



CAN WE SEE THE EDGE?
JIM SCHOFIELD

The Conundrum of Time & Distance In the Cosmos

1. Introduction

Some time ago I was somewhat perplexed when listening to cosmologists talking about the Universe as seen through the latest telescopes. They seemed to be drawing bizarre conclusions about things, and I was at a loss to see how they could manage to come up with what they are saying. You would think that their view of the Cosmos, was like our view across the street, with everything simultaneously available, and all relations easily extractable and comprehensible. How on Earth (or in the Cosmos) were they managing to draw such conclusions?

If we take fairly moderate distances out into Space, we find that we are looking at a fairly precise distance, but certainly **not** as it is now! We are also looking across some significant time period into the distant past! And the further we look into the distance, the further back in time, are we seeing. This is nothing like everyday viewing is it? And it is so because the distances are so colossal that we must take into account the time it takes for the light from a particular distant spot to reach our current position. We are now seeing what it was like **then** at that position! Apart from the tiniest region very close to the Earth, absolutely everything we see has taken time to reach us. Everything is from the past, and, sometimes, tremendous delays are involved.

This is so much the norm that we do not measure the distances involved in miles, or even in millions of miles, but in “light years” – the time in years it takes for the light to reach us has come to be how we measure distance, when we are talking cosmologically.

Now, this having been explained, you would think that it isn’t much of a problem. We can keep that in mind. But, I’m afraid it is certainly much more difficult than that!

Think about it. If we want to study a certain situation in both distance and time from here and now, we don’t get very much from even the most careful viewing. We cannot merely **choose** what we want to see. Indeed, for a given time in the past, all that is available to us is a very thin spherical shell. We cannot choose the distance away from us that we wish to study. That is totally fixed by the time we have chosen. It will include **ONLY** those events at that precise distance from us indissolubly locked into the time we have chosen. Looking to any even slightly different distance will give us what was there at a **different time**. Our usual method of looking around a situation, as we do around ourselves on Earth, is impossible at cosmic distances.

To make this crystal clear, let us address the key questions;

What is the Edge of the Universe like?
Where is it now?
What can we see of it?

If we had first of all picked upon a direction and focussed deeper and deeper until we hit the obvious edge to our Universe, what could we discern from that viewing?

Well, we will be looking at a particular spot and also a particular time in the past. If we move to the left, or right, or up or down “following the edge”, we would have to consciously “refocus”, because we would be looking at a different time and a different distance as we “seemingly” traced around the edge. Indeed, theoretically we could trace out a continuous edge as a shell all around us, but all its seeming continuity would be merely an **illusion**, because in sticking to that edge, we would be choosing to move in both space and time as we did so.

The proof would be in what we see. For it would appear egg-shaped! (As will be demonstrated later) Now, by all reasonable thinking, we would expect the universe to be spherical, and it probably is. But, it is impossible to see the whole edge **all at once** at any chosen moment in the past. The reason should be becoming obvious. Not every point on the edge at a particular time is the **SAME** distance from us now, and we can only see things at the same time, which were exactly the same distance from us then! Otherwise it is impossible! It was our choice of attempting to view what was, and still is, a continuous feature in Space that made our task impossible. All we can see from the exact same time is a very thin (cosmologically speaking) spherical shell, and if we could “turn off” everything else that is visible except this same-time shell, there would indeed be very little for us to see. We would be taking such a thin “slice” that there would be almost nothing in it.

Clearly, this becomes a major disadvantage, because we want to discover the trajectory of the growing and evolving Universe in order to understand it. It is this situation that determined what this first Special on Cosmology HAD to be about. What else could it be but **Can we see the Edge?**

That might appear to be the exact time to terminate this introduction and move on immediately to the collection of papers, but I am still somewhat concerned.

Let us suppose that in seeking the Edge of the Universe we pick a direction and look deeper and deeper into the past. Now, if the Universe is NOT infinite in either Age or Extent, such a process cannot go on forever. We will perhaps finally arrive at the looked-for Edge, beyond which there would be absolutely nothing. **BUT, we could run out of time!** It may take longer for a view of that distant Edge to reach us, than it would take for the Earth to arrive at our position now. The light from that Edge would still be on its way. Indeed, that turns out to be true for all Edges of the Universe in every single direction. All current edges will be invisible, but we will be able to see earlier edges, which were at just the right distances then for the light from there to reach us now!

