COSMIC SPACE AND TIME

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In this article the big-bang theory is examined critically. Points considered include problems having to do with initial values, entropy, the initial expansion rate, the relative abundance of matter and antimatter, the formation of stars and galaxies, the interpretation of the cosmic red shift, the missing mass, uncertainties in the Hubble relation and constant, the distribution of quasars, the synthesis of elements, and the Schwartzschild radius of the universe. It is concluded that the big-bang theory fails to provide a satisfactory explanation of the universe.

Pick up any contemporary article by any evolutionist on the subject of cosmology and you will be impressed by the assured certainty with which the processes and ages of the universe and its constituents are known. But below the popular surface there lurks quite a different story. There are a considerable number of problems with which the modern cosmogonical theories, despite their sophistication, have been unable to cope. Certainly there is no comprehensive evolutionary view of the universe which can escape super-miraculous elements which point to the Creator.

The most highly favored cosmogonical model today is the big-bang theory. As a theory, it resulted from the observation that almost all faint and, presumably, distant galaxies appear to be receding from the earth at speeds which increase with their distance. Starting from trigonometric parallaxes and passing through Cepheid variable stars to the brightest galaxy cluster members, man has constructed a cosmic distance scale. The resulting distance scale involved billons of light years and it has allowed a more or less linear (but see later) relation to be developed between a galaxy's redshift (presumably a measure of the galaxy's speed along the line-of-sight away from the earth) and the galaxy's distance. The slope of the resulting line is called the *Hubble constant* and its inverse, which has units of time, is taken as a measure of the age of the universe. Such an interpretation of the Hubble relationship implies that the entire universe and all that in it is was once compacted into a single point. Since the interpretation of the Hubble effect is that the matter constituting the universe is presently expanding outward from that point, evolutionists speculate that all matter exploded violently from said point, and that explosion is termed the *big bang*.

To the evolutionist, the most unmentionable of the problems associated with the big bang is its ultimate origin. Whence is all the material that makes up the universe? Any theory about any origin will, of necessity, involve mathematical terms which depend inversely on the coordinates. Such terms will end up being indeterminate at the origin. In other words, the mathematician or physicist will end up dividing by zero at the origin. Take the density of the universe as an example. Density is simply the total mass divided by the volume. Now the mass of the universe presumably remains constant (from the first law of Thermodynamics), but as the big bang is extrapolated back in time, the volume of the universe goes to zero. This makes the density equal to some finite number divided by zero and the solution to that is indeterminate.

To avoid dealing with such indeterminate solutions the physicists and astrophysicists do not really start the universe at time zero but, instead, start a fraction of a second (10^{-44} second) later than time zero. Likewise they do not start at zero size but start at a radius equal to the speed of light times said time which is 10^{-34} cm. But this merely begs the question of indeterminacy.

The Heisenberg uncertainty principle (that both an object's position and its momentum; or its energy and its time, cannot be known to utmost precision) is invoked as an excuse for such negligence; but this means that the Heisenberg uncertainty principle should be independent of matter since the evolutionists thus assume that the principle existed before the universe and that the universe resulted from the principle. Yet the uncertainty principle is only definable in terms of material substance as either: $\Delta E \Delta t \sim h/2\pi$ where ΔE is any change or uncertainty in energy, Δt is the uncertainty in time (i.e. *when* the object has energy, E) and h is Planch's constant; or else it is defined in terms of position, x, and momentum, p: by $\Delta x \Delta p \doteq h/2\pi$.

Invoking the Heisenberg uncertainty principle to account for the origin of the universe is thus to revert to the old question of which came first—the chicken or the egg—and does not solve anything.

Allied with the question of the ultimate origin of the universe in a big-bang context is the problem of entropy. There is a real problem here as to how such a chaotic mess as the big bang is purported to have been should ever evolve into the ordered universe which we know today. Evolutionists generally attempt to circumvent this problem of entropy by pointing out that the overall entropy of the universe remains constant as long as it is assumed that the universe expands adiabatically. But this is trivial, since to assume that the universe expands adiabatically is to assume that the entropy remains constant in the first place. The definition is thus circular.

