Ten Assumptions of Science and the Demise of 'Cosmogony'

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The absurdities in current physics and cosmology are founded on indeterministic presuppositions uncovered in this review. Once subconsciously held presuppositions are stated, they become assumptions, objects amenable to study. Each indeterministic assumption has its deterministic opposite. To obtain a logically coherent set of fundamental assumptions, one must include generalized infinity, which is resisted vehemently by the present culture. Nonetheless, the ten deterministic assumptions are: 1) MATERIALISM: The external world exists after the observer does not. 2) CAUSALITY: All effects have an infinite number of material causes. 3) UNCERTAINTY: It is impossible to know everything about anything, but it is possible to know more about anything. 4) INSEPARABILITY: Just as there is no motion without matter, so there is no matter without motion. 5) CONSERVATION: Matter and the motion of matter neither can be created nor destroyed. 6) COMPLEMENTARITY: All things are subject to divergence and convergence from other things. 7) IRREVERSIBILITY: All processes are irreversible. 8) INFINITY: The Universe is infinite, both in the microcosmic and macrocosmic directions. 9) RELATIVISM: All things have characteristics that make them similar to all other things, as well as characteristics that make them dissimilar to all other things. 10) INTERCONNECTION: All things are interconnected; that is, between any two objects exist other objects that transmit matter and motion. Among the primary conclusions: time is motion, light is motion, the Universe is Euclidean, there is a dynamic ether, gravitation is a push, and the 'Big Bang' Theory must be replaced by the Infinite Universe theory.

Introduction

Cosmogony is the study of the origin and ultimate fate of the Universe. The objective of this paper is to show that it is illogical and unscientific to claim that the Universe had a beginning or may have an ending. The study of cosmogony is without merit and should be abandoned. The Big Bang Theory, the latest of cosmogonies, persists as part of the grand philosophical struggle between determinism and indeterminism. *Determinism* states that there are material causes for all effects, while *indeterminism* claims that some effects may not have material causes. In particular, indeterminists believe that they have 'free will' and that the infinite concatenation of cause and effect does not apply to human thought and action. Because most people believe in free will, they knowingly and often unknowingly support the associated indeterministic presuppositions handed down to them over the millennia. The Big Bang Theory is a natural outgrowth of indeterministic philosophy and the physics developed at its behest. Its pronouncements may appear absurd only to those who, for whatever reason, do not fully accept the indeterministic program upon which it is based. As I have shown in my recent book [1], the alternative, deterministic program must be adopted if the Big Bang Theory is to be overthrown. Timid, piece-meal approaches will continue to fail in the face of established physics, which has produced a lucrative, if not truthful accommodation with the greater society.

Discovering the Assumptions of Science

In 1940, R.G. Collingwood [2] insisted that science had *presuppositions*, hidden assumptions, upon which the work was based. This idea flew in the face of the common belief that science was based on empirical 'fact', whereas religion was based on 'faith'. Collingwood didn't say what the assumptions of science were, but he did provide the recipe for discovering them.

Motivation. First of all, the interest in fundamental assumptions is common only to those who are dissatisfied with current explanations. Most Big Bang Theorists, mathematical physicists, and philosophers of science are quite satisfied, thank you, with the post-modern mythology. In other words, anyone qualified to do this work is automatically unqualified to do the work. It would have to be someone outside the pecuniary mainstream.

Contradiction. Second, all fundamental assumptions have contradictory opposites, neither of which can be proven without a doubt. Thus, one can assume that the Universe is either infinite or finite. There is no way that one could examine the 'end of the Universe' to prove the proposition to the satisfaction of all. Fundamental assumptions thus take the form of 'beliefs' that are not 'falsifiable' as Karl Popper [3] demanded of ordinary scientific occasions.

'Consupponibility'. Third, all fundamental scientific assumptions must be *consupponible*; that is, if we can assume one of them, we must be able to assume all the others with a minimum of contradiction. Such a logically coherent set of assumptions is called a *constellation*.