If, as the cosmologists insist, the Universe is 13.7 billion Years old, then this gives us a time limit. Within that time, the universe will had to have had enough time to expand to a given size, AND for its light to then travel from the further away Edge to the position of observers on Earth. Now, though 13.7 billion years seems a long time, the crucial factor has to be the speed of expansion of the Universe since an initial Big Bang. This author has tried various speeds, and ended up using an average speed of expansion of the **material** Universe of C/10. So this would deliver a radius of only 1.37 billion light years. So a maximum distance for light from one edge to reach a (assumed) position of the Earth at the opposite Edge at a distance of 2.74 billion light years. Now this seems small compared with 13.7 billion years for the age of the Universe, but, of course, the light from the far edge is only NOW starting on its way, and will only reach the current position of the Earth in 2.74 billion years time (by which time the Earth will no longer be there but a further 0.274 billion light years further way.

As can be seen by these limited considerations, to deal with the full question a solid method will have to be developed which will enable these two developments – of the size of the Universe, and that of the propagation of Light across it, to be brought together to give us all that we want. These questions are begun in this Special.

Another flip idea that seems to get bandied about, is the possibility of seeing very far back towards the Big Bang itself, and what is always forgotten is that at that time the Earth (or what will later become the Earth) was AT (i.e. within) the Big Bang itself, and ever since it has be moving outwards at only a fraction of the speed of Light. That being the case, the light (if any) from the Big Bang has throughout the whole history of the Universe been **already past**, and soaring well beyond, our positions throughout. Indeed, the vast majority of the light from most parts of the Universe has either long since passed us and vanished into the far distance or as not yet had time to reach us. The final paper in this Special attempts to clarify this difficulty too.

Clearly, it is likely that when we look at the precise position of the Big Bang itself we will see what was happening there only 1.37 billion years ago, some 12.33 after the Big Bang occurred. The vast majority of all light from that position has not only passed us way back in the past but has been past our position at all times ever since.

We would have to look to the far side of the Universe well beyond the position of the Big Bang to expect to see anything at all from early(?) in the Universe. Yet, if we see it, it could not be from early in the Universe: light from those times has been and gone long ago! Once again there is a paper in this Special, which addresses this question too.

Finally, even at this point in time, there is already more than enough material to fill **three** Specials, and they continue to be written all the time. SHAPE Journal will publish all of these, and presumably not only what else is made available in the future, but any cogent criticisms of those already lined up.

Jim Schofield

Can We See The Edge?

Special Issue 2

1. Introduction
- 2. Contents**
3. Can We See The Edge?
4. Our Egg Shaped Universe
5. Does It Really Explode?
6. Seeing The Edge + Speeds of Expansion
7. Mathematical Speculation in Cosmology
8. Creation & Expansion of Space Itself
9. Initial Speed of Light
10. Time Space Mapping of the Big Bang Universe
11. Credits

3. Can We See The Edge?

Papers 1 & 2

Now, following an important (but brief) paper entitled **Sizes** (16/07/06), and a recent TV programme that seemed to travel a very odd **animated** journey though both Time and Space, I thought it essential that I returned to that initial contribution and extracted as clearly as possible exactly what it sought to demonstrate and apply it to the new stuff.

The problem is that we have **distances** AND we have **times**. Normally time doesn't come into measuring distances: we assume ALL is simultaneously available everywhere, so there always TWO currently existing and communicating measurers holding each end of the tape. But in Cosmology that is NEVER the case!

Real confusion can be caused by the fact that many distances in the Cosmos are so vast that even at the Speed of Light, radiation can take considerable lengths of time to reach us. This means that we don't SEE things as they are now, but as they were when their light commenced its journey towards us. We are holding one end of the tape, but no-one is holding the other, for it is a long time ago in the past. Any distance measured is between where **IT** was THEN, and where **WE** are NOW.

Now, the ONLY things that we can see in the Cosmos are those emitting Light, and these are always material entities, and though they can move very quickly it is considerably less than the speed of propagation of Light. The Universe is said to have started with the Big Bang some 14 billion years ago, and hence, depending where you are observing it from, you will see **different places** at **different times**.

These factors, which MUST be taken together, can cause some considerable confusion. We are so used to our God-like, overall and simultaneous view of everything at once, that we constantly make errors when dealing with the situation on the Cosmos.

Now, I'm afraid that this confusion doesn't only affect ordinary mortals like you and me, but also the makers of T.V. programmes, so they make their own arrangements, presumably to help us ignorant viewers. If only this were true! My feeling, particularly on watching this latest "epic" was that they sometimes confuse rather than elucidate! So, I have set myself the task of clarifying what is actually going on when we observe things from our position on this tiny planet.