Evolutionists disdain the miraculous when it comes to nature and the creation; but the big bang is even more dependent upon miracles than is the Genesis 1 account of creation. Let us, for the sake of argument, assume the big bang model to be correct. In that case, the universe exploded into existence some 10 to 20 billion (10^9) years ago. Yet we find then that the miraculous is still present, for as Robert Dicke has written:

> If the fireball had expanded only .1 per cent faster, the present rate of expansion would have been 3×10^3 times as great. Had the initial expansion rate been .1 per cent less and the Universe

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> would have expanded to only 3×10^{-6} of its present radius before collapsing. At this maximum radius the density of ordinary matter would have been 10^{-12} gm/cm^3, over 10^{16} times as great as the present mass density. No stars could have formed in such a Universe, for it would not have existed long enough to form stars.[1]

For a chance fluctuation of the Heisenberg uncertainty principle, that was some exact fluctuation! But then there are those evolutionists who would maintain that if it had not happened just so precisely that we would not be here to observe it. Hypocritically, the same people will not allow creationists to argue the anti-parallel of the argument, namely, that the presence of such design in the universe argues for the existence of the Designer.

Most of the big-bang models, and there are several, predict that equal amounts of normal matter and antimatter arose from the initial stages of the big bang. Yet the universe appears to be constituted primarily of normal matter; at least, that is the evidence from observational radio astronomy.

If a radio wave travels through a magnetic field, then the wave's plane of polarization is rotated by that field. Such an effect is called *Faraday rotation* and occurs in such a way that the polarization plane is curled in one direction if the field is due to normal matter, and it is curled in the opposite direction if the magnetic field is due to antimatter. Reinhardt[2] observed that the rotation of the polarization plane or radio waves from celestial sources was primarily in one direction. This indicates that the universe is primarily made up of one type of matter; presumably, normal matter. There are some theories, however, which have been proposed to account for the apparent lack of antimatter in the observed universe. The best of these theories require that the universe be expanding evenly in two directions and at a different rate in the third direction (dimension).[3] But this, too, is not observed.[4]

The big-bang has other problems, too. Evolutionary models have never been successful in accounting for the formation of a single star, let alone an entire galaxy or cluster of galaxies.[5] Virtually every star-formation model invoked today assumes that both stars and galaxies started out as density irregularities in the very early stages of the big-bang. Without such an assumption, the physics of collapsing gas clouds will not allow for the formation of objects even remotely resembling the major constituents of the universe.

In order for such density irregularities to be present in the early stages of the big bang, certain explanations have been proposed. These include magnetohydrodynamical "pinch" effects (like plasma bottles or magnetostrictions)[6], but the existence of such pinch-effects in the early stages of the universe requires that there presently be a cosmic magnetic field. The existence for such a cosmic magnetic field is in doubt, there being conflicting evidence for and against it.[7] Furthermore, the 3-degree Kelvin black-body radiation field shows no evidence for any significant clumps of matter at a time believed to be about a million years into the big bang.[8]

Throughout the speculations of the evolutionists, which speculations we have mentioned this far, the evolutionists have assumed that the Hubble constant is indicative of a real expansion of the universe; but for over a decade, now, Halton Arp[9] has been pointing at cases which contradict the Hubble interpretation of the redshift. Arp first found a statistical correlation between the sky positions of quasars and bright, nearby galaxies. Furthermore, he has pointed out that if quasars were local objects, that then they cannot result from being thrown out of the nucleii of galaxies, the most popular "local" theory, for then we should observe as many blue shifts as red shifts; but only red shifts are observed.

