific Revolutions" to get an idea of what is going on here and why the gate keepers of conventional cosmology will not be refuting the BBT in their highly respected, peer-reviewed journals any time soon.

Comment [GB2]: True.

Comment [GB3]: False. The cosmic wave background was predicted by many other theories. The BBT even got the temperature wrong: it is not 10K, but closer to the 3K predicted by others.

of several phenomena, notably large-scale structure formation, is yet to be provided, big-bang cosmologists do not see this as fatal. Lerner, however, argues that these deficiencies are so severe as to invalidate the whole notion of a universe finite in time and space.

The big bang may be wrong, but Lerner can't seriously expect to prove it in a popular book. The issue is hardly likely to be settled without the technical detail, careful reasoning, and expert critical review of the conventional scientific paper or monograph, which this is not. Lerner attempts to go over the heads of cosmologists to the general public. Despite current criticism of science, I see no sign that the public is demanding suffrage in the determination of scientific truth.

The author does not limit himself to a scientific critique of big-bang cosmology, but has a larger agenda. His goal is to refute not just the big bang, but the very thought processes of conventional science as well. He argues that the hypothesis-testing procedure is a throwback to Platonism, a product of theological rather than scientific thinking and antithetic to the essence of the scientific revolution.

According to the author, the equations used in big-bang calculations are treated by the science elite as the ultimate reality of the universe - like Plato's forms. Even after these equations are shown to disagree with observational facts, as Lerner claims they have been, they are retained by big bangers because of an irrational prejudice that the theory must be correct regardless of the facts. Rather than discard the big-bang theory, cosmologists invent new unobserved phenomena, such as cosmic strings and invisible dark matter, to "save the phenomena."

The big bang is promoted, in Lerner's view, because science has sacrificed its soul to theology. The theory confirms the theological notion of creation *_ex nihilo_*: The universe is finite, having a definite beginning, created with a fixed design, and gradually winding down under the inexorable effect of the second

Comment [GB4]: True, big bangers assume finity and Lerner assumes infinity.

Comment [GB5]: False. One never knows what straw will break the camel's back. It is highly doubtful that more technical data interpreted from the standard indeterministic perspective would make any difference. The BBT has been a gross violation of the First Law of Thermodynamics (conservation) from the beginning. That hasn't made any difference.

Comment [GB6]: This remarkably severe criticism needs a quote from the book for it to be believed.

Comment [GB7]: True. In cosmogony, physics today is a slave of mathematics. For example, treating time mathematically as a dimension does not make it one.

Comment [GB8]: True.

law of thermodynamics.

Lerner argues that this picture disintegrates on exposure to observed facts, not just those gathered with telescopes but common experience as well. From everyday observations, the universe is growing and evolving to a state of increasing order. The second law is simply wrong, or wrongfully interpreted.

The curved space and black holes predicted by general relativity are likewise not common experience, but the result of abstruse mathematics. Lerner says we should believe what our eyes tell us, not some fashionable mathematical equation.

Finally, Lerner finds within this cosmotheological conspiracy the source of most of the evils of society. The slavery of the past and the continued authoritarianism of the present somehow arise from the idea that the universe came into being at an explosive instant and is headed toward ultimate decay. He says the big bang is a convenient paradigm employed by an unholy alliance between church and state to subjugate humanity. In their view, the material world came from nothing and is next to nothing, transient and meaningless in the face of the eternal, limitless power of God.

Lerner's alternative universe is based on the matter-antimatter symmetric plasma cosmology promoted for years by Nobel laureate Hannes Alfvén. Most conventional cosmologists insist that plasma cosmology is inconsistent with observational data. In particular, Alfvén's universe is half matter and half antimatter; yet no more than one part in a billion of antimatter is observed anywhere in the universe.

What arguments does Lerner use to promote the plasma universe? Again they fall into the same classes as his arguments against the big bang. And they possess the same flaws he purports to find in conventional cosmological argument.

While castigating big-bang cosmologists for using hypothesis-testing, Lerner is not beyond claiming successful tests of the hypotheses of plasma cosmology. While maligning big bangers for inventing new ad hoc

Comment [GB9]: False. For every part of the infinite universe increasing in order, there is a part that is decreasing in order. See my paper "Resolution of the SLT-Order Paradox" at www.scientificphilosophy.com.

Comment [GB10]: I agree with Stenger on this one. Lerner's interpretation is wrong. Infinite Universe Theory states that order increases due to convergence (*complementarity*) and decreases due to divergence (2nd Law).

Comment [GB11]: I agree. The data trump the math.

Comment [GB12]: I don't consider this a "conspiracy" so much as a reflection of the state of humanity's ignorance. The BBT, like other pre-Copernican views, simply reflect the solipsism that humanity will outgrow as it matures.

Comment [GB13]: The matter-antimatter opposition makes no sense from the neomechanical standpoint. There is matter and the motion of matter, period. I assume that the idea that matter could interact with antimatter to produce pure energy (matterless motion) is false.

Comment [GB14]: Again, this must be a misunderstanding. Hypothesis testing is the basis of all science.

entities, such as the dark matter, to "save the phenomena," he introduces unobserved, invisible "filaments" throughout the universe to scatter the microwave background and make it isotropic as the data require. (The big bang requires nothing ad hoc here, and, in fact, predicted the microwave background.) While he derides the mathematical equations of general relativity for being inferred from arguments of symmetry and elegance, rather than directly from experiment, Lerner extols the marvels of Maxwell's equations of electromagnetism - also inferred as much from arguments of symmetry and elegance as from observation. And while he criticizes the theological nature of creation ex nihilo, he calls on the equally mystical ideas of Teilhard de Chardin.