To make things straight forward, I have assumed that the expansion of the Universe since the Big Bang has been at C – the speed of Light **for the Energy** involved, and at C/4 for the speed of **the exploding Matter** from that Event. These are simplifying assumptions, but should make the following calculations understandable, AND allow easy changes and corrections to be inserted if and when necessary. My main problem, in the recently televised programme, was with the narrative voice-over and the accompanying "virtually-constructed" views, which seemed to deliver both things going back in time together all the way to the Big Bang. (We were observing the whole of cosmological history being played out in reverse (as if by God himself). You can tell that the makers were much happier with this form of presentation. And maybe most viewers would also be happier, but it did nothing to reveal the problems at all. You were being informed as to how an immaterial being, who could travel instantaneously through Time and Space, could observe the whole thing **from the outside**. So, I have to state categorically that most of what was shown was both speculation and technically incorrect.

So, let us describe what we can really see, and why!

In looking at some distant source of Light, be it a star or a Galaxy, we never see it as it is now, because, as explained above, it takes time for the Light to reach us. We can however say exactly from what precise time in the past our view has come. If we know the distance, and we have the speed of Light, it is a simple matter to calculate how long it has taken the light to arrive at our position. We simply use **Distance/Speed = Time**.

Now this is a nice easy equation, but if we used feet and seconds, or even miles and hours, the figures involved would be colossal, and we would have lots of zero's right across the page. So we use how far light will travel in a year as a measure of DISTANCE (these units are **Light Years**), with **Years** as the measure of TIME. So, the Light from something 1 Light Year away will reach us in 1 Year. Why these units are necessary becomes clear when it turns out to be necessary to use distances which soon amount billions of Light Years, and take billions of Years to reach us. So everything is related to the Speed of Light. Something travelling at the speed of Light is moving at a speed of 1 – Light years per year. Needless to say ONLY Light can travel at such a colossal speed.

Now, if you, like me, sometimes get confused with such units, do not despair. I will do my best to explain exactly what is going on at every point.

By various separate and independent means the time since the Big Bang has now been agreed to be about 14 billion years (though there seem to be regular small adjustments to this figure as new evidence is integrated into the latest models). So, we can very easily give the extent of the **radiation** emanating from that Event. It will, of course, be 14 billion Light Years in radius – or 28 billion light years across! But, you will remember that **NO matter** can possibly travel at such a speed, so I have guessed that any such “solid stuff” probably exploded at $C/4$ – one quarter of the Speed of Light. Hence inside that vast sphere of Energy, will be a much smaller sphere comprising the **Material Universe**. It, therefore, will be a sphere of 3.5 billion Light Years radius – or 7 billion Light years across.

Now there are always problems with just how much of this latter sphere is actually “filled”, for an initial filling of 100% (before any aggregating of matter into stars and galaxies, of course), the Big Bang would have to have been a continuous explosion carrying on right up to the present. Now that is certainly NOT the case, but we will not allow ourselves to be deflected from our chosen calculations. We know about that, but consider addressing it must be delayed until later. Too many “Yes, but...” qualifications will truncate our starting to address basic questions, so let’s get on with it! Using the above figures, we must be situated (roughly) 3.5 billion light years away from the position of the Big Bang. But, light from that position will have been travelling at the full speed of Light, so what we are seeing can only be what was happening there 3.5 billion years ago – some 10.5 billion years **after** the Big Bang. It is clear that if we are now seeing light from that position exactly 3.5 billion years ago, ALL the light from that position from the time of the Big Bang up to that time will have **already passed** our current position, and by now be lost in the abyss beyond our current position. As such, the whole light record of that period has been lost forever!

So how can we interpret what we see? From our close vicinity we will see what was happening only a very short time ago, but as we look further towards the position of the Big Bang, we will see successively further back in time, until we see the position of the Big Bang as it was some 3.5 billion years ago.

NOTE: As an interesting aside, it might be useful to tell the reader just what was happening on Earth 3.5 billion years ago. It was a rather important event. It was the Origin of Life on Earth. The Earth was only a few hundreds of thousands (perhaps a million) years old at that time, but it already had oceans, and the very first traces of Life.

Let us go BEYOND that position where the Big Bang occurred, and we will see light from the Big Bang explosion materials that were careering outwards in the opposite direction. But now as we delve deeper and deeper into space we will be getting light from earlier and earlier in that expansion. BUT, we will be going away from the origin of the Bang! Now this is the difficult part, as we go further into the past, we MUST finally reach a position which the Bang has just reached, and yet the light from the situation is exactly what WE are seeing NOW.