I know of no such constellation in support of modern mathematical physics and the resulting Big Bang Theory. The current muddle apparently is satisfactory to most. There is no guide for distinguishing between science and nonscience. The secret to my own approach in devising the ten assumptions is the denial of 'free will'. The scientific constellation must see all things and all events in the Universe as natural results of preceding conditions. There may be an infinite number of possibilities,

but there has not been, nor will there ever be a single impossibility. Let us summarize the ten assumptions. Please note that infinity is the thread running through all of them—in stark contrast with the fundamental assumption of cosmogony.

1. MATERIALISM: The external world exists after the observer does not.

This seems so obvious that one would think that even those with an indeterministic bent would agree readily. Not so, as Bishop Berkeley claimed apparently in all seriousness as he swung the materialism-immaterialism pendulum as far to the right as it would go. Note, however, that this statement has not, nor will it ever be tested to its full extent. It essentially says that the Universe consists of 'matter', which will do its own thing after we are gone. Matter is primary; ideas are secondary.

According to determinists, and scientists generally, the 'truth' of an idea is determined by interacting with the external world. Thus, I may believe that I can fly. The way to find the truth is to take the big jump. I may have the idea that the ground beneath my feet can support my next step, but the only way to test this 'faith' is to interact with the external world. Indeterminists and non-scientists characteristically believe that there are other ways of determining 'truth'. Unfortunately, transgressions against MATERIALISM within science are common. Albert Einstein, for instance, was fond of the *gedanken experiment* (thought experiment), which is really an oxymoron instead of an experiment. Although it didn't help him find the 'truth', it sure didn't hurt his popularity with indeterminists of every stripe.

At one time, the great struggle in philosophy was between materialism and idealism. As a scientist, however, I have always had problems with that. We need to imagine ideal forms of matter to understand the intervening reality. We should not think that these ideal forms actually could exist, but we need to imagine them just the same. I find the determinism-indeterminism dichotomy to be more radically instructive.

2. CAUSALITY: All effects have an infinite number of material causes.

We have assumed that the Universe consists of matter. With causality we give motion to that matter. We claim that there are interactions between various bits of matter. At minimum, a specialist in science must believe in *specific causality*, the proposition that a particular effect has at least one cause. By persisting in the specialty, one may see no contradiction with *acausality*, the belief that some effects may not have material causes.

But by broadening our exposure to the external world, we tend to become lazy, seeing causality, not merely in specific instances, but in *all* instances. The belief in universal causality is a sign of maturation in science. There are two kinds of universal causality, however.

The first to evolve was *finite universal causality*, the assumption on which Newton's classical mechanics and Einstein's relativity was founded. They claimed that each effect had a finite number of causes. This meant that, theoretically, a finite mathematical equation could be used to describe the causes for each effect. Enamored with the idea, Laplace imagined a 'demon' who would be able to postdict the past and predict the future if he knew the position and velocity of every single thing in the Universe. Einstein wasted twenty years hoping to find a single theory that essentially would amount to the same thing.

The second to evolve was *infinite universal causality*, proposed by David Bohm in [4] 1957. I adopt it here by capitalizing CAUSALITY whenever infinite universal causality is meant. Theoretically, an equation based on this form of causality would have an infinite number of terms. The way we handle CAUSALITY in practice, is to ignore some of the terms as insignificant. For instance, suppose we wanted to calculate the distance between the earth and the moon. At minimum, we would need to know the position, mass, and motion of the sun, earth and moon, because they all affect each other. For an even more precise determination, we would need to consider the surrounding planets and galaxies. In a macrocosmically infinite Universe, there would be no end to the number of causes we would need to consider—the 'complete' equation that Newton, Laplace, and Einstein dreamed of would be impossible.

3. UNCERTAINTY: It is impossible to know everything about anything, but it is possible to know more about anything.

The advent of quantum physics forced a showdown with the classical view. No matter what anyone did, there would always be an uncertainty, a plus or minus, associated with the determination of any *real* matter or any *real* motion. As per MATERIALISM, the only way to know the truth about the external world was to interact with it, but this act, by itself, changed the external world and thereby changed the 'truth'. One had to choose between two propositions: 1) causality was objective and uncertainty was subjective or 2) causality was subjective and uncertainty was objective. Determinists, like Bohm, chose the first and indeterminists of the Copenhagen school chose the second. UNCERTAINTY, as stated above, clearly is consupponible with CAUSALITY and, as I show below, with INFINITY. Indeterminists believe, with Aristotle, that uncertainty is due to 'absolute chance', while determinists believe it to be a sign of observer ignorance.