Arp has also found cases such as NGC 1199 where an object with a redshift amounting to 13,300 km/sec is found to be located in front of a local galaxy with a Doppler shift (redshift) of 2,600 km/sec.[10] Recently the local hypothesis for quasars has suffered further setbacks, the luminous bridges mentioned by Arp being dismissed as optical effects, the bending of light in gravitational fields, or diffraction effects similar to that observed by bringing one's thumb and forefinger together when they are silhouetted against a light. As we shall note shortly, if quasistellar objects are really at cosmological distances from earth, then the result is disastrous for the evolutionists.

Another assumption that lies buried in the Hubble relation is the assumption that the cosmic distance scale is known. Underlying this is the further assumption that all parts of the universe look alike (cosmological principle). But if the distance scale, as presently adhered to, is even remotely correct, then there is the problem of the missing mass. The rotation of galaxies appears to be non-Keplerian; indicating that there is some 10 to 30 times as much material in a galaxy as can be accounted for by its luminosity (light output). For a cluster of galaxies, the discrepancy between the light and dynamic mass estimates increases to factors of 100 to 500 or more.[11]

If Bouw's detection of the rotation of the Virgo cluster of galaxies is correct,[12] then judging from the shape of the rotation-curve, either Newton's law of gravity appears to break down at large distances or else there is a tremendous mass distribution in galaxy clusters. If this is so, then this, too, must sooner or later be taken into account by the big-bang evolutionary models.

Then there is the problem that although the relation involving the Hubble constant is taken to be linear, in actual fact the data do not give a straight line at all. Evolutionists can only fit a straight line through it by assuming that departures from linearity are due to evolutionary effects. Such departures are subsequently defined to be evolutionary and set the standards for evolution in galaxies as a whole. The true shape of the Hubble relation is much closer to being quadratic than to being linear.

Even if the Hubble constant is accepted, and the linear relation, evolutionists are still not out of the rough with the big bang model. The actual value of the Hubble constant is tremendously uncertain. Modern estimates range from 20 km/sec/Mpc to 125 km/sec/Mpc. For the last several years the value has been arbitrarily set at 50 km/sec/Mpc since this is the highest value consistent with the geological age of the earth and the lowest value even remotely consistent with observa-

tion. In other words, the evidence is that the universe, according to the Hubble constant, is too young to have allowed for the evolution of the earth. This is especially so in light of recent evidence which raises the Hubble constant back up to a value of 95 km/sec/Mpc, a value which corresponds to only 10 billion years for the age of the universe.[13] This leads to further problems because if we assume that the uranium and thorium were produced by some unknown process at the time when the galaxy was formed, then using the same argument that is applied to the dating of terrestrial rocks and extraterrestrial meteorites, it appears that the Milky Way must be at least 12 billion years old, an age which exceeds the age of the universe according to Hubble's constant.[14] Even some stars and some star clusters are claimed to be older than 10 billion years.

Browne and Berman[15] applied the usual evolutionary age determination logic to rhenium-187 and osmium-187 abundances and came up with an age of the universe of at least 20 billion years and, more comfortably, 29 billion years. This figure far outstrips any "comfortable" Hubble age.

All this serves to cast doubt on the Hubble constant as an indicator of age. As Akridge[16] has suggested, though, the Hubble constant may be purely a measure of the initial density of the universe at the time of the creation and that it thus cannot legitimately be extrapolated back in time to give any meaningful age.

As if the aforementioned radiometric problems were not enough, the assumption that quasar redshifts are cosmological in nature leads to a very interesting conclusion. Said conclusion is noted by Varshni with the following words:

> It is shown that the cosmological interpretation of the red shift in the spectra of quasars leads to yet another paradoxical result: namely, that the Earth is the center of the Universe.[17]

Varshni found some 57 groupings among a sample of 384 quasars. His groupings were purely in terms of similarity of spectra, not in values for the redshifts and not for clustering in areas of the sky. On the contrary, his objects are not necessarily near each other when projected onto the sky, but he did find that the value of their red shifts was very coincidental. He thus concludes that if the cosmological red-shift hypothesis is true, that the 57 groups are arranged on 57 spherical shells, all centered on the earth (see Figure 1).