This seems to indicate that billions of Light years away beyond the site of the origin of the Big Bang, we can see NOW the **far edge** of the expanding Universe.

Now, it is clear that this position MUST be there. The next question must be, “Can we calculate where the Edge we can see is, and when it occurred?”

The answer is, “Yes!”

Now, these ideas were NOT reflected in the magical mystery tour back to the Big Bang via our clever bit of cinematographic animations in the T.V. programme. They had constructed for us a Time/Space vehicle, that travelled in Space back to the origin of the Big Bang, BUT it also was simultaneously travelling back in Time too. It would take us back through Space a mere 3.5 billion light years, but also through Time a massive 14 billion years to arrive at the very moment of the creation of the Universe. What arrogant types they were! It did not matter to them that they didn’t deliver to you what had actually occurred. A god’s eye view was both easier to deliver and easier to follow. That would do!

Now, as far as I am concerned, the Truth is far more exciting than any plausible fiction, so though we have answered the basic question, it seems to me that there is still much to be done.

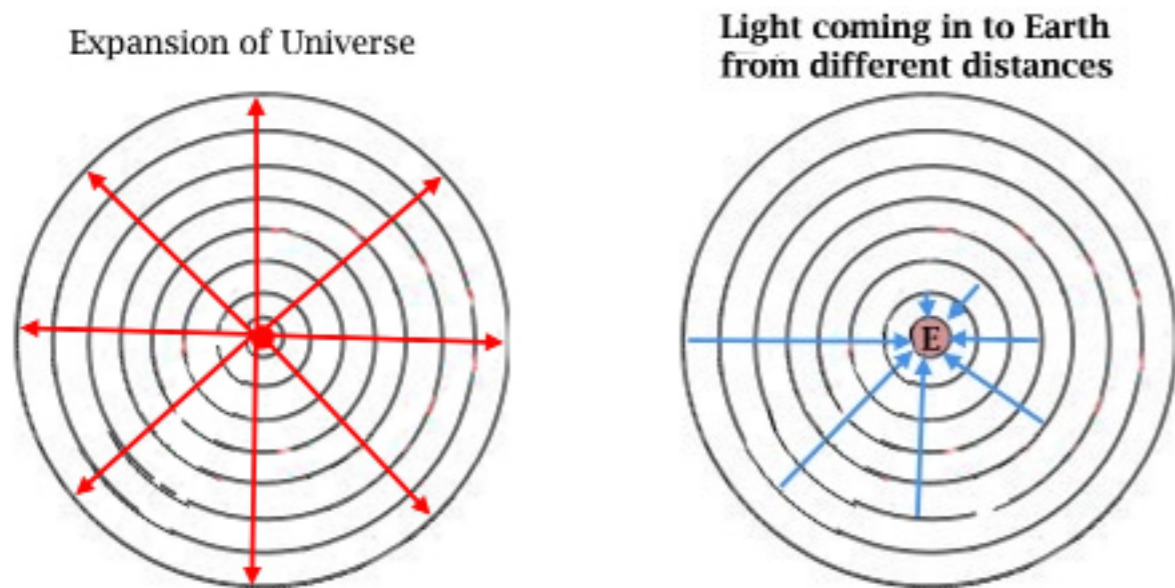
We must chase the expanding Universe from its creation, regularly working out its increasing size at various times. From these calculations and the simpler ones concerning **what we can see now**, I want to calculate that far edge of the universe. It will not be that far Edge NOW, because between the time of the Edge as we will see it, and the current time, that Edge will have travelled well beyond the point we see.



The result of this rethink, was that I decided to think carefully through exactly how the Universe perimeter would **look to us** NOW. That is, of course, NOT the actual state of that perimeter NOW, for via our onion-layer view of both Time & Space we will inevitably see further back in Time, the deeper we look into Space! Objects that we see that are very close to us will also be close to their actual positions NOW, but with each deeper penetration we will be seeing older and older views.

So, we will be seeing a smaller and smaller Universe as we penetrate deeper and deeper into Space. Our view of the Universe and its perimeter will be distorted. We will not see a sphere of extent at all!

It soon became clear that though the Universe is in fact perfectly spherical and radially symmetrical, our view will inevitably deliver it as some sort of OVOID, with its major axis along a line connecting the Earth (NOW) to the site of the Big Bang (THEN). By considering a set of concentric spheres around the position of the Big Bang to represent its expansion over time, and another set centred on the Earth(NOW) to represent the “from where” onion skins of what we are seeing NOW, as an increasingly older and older layer of what things were like at each time in the past, we could get some idea of what we would see as a whole by relating these TWO nested sets of spheres.