4. INSEPARABILITY: Just as there is no motion without matter, so there is no matter without motion.

This assumption also seems to be matter-of-fact. What with the discovery of planets, galaxies, and drifting continents, the idea of things that do not move relative to other things seems moot. No argument here, but how could there be motion without having a thing that did the moving? Could motion go off by itself, independently of matter? We could have legs without running, but could we have running without legs? That is exactly the assumption fondly used by religious indeterminists everywhere. Eternal salvation, for example, apparently depends on the 'soul', which appears to be a kind of matterless motion that can fly off to meet comets or frighten teenagers that hang around particularly decrepit buildings. Some cosmogonists cap off separability with the idea that the Universe was once filled only with 'energy', a kind of matterless motion that occurred before the Big One. This is despite the famous equation, $E = mc^2$, which clearly implies that if $m = 0$, then $E = 0$. The Universe, and every language describing it, includes both subject and predicate.

So with INSEPARABILITY, the connection with societal indeterminism is clear. Modern physicists fell for it totally, inventing their own conforming mythology. The irony is that, to understand the inseparability of matter and motion, one must clearly distinguish between the two at the same time that we insist that they are inseparable. Since the relativity muddle, a well-schooled modern physicist doesn't even know the answers to fundamental questions. What is time? A dimension? A concept? A measurement? From the deterministic point of view *time* simply is motion, the motion of one portion of the Universe with respect to another portion. Clocks always measure one kind of motion or other. Universal time is the motion of each thing with respect to all other things. Time is not a dimension even though we can draw a model of 'it'. A material model of motion cannot make motion a 'thing', any more than it can make a fourth dimension for the Universe.

5. CONSERVATION: Matter and the motion of matter neither can be cr ·ated nor destroyed.

The First Law of Thermodynamics is still true. In an infinite Universe, matter and its motion is involved in the creation of an infinite variety of things from still other things. Its indeterministic opposite, *creation*, claims that material things, even the Universe itself, could be created from nothing. This may be totally illogical, but indeterminists seldom call upon logic in their defence.

The struggle between CONSERVATION and creation has taken many forms. In geology, the battle ensued between 'uniformitarianism' and 'catastrophism'—slow change vs. rapid change. In biology, it was between evolution and supernatural creation. In astronomy, it was between cosmology and cosmogony.

6. COMPLEMENTARITY: All things are subject to divergence and convergence from other things.

The Second Law of Thermodynamics states that the entropy or disorder of an *isolated* system can only increase. COMPLEMENTARITY states that there is a complement to the Second Law that states that the entropy or disorder of a *nonisolated* system can only decrease. In an infinite Universe, the Second Law is a law o_ divergence, while its complement is a law of convergence. Things go out of existence as their separate parts come apart; they come into existence as their separate parts come together. COMPLEMENTARITY is a restatement of CONSERVATION and the deterministic version of Newton's First Law of Motion:

> An object at rest tends to stay at rest and an object in motion tends to stay in motion with the same speed and in the same direction *until* acted upon by an unbalanced force.

Newton's use of the word *unless* instead of *until* merely betrayed his belief in macrocosmic finity as well as his idealistic belief that an isolated system actually could exist.

7. IRREVERSIBILITY: All processes are irreversible.

This should be obvious from the aforementioned assumptions. Each event in an infinite Universe is unprecedented. The sky, for example, can never be the same on two different nights. So the motion of each portion of the Universe produces a unique occurrence. Reactions can be considered 'reversible' only by ignoring the environments in which they occur. Dreams of 'going back in time' are pure sci-fi and have no possibility of occurring.