After considering and dismissing two other alternatives, Varshni finds that he is forced to conclude that if the redshift hypothesis is accepted for quasars, and that likewise, if the big-bang model is accepted for them, that then:

> the Earth is indeed the center of the Universe. The arrangement of quasars on certain spherical shells is only with respect to the Earth. These shells would disappear if viewed from another galaxy or quasar. This means that the cosmological principle will have to go. Also it implies that a coordinate system fixed to the Earth will be a preferred frame of reference in the Universe. Consequently, both the Special and the General Theory of Relativity must be abandoned for cosmological purposes.[18]

There might be a tendency to dismiss this as a chance occurrence; but Varshni does consider the odds and concludes that the odds against a chance occurrence is 3×10^{86} to one.[19]

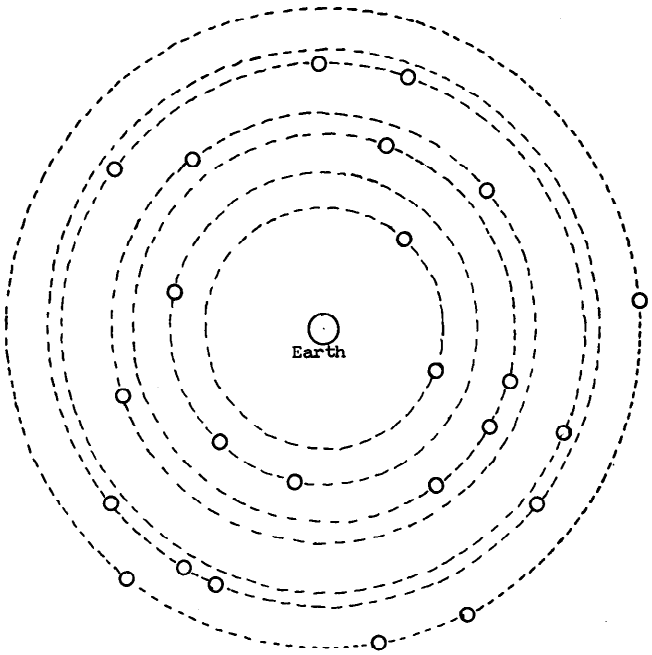

Figure 1: A two-dimensional representation of Varshni's result. Here the quasars are represented as distributed on circles which are centered on the earth. Note that moving the point of viewing away from the center to one of the quasars will destroy the cosmological principle in that the other quasars will no longer appear centered on the quasar. It will be understood that this drawing is not necessarily to scale.

Removing the cosmological redshift hypothesis does not necessarily help the evolutionists, for, as Arp and others have pointed out,[20] there are serious problems with any local explanation for quasars, not the least of which is to explain their redshifts since all other redshifts would thus also be suspect. Varshni's alternative is that the quasars are local, but then we might question as to why there is not a greater dispersion in the redshifts of the 57 groupings; they would still appear to be centered on the earth.

The bulwark of the evolutionist's evidence for the big bang is the 3-degree Kelvin blackbody radiation. This radiation is believed to be due to the light released when electrons and protons first combined to form atomic hydrogen some one million years into the course of the big bang. The temperature of the universe at that time is calculated to have been about 3,000 °K and what makes up the 3 °K radiation field today is that 3,000 ° field redshifted by a factor of $z = 1{,}000$.

Here, too, a curious situation arises. The redshift of the hydrogen flash is thus taken to be 1,000, but the highest redshift of any observed object is less than 4, and that is for a quasar at that! Where, then, are the objects with intermediate redshifts? Where are the objects with redshifts between $z = 4$ and $z = 1{,}000$? Was the universe devoid of objects for all the intervening billions of years?