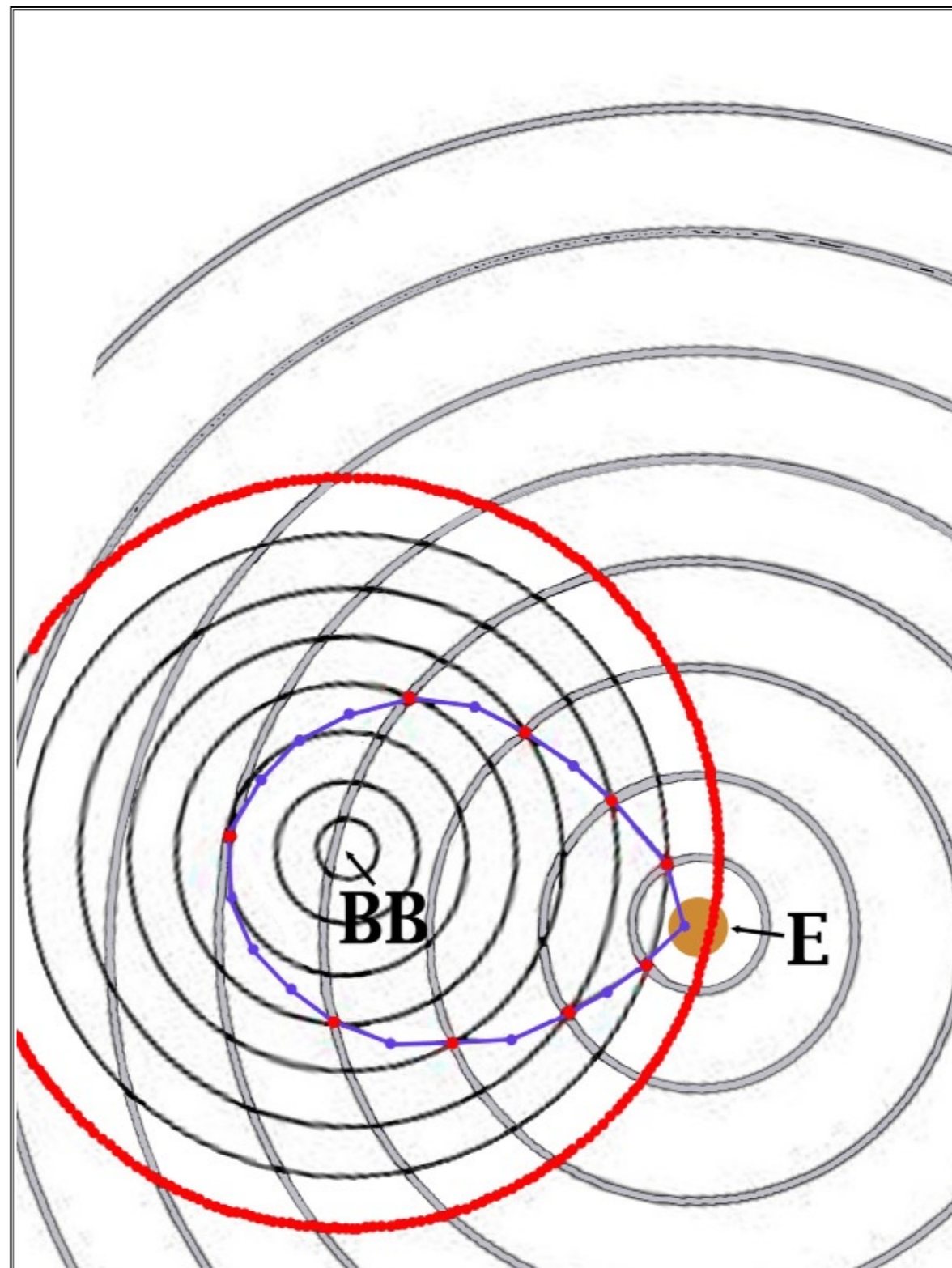


Now BOTH these sets are of “times”, so we could bring them onto a picture of the site of the Big Bang (THEN) and of the Earth(NOW) and by matching up the same times in each set AND where they cross, we could find the SEEN SHAPE of the Universe as seen NOW from Earth. To do justice to such a diagram I made a half dozen attempts to deliver a clearly understandable and unambiguous image. My final version is shown opposite >>

It is still no easy thing to interpret, so I will, later on, put some time into improving it. If this diagram does not immediately do a great deal for you, join the club! But what has been done to the two sets of concentric spheres is the promised marking of intersections between the two, which PICK OUT what we see NOW of what it was like THEN at points around the periphery of the Universe as it continued to expand.