8. INFINITY: The Universe is infinite, both in the microcosmic and macrocosmic directions.

The Universe is either finite or infinite. Although the choice between these two contradictory possibilities must forever remain an assumption, that choice is absolutely critical for the advancement of science at this juncture. There are two forms of the belief in infinity: microcosmic and macrocosmic. The first scientific worldview was Newton's classical mechanics, which tended to overemphasize the outsides of things. It attempted to combine microcosmic finity with a vaguely permissive approach to macrocosmic infinity. The second scientific worldview is today's systems philosophy, which tends to overemphasize the insides of things. It attempts to combine a vaguely permissive microcosmic infinity with macrocosmic finity. A proper consideration of both the microcosmic and the macrocosmic (INFINITY) leads to a new scientific worldview that attempts to treat the insides and outsides of things equally. [5] As with INSEPARABILITY, the philosophical resistance to INFINITY is extreme due to the obvious religious implications. The current compromise may have sacrificed atomism, but it is not about to surrender cosmogony without a long, drawn-out fight.

9. RELATIVISM: All things have characteristics that make them similar to all other things, as well as characteristics that make them dissimilar to all other things.

All thinking requires the comparison of one thing with another. How we regard those comparisons is similarly decisive. The opposite of RELATIVISM is *absolutism*, the indeterministic belief that some things may be perfectly identical or completely different from other things. In nature, however, there are no perfect identities or dichotomies. RELATIVISM nevertheless enables us to transfer studies of portions of the Universe to still other portions. This makes *all* portions of the Universe amenable to scientific study. RELATIVISM is characteristic of the real world, which exists, while absolutism is characteristic of the ideal world, which is only imagined. Due to its kindred requirement for finity, mathematical physics is plagued by absolutism. Thus, in the measurement of time, for example, each second is considered identical to all other seconds. In reality, no two seconds are identical because any clock anyone could ever use to measure them has a plus or minus associated with it. As mentioned, the infinite number of effects that contribute to real occurrences produces this deviation. The answer is not to give up the idealizations of mathematics entirely, but to continually remind ourselves that mathematics never can be more than an approximation of a reality whose primary characteristic is its infinity.

10. INTERCONNECTION: All things are interconnected; that is, between any two objects there exist other objects that transmit matter and motion.

To be logically consistent, indeterminism must support disconnection along with finity, absolutism, and the other indeterministic assumptions. Ironically, Collingwood's appeal for con-

supponibility implied that INTERCONNECTION must be included within any constellation that was logically coherent. Being an idealist, he certainly would not have stated INTERCONNECTION as I have above. Like Einstein, he no doubt would have preferred to believe that 'empty space' truly was empty, and, maybe like the atomists, that 'matter' was indivisible, solid, and without a smidgeon of empty space. But in all our investigations, we have never been able to find pure, empty space. Also, when we subdivide matter we always find two main properties: 'space' and 'matter'. INTERCONNECTION thus recognizes empty space and solid matter as ideal end members of the intervening reality. Neither empty space, nor solid matter actually could exist—they are only ideas. The 'nonexistence' of the Universe is merely an idea; the reality, we assume, is that nonexistence is impossible, everywhere, and for all time.

Conclusions

According to the ten assumptions of science, the study of cosmogony is without merit. The mathematical physics supporting the current version, the Big Bang Theory, uses a variety of assumptions that are primarily indeterministic. Mostly, those assumptions really are not assumptions at all, but presuppositions, because they are not fully recognized as assumptions by those who use them. The infinite Universe can never provide us with definitive starting points--assumptions that cannot be questioned. The best we can do is to select consupponible assumptions that provide insight into the true nature of the Universe. As scientists we always know how to determine what the 'true nature' of the Universe is—interact with it.

The primary conclusions of this work include the propositions that: time is motion, light is motion, the Universe is Euclidean, there is a dynamic ether, gravitation is a push, and the 'Big Bang Theory' must be replaced by the infinite Universe theory.

References

[1] G. Borchardt, **The Ten Assumptions of Science: Toward a New Scientific Worldview** (Lincoln, NE, iUniverse, 125 p., 2004).

[2] R.G. Collingwood, **An Essay on Metaphysics** (Oxford, Clarendon Press, 354 p., 1940).

[3] K.R. Popper, **The Logic of Scientific Discovery** (15th ed.) (New York, Routledge, 544 p., 2002).

[4] D. Bohm, **Causality and Chance in Modern Physics** (New York, Harper and Brothers, 170 p., 1957).

[5] G. Borchardt, **The Scientific Worldview: Beyond Newton and Einstein** (Lincoln, NE, iUniverse; in preparation, 2005).