There is a possible creationist interpretation of the cosmological 3 ° Kelvin radiation field and it does not

involve any evolution at all. There is a "curious coincidence" which was first mentioned by Hoyle *et al.* in 1968[21] and which was echoed by Clayton in 1969.[22] If we assume that all the elements in the universe were created *in situ* by nuclear fusion from hydrogen, and if the resulting photons were then thermalized (so as not to be potentially life-threatening,) then the resulting radiation field would have a temperature of 3° Kelvin and would have a black-body spectrum. Actually, Hoyle and his colleagues considered only the conversion from hydrogen into helium and that not necessarily *in situ*, but their estimate for the mean density of the universe is probably low so that the effect remains when we consider all the elements.

Evolutionists are thus faced with a miraculously balanced big-bang, which somehow managed to start sometime after time began and thus avoided insurmountable difficulties which it would never have overcome in the first place, a miraculous placement of the earth at the apparent center of the expansion, and contradictory values of the ages of earth, Galaxy and universe. But their problems do not end there. Hoyle[23] has drawn attention to yet another "coincidence" which happens to be a particular favorite of his. The nucleii of atoms exhibit energy levels in much the same way as electrons exhibit energy levels about the nucleus. Now it so happens that carbon-12 has a nuclear energy level at 7.655 Mev and oxygen-16 has a level at 7.119 Mev. If we accept nuclear fusion to account for the elements (even fusion *in situ* some 6,000 years ago), then the relative placement of these two energy levels is nothing short of miraculous.

The energy levels themselves are due to properties of the strong nuclear force and the electromagnetic repulsion between protons. Change these two properties ever so slightly and there would result a drastic change in the two aforementioned energy levels. The change would be such that almost all the atoms that are now carbon-12 would have gone on to become oxygen-16. The implication of this is clear; no carbon, no life as we know it.

Finally, there is one other factor which has not been dealt with in either the evolutionary or the creationist literature as far as the author is aware. The astronomical literature for the last 10 years has been abuzz with rumors and speculations about *black holes*. A black hole is defined as a clump of matter which has been so compacted that its gravitational field has overwhelmed all other forces so that its escape velocity exceeds the speed of light. Nothing can escape a black hole; at least, not a massive black hole.

For a given mass, M, the radius, R, to which the mass must be compacted in order to become a black hole, termed its *Schwarzschild radius*, is given by: $R = 2GM/c^2$, where G is the gravitational constant, and c is the speed of light.

According to Dirac's large number cosmology, there are about 2×10^{78} nucleons in the universe.[24] At a mass of 1.67×10^{-24} gm per nucleon, this yields a total mass for the universe of 3×10^{54} grams. The Schwarzschild radius of a universe of that mass is about 500 million light-years; far less than the currently held radius of the universe. In order to save the big-bang cosmology are we to believe that the universe escaped from out of its own Schwarzschild radius or that the physics of black holes does not work for the universe?

Otherwise, if we accept the missing mass as being above and beyond the mass of the Dirac cosmology, thus giving us a factor of 500 to play with, can we conclude anything at all from the Dirac cosmology? In particular, can we conclude anything about the age of the universe from Dirac?

In connection with our discussion of black holes we might make note of some recent developments in the field. There is mounting evidence that quasars, Seyfert nucleii and the nucleii of normal galaxies are all related and represent more or less a continuum of states or characteristics. The nucleii are taken to be supermassive objects; objects above 6 solar masses are defined to be supermassive objects but when it comes to these nucleii hundreds of thousands to millons of solar masses are considered to be involved. If this should prove to be the case, then Varshni's observation will hit with a vengeance, for the centrality of the earth cannot be removed by any such development as the demonstration of an apparent link between the nucleii of normal galaxies and quasars.[25]

We have considered only a few of the fundamental problems which face modern evolutionists in their struggle to hold on to their atheistic naturalism—their "bang! you're alive" model. Much of what has been critiqued here will be outdated in the years to come for such is the nature of modern science. After all, historically, today's science is tomorrow's superstition; especially in an age where a theory is considered "fruitful" if it raises more questions than it answers. In the light of our study it would appear that the big-bang is a superstition and is devoid of any factual basis in reality: it is based on some of the least understood, most speculative, and least investigated assumptions ever adopted by any man. Truly it is "science falsely so called" (I Timothy 6:20).