Now, though the first two diagrams shown above clearly extracted the required evidence, they and my first few following attempts to integrate both expansion and seeing-through-time onto the same diagram certainly didn't bring out what I thought was necessary. But the final diagram was about as good as I could get, and I believe that it encapsulates what was missing in the paper from two and a half years ago.

Nothing new was added to the final version, and indeed, its superiority came mainly from its large size, its almost “immersed” viewpoint and its colouring and choices in representations.



I hope I can be forgiven for not carrying this even further, but it surely is sufficient.

The blue egg-shape with its red-dot intersections between the sets of concentric spheres delivered the postulated Ovoid view of the Expanding Universe. But, of course, this final form is NOT as the present day Universe actually is, but as we see it looking outwards at the present time, and into the distance and the past.

The “appearance” of the furthest away point on the periphery of the Universe, was, as expected situated on an extension of the main axis connecting the present position of the Earth with the original position of the Big Bang when it first exploded into existence...

5. Does It Really Explode?

Part I: The Physical Nature of the Event?

The question of the detailed physical nature of the Big Bang **must** be addressed if we are to seriously predict its full consequences. Obviously, it cannot be the same as an explosion caused by the rapid burning of some highly inflammable fuel, with the consequent production of colossal amounts of produced hot gasses, involving considerable outwards expansion with immense force. Such an explosion would cause it to propel that gas and all associated matter outwards at a pace determined by some physio-chemical set of laws.

But nonetheless, we have to start somewhere, so let it be with precisely that known process and see **its** full consequences, before we successively address the obvious differences with the suggested stupendous creation of the Whole Universe that is the Big Bang.

Look at the debris from any terrestrial, normal-type of explosion. The explosion, first of all, is always of finite and of extremely short duration, for otherwise almost inconceivable energies would be necessary to sustain the process at such a rate of ejection. The actual duration, governed by the exhaustion of all the available explosive substances is at most a fraction of a second, and it always excavates the surrounding ground, and throws all that outwards too. But, surprisingly, it does NOT leave a ring of debris at a calculatable distance from the source.

It has maximum effect very close to the site of the explosion, where it leaves its most striking calling card – a crater in the ground. Surrounding this hole, there is obvious damage (reducing with increasing distance) all of the way to some actual perimeter. Yet occasional pieces can be thrown much further. The on-the-ground leftovers certainly constitute NO obvious ring. Now this is almost certainly due to the successive impediments to the course of the explosion – the ground itself, houses, trees etc., which being massive and destructible will themselves produce fragments of every size – from giant pieces, which remain more or less close to their source position, all the way to random fragments of considerably smaller size, which can be projected quite enormous distance. [In the Second World War, my mother extracted a large piece of shrapnel, evidently from a German bomb, from our back door, even though the nearest bomb damage was almost a mile away.

Much bigger explosions sometimes contained NO actual fuel. The impact of a large meteorite did its job by converting its enormous Kinetic Energy of a fast-moving and massive impacting object into pure Energy in a very short time, and this was so enormous that almost everything at the point of impact would be rapidly shattered into both fragments and gas, and at intensely hot temperatures too. The Arizona Crater can be used as a model for such an impact in an empty space, while the famed Siberian version in the early 20th century encountered only trees and landscape in a largely unpopulated and non-built up region, and give a very different pattern of damage. Yet these giant events still conformed to the usual pattern (but constrained and modified by the nature and contents of the Strike-location. The Atomic Bomb, on the other hand, which purposely converted amounts of matter **directly** into enormous quantities of energy, and by this means the site was largely destroyed by Blast. Almost everything was flattened!

Now, though these are inappropriate models for the Big Bang as they stand, they do give us a starting point. The main difference must be that any Cosmic Explosion takes place in Space.

There is NO ground - and NO material obstructions to speak of. The vast majority of the explosion will be into Empty Space, where according to one of Newton's famous Laws anything propelled by a force will be given an acceleration only during the presence of that force, and would then cease to get faster but continue upon its trajectory thereafter at its final speed for ever (unless, that is, it is confronted or hindered by other subsequently encountered forces). This will undoubtedly involve few, or indeed NO, constructions and would therefore seem to be infinite in effect). There can be nothing to hinder it!