Has Eric Lerner punctured the big-bang balloon so that its collapse is at hand? I doubt it. The big-bang theory is in no more trouble than the theory of evolution. Creationists tried and failed to invalidate evolution by trumpeting a few of the problems biologists still argue over. Similarly, Lerner tries and fails to invalidate the big bang by drawing attention to its current unsolved problems, declaring them fatal while ignoring the theory's many successes, unmatched by any alternative theory.

The first successful test of the big bang occurred with the discovery of the microwave background in 1964. Lerner dismisses this prediction, labeling it a failure because the measured temperature of the radiation was lower than predicted. But the important result was that the radiation was there at all. No other theory, including plasma cosmology, foresaw this. Lerner's argument here is like someone saying that Columbus failed to prove that the earth was round since he set foot in the Americas, rather than East Indies, where he had expected to land.

Lerner also argues that the universe must be much older than the 15 to 20 billion years required by standard big-bang theory. He claims that the large structures being observed by astronomers ". . . were just too big

Comment [GB15]: No longer required. The isotropism (perfect uniformity) at first predicted by big bangers could not be substantiated in later analyses. True to history, this minor falsification did not destroy the BBT.

Comment [GB16]: So did other theories, even more precisely.

Comment [GB17]: This mistake merely shows that indeterministic assumptions, such as those held by Chardin, are common even among the best scientists and must be avoided at all costs.

Comment [GB18]: Infinite Universe Theory predicts that empty space does not exist and that ether permeating all space must have a temperature (defined as the motion of matter). If the BBT was as faithful to Einstein as it claims, it would have predicted that the measured temperature was zero.

Comment [GB19]: The solar system is 4.5 billion years old and the galaxy is at least 10 billion years. Galactic clusters must be still older, and yet, the event horizon is considered to be only 13.7 billion light years away. All the galaxies are supposed to be moving away from each other. M31, however, is blue, not red. It is moving toward us, not away.

to have formed in the twenty billion years since the big bang" (p. 23). While current cosmology has yet to accommodate these structures, Lerner has not demonstrated that it never will within the big-bang framework. His calculation is based on the lengths of the structures, the longest being somewhat less than a billion light-years. In fact, only their widths, tens or hundreds times smaller, need be explained. In a 15 to 20 billion year-old universe, ample time exists to generate a structure a billion light-years long and a hundred million light-years wide. We just do not yet know the exact mechanism.

The fact is: No observation rules out the big bang theory at this time. And the big bang theory is successful in quantitatively explaining many observations. For example, calculations on the synthesis of light chemical elements in the big bang give remarkable agreement with measured abundances.

Lerner uses the kinds of arguments one often hears in public discourse on science, but rarely among professional scientists themselves. For example, he argues that plasma cosmology is in closer agreement with everyday observation than big-bang cosmology, and hence is the more sensible. A look through a telescope reveals spirals and other structures similar to those observed in the plasma laboratory (and, as cosmologist Rocky Kolb has remarked, in your bathroom toilet as well). Following Lerner's line of reasoning, we would conclude, as people once did, that the earth is flat, that the sun goes around the earth, and that species are immutable. The scientific revolution taught us to question commonsense expectations.

Finally I want to comment on Lerner's connection of the big bang to the Judeo-Christian concept of Creation. I agree with the author in condemning the way the big bang has been exploited by preachers, popes, and some scientist-authors of popular books, as providing an imagined link between science and religion, and even a verification of the existence of a Creator. We have seen this phenomenon repeated as the recent COBE

Comment [GB20]: False. The BBT requires unprecedented interpretations of ordinary phenomena. We have not seen 4-dimensions anywhere, and yet, we are to believe that we live in a 4-D universe. The Doppler effect only occurs in a medium, and yet we are to believe that no medium exists.

Comment [GB21]: As well as those proposed by indeterminists with a religious ax to grind.

results are trumpeted by the media as evidence for God's presence "shining through" in the design of the universe. These commentators do not understand that quite the opposite is the case. No support for creation by design can be found in the theory of the big bang.

Complete quantum chaos must have existed at an early moment of the big bang (the *Planck Time*, 10^{-43} second). All we know about the universe is consistent with a beginning that was a spontaneous quantum fluctuation, with structure and physical laws developing by the purely material processes of self-organization. The uncreated universe does not, as some people think, require a violation of the first or second law of thermodynamics, nor any other principle of physics.

Perhaps the big bang did not happen exactly as currently envisaged, but Lerner does not make much of a case against it. In fact, a great deal of what he discusses in his book, like cosmic plasma phenomena, is perfectly consistent with the big bang. He could have used the same material had he decided to write "The Big Bang Happened!"

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Comment [GB22]: False. The indeterministic assumption of finity is held by big banger and religious fanatic alike.

Comment [GB23]: Gobbly gook of the high priest. Fluctuation of what? Remember, we are hypothesizing a beginning here.

Comment [GB24]: A word usage common to systems philosophy, which sees the system as responsible for its own evolution. The BBT is the archetype of systems philosophy. In actuality, each system is a product of the infinite matter in motion inside it and the infinite matter in motion outside of it.

Comment [GB25]: Special pleading having nothing to do with reality, but being necessary for any cosmogony. One has a choice: one either assumes *conservation* (matter and the motion of matter neither can be created nor destroyed)(1st Law) or one assumes *creation*, its opposite.