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[25]According to current theory masses over about 60 solar masses up to 5.4×10^5 solar masses and then those over about 7.5×10^5 suns will all end up as black holes. This theory ignores a well known theoretical "fact", namely, that stars above about 6 solar masses will not contract homologously. Instead, such stars should (ignoring the problem of initiating the collapse in the first place) collapse only up to a certain point beyond which it cannot contract and during which phase material should be falling onto the star which thus gains mass. Eventually the star "explodes" or "burps", losing mass. This burp is followed by a period of material again falling onto the star and the cycle starts all over again. Of all the evolutionary theories, this one is the best that there is to account for the apparent continuity from galaxy nucleus to quasar. From a creationist point of view this has two effects: first, it lessens the energy problem of sustaining quasars for 10^7 years, the new theory making them only a periodic phenomenon and second, it provides creationists with a complete spectrum in one model since the model need not have anything at all to do with time or evolution. Such behaviour on the part of galactic nucleii is independent of whether they have evolved or not. There are problems with the new theory and these problems are the same as face black hole enthusiasts with accreting disk models. There is also some question as to whether or not any material blown away from the supermassive star would collapse back onto its surface in a time scale which is short on a scale of 10^7 years. But most of these are problems for evolutionists. Finally, this theory avoids black holes since it indicates that supermassive stars will not ultimately collapse into a black hole. Black holes would have to come into being in other ways, if they exist at all.

THE OKLO NATURAL URANIUM REACTOR EXAMINED FROM A CREATIONIST'S VIEWPOINT

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In 1972 evidence was discovered that a body of uranium ore found at Oklo in Gabon, Africa, had once been a natural reactor. At least six reactor zones existed in the pre-Cambrian rock found at Oklo. Some have believed that the evidence indicates an age of 1.9 billion years for the reactors. In this paper, arguments are presented which show that the data are consistent with a more recent date for the self-sustaining chain reaction which was achieved—a date, in fact, which would be compatible with young-Earth Creationism.

In 1972, while analyzing some uranium which had been mined at Oklo in Gabon, Africa, some scientists working at the nuclear-fuel-processing plant at Pierrelatte in France discovered some ore which had an abnormally small percentage of U-235 as compared to U-238. In most ore the fraction of the total uranium which is U-235, called the enrichment, is 0.72%. No natural uranium had ever been previously discovered which was more than ±0.1% different from 0.72%. In trying to explain why the particular ore being analyzed was different, it was found that a fission chain reaction had occurred in this ore, hence a natural reactor had existed (probably started by an influx of water to serve as a moderator) long before man ever discovered fission or built a nuclear reactor. The various arguments involved have been discussed by Cowan.[1,2] It also seems to have been concluded that the data are not consistent with an age for the reactor less than about 1.9×10^9 years. The author does not agree that this conclusion is necessary, and in this paper would like to present arguments to show that a younger age can be supported by the data, in fact an age as recent as 6000 years or so. There are four areas which need to be discussed: I. Interpretation of the Reactor as it Relates to the Genesis Flood, II. Nd-142 Concentration and Fuel Depletion, III. The Total Number of Megawatt-Hours of Energy Produced by the Reactor, and IV. The Effective Multiplication Factor for the Neutron Population.

I. Interpretation of the Reactor as it Relates to the Genesis Flood

In historical geology, it has become common practice to relate different strata found at a location to a "geological time table" spanning a few billion years. Creationists do not deny that the different strata exist, but interpret them in terms of different types of sediment deposited by the Genesis flood.[3] In the Oklo area of Africa, the surface rocks are pre-Cambrian rocks, which according to standard historical geology are the oldest and lowest lying strata. According to our young earth model, the pre-Cambrian rocks would either be the lowest lying sediments from the flood, or else the pre-flood rocks.

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