Now, the nearest obvious, and frequently observed phenomena, **within** the present-day Universe must be Novae and Supernovae, and they do leave debris, which is certainly NOT entirely delivered as a hollow shell of propelled substances.

At the opposite extreme, we have the slow-motion explosion that constitutes all normal every-day stars. Here there is some sort of ground! The star is composed of matter – so vast that it produces colossal pressures and temperatures at its heart due to the effect of gravity alone. Initially, the aggregation would NOT have been a star, but merely a coming together of enormous quantities of matter - indeed everything in its immediate locality would have ended up as a single massive entity (with a small amount of leftovers with enough angular momentum to establish stable orbits instead)

The material heart of the star would be mainly Hydrogen (and maybe some Helium), but if it were a second or third generation star built from the debris of previous novae, it would also contain heavier elements actually produced by nuclear fusion in those previous manifestations.

In fact it is that very process which turns any aggregation big enough into a STAR. The colossal pressures and temperatures at the centre become high enough to start the process of fusion of Hydrogen nuclei into Helium nuclei. Now a certain amount of actual matter is consumed by this process and turned into Pure Energy. It is this, which **lights up** the aggregation to become a star. A star is therefore an enormous Hydrogen Bomb, in which gigantic resources of Hydrogen fuel keep it delivering radiated energy for billions of years. But a star is an unusual case!

The only place that fusion would occur, would be at the centre of the body, where pressure and temperature would be high enough to trigger the onset of fusion, And hence this process would be surrounded by enormous amounts of matter, The energy of fusion would both affect this surrounding matter, and have to get through it to shine. Now, the question arises as to the continuing size of such a body. Why does it not simply run away into a nova from the outset? The reason is that the required conditions DO NOT exist throughout the star. They are limited to an inner region and as we move to the outer layers these conditions decline and ultimately vanish. In addition, while the outflow of energy is FROM the centre, the movement due to gravity is TOWARDS the centre, and thus a balance between these forces maintains a steady size to the body as a whole. Thus it is like a slow-motion explosion, constrained (and even maintained) by gravity!

But this balance between nuclear explosion and Gravity is NOT eternal. With the depletion of the available Hydrogen fuel, the atomic side can diminish and the star can undergo a calamitous collapse under the now-dominant gravity. Such an implosion always involved the previously “propped up” matter avalanching downwards towards the centre and producing even higher pressures and temperatures. But this could, and did, produce a new phase in the life history of the star, because these conditions could get high enough to start to fuse Helium nuclei together. Once more matter is converted to energy as a by product of this process and the consequent outwards flow due to the Helium Bomb finds a new balance with gravity and a relatively stable Helium star is produced. The slow explosion has been resumed with a new fuel – Helium, and a new size!

These types of crises and rebirths of the star can repeat several times, with, at each stage a different type of nucleus as the fuel in a sequence of atomic fusion processes. Each new phase involves a higher “tripping pressure/temperature threshold”, and produces larger, heavier elements in the process. [Note: much of this theory is due to Hoyle and NOT the Copenhagen School]

BUT, such a succession is also NOT infinite!

There is a limit to such a cyclical oscillation until ultimately the “final Failure” and collapse produces an explosion of such colossal nuclear energy that the star is destroyed (or leaves only a tiny fairly stable remnant, eking out its fragmentary left-over resources at a much lower level, until its final, much delayed demise).

Part II: Black Holes and Consequences

So, the previous, necessary diversion has described the “usual” Cosmic explosions that are not only possible within this Universe, but have been frequently observed at various times over hundreds of years. There do seem to be extreme situations beyond this “main sequence” of star behaviours.

There is postulated a situation in which the matter aggregating into a given position cannot ever flip into nuclear fusion, because the nuclei present are too heavy, or are too diverse, for fusion to be triggered into a continuing process, and the aggregation cannot trip-over into becoming a star. The process is then considered infinite (by our mathematical Cosmologists) and continues well beyond previous limits within stars.

The concentration of mass is so vast that NOTHING can be said to escape its gravitational pull, and the concentration is said to even pull in radiation! To make matters worse, indeed considerably so, the mathematicians (as is their wont) have “modelled” this type of entity purely mathematically. [And those familiar with their discipline, will not be surprised that the famed situation of the **Singularity** will inevitably arise – as it does in many mathematical forms taken to infinite lengths. It is an inevitable outcome of Pure Form Worlds, which cannot deliver the results of their own demise].

Now, YOU may think that they have made gravity pull in everything into a smaller and smaller volume until it vanishes up its own orifice. And you would be right! For, according to the mathematicians, a Black Hole has been born!

But, of course, in the way it is described, it is ONLY mathematics! All such formulae are descriptions ONLY and not the **causes** of phenomena. And therefore they all end up with infinite asymptotes or completely zero results. But such are NOT real! All of these are merely a function of the World of Mathematics alone – that world of Pure Form, which I call Ideality! Usually, in all real world situations, such “blow ups” of formulae simply cause the mathematician to discard his current (now defunct) equation, and **address the new context**, where a new form can be found to fit new measured results. We say that the old formula has exited from its Domain of Applicability: the conditions for its continuance are no longer present and it must be dumped!

Scientists (as distinct from mathematicians) know what their job has to be. They must find the necessary experiments to deliver enough data in the new context to allow a more appropriate formula to be derived. Indeed, mathematicians **never** deal with such transitions! They may “frig-up” combined equations, which flip from one mode to the other, but they actually **tell** us **nothing**. Only scientists consider it their job to EXPLAIN such transitions. You can see why I do not ascribe the title **scientist** to these mathematical speculators, can you not?

But it is not always so! Many times the transition **cannot** be explained, and even scientists merely “change sciences” and continue their investigations without explaining the transition at all: the Origin of Life on Earth is the defining example, is it not?

But, of course, Cosmologists CANNOT carry out experiments where they actually intervene in the processes of the Cosmos: In addition they cannot do **anything** in the laboratory - they are Observation-only types! (Or, if you prefer it, they are Observation-plus-Speculation-only types). So they are left with formulae that “bomb-out”, with no way of investigating what follows. They are egged on, by the mathematical “physicists” of the sub atomic world, to make the clear(?), mathematical singularities of such “blow-ups”, into **Physical Singularities**. Now, you may consider this entirely legitimate, but THINK!

The mathematical singularity is either a “dot” of ZERO extension, or it actually zooms off and “reaches” INFINITY. You HAVE to see Universes vanishing into such dimensionless dots carrying with them almost infinite mass as the subsequent content of the Black Hole. Is this, in any way, a reasonable assumption? It IS NOT! And, they know it! They are not fools!

So, what do they do? They postulate that such Singularities are possible “connections” to invisible and undetectable Parallel Universes to act as sinks for everything pouring into a Black Hole. The Dimensionless Dot then becomes a “conduit” to another Universe. That’s their solution!

But, I’m afraid it simply will NOT do! For if it were true, why would the Black Hole continue to exert colossal gravitational force IN OUR UNIVERSE, which amounts to truly prodigious proportions? How does that work? And further, what forms would our matter take in that Parallel Universe? Would it stay, like a carbuncle, closely associated with the other end of the necessary connecting Wormhole, so that it could continue to exert its evidently still-existing forces “through the keyhole”, so to speak? [Note: I could go on and talk about the dimensions of such a Wormhole and innumerable other points, but, let’s face it, it IS indeed absolute junk, is it not?]

And what would be the effect of this Emitting Wormhole on that other Parallel Universe? Surely, unless it was dispersed it would be so BIG a concentration that it would in turn create its own Black Hole there too? And presumably this would generate a “return wormhole” to funnel everything through it into “another” Parallel Universe. Question: Would that be our Universe or a new one, and if the latter, won't the out and return wormholes mess each other up, or should we see some never-ending “sequence” of wormholes and Parallel Universes off to infinity(?), or whatever?

Aha! So it really **must** be dispersed, perhaps violently, to get it away from the Singularity as quickly as possible (perhaps the captured energy could propel it?). It sounds awfully like a Big Bang to me! What do you think?

Part III: Sequences of Universes?

Now, as you have guessed, with my descriptions so far, my tongue has been firmly in my cheek, but only because these “theoreticians” are evidently well into the very centre of Cloud Cuckoo Land.

They are basically *mere* speculating mathematicians! And they consequently deal ONLY in Pure Form! There exists a sort of “physics-like chat”, but the dominant feature is certainly NOT Reality, but a World of Form alone, which I insist should be accurately labelled as Ideality – wherein any Form, but ONLY Form, is eminently and entirely possible! In Ideality, there is NO Reality as the supreme and final arbiter of Existence. Ideality is indeed INFINITE because it has no constraints, but only **Consistency**. For constraints only exist in Reality.

If the type of reasoning I have been describing above is carried through, all sorts of magical possibilities can, and indeed DO, emerge. Let us look at a few!

If the Black Hole continues to exist, and suck in matter into its Dimensionless Dot, and hence through its handy wormhole into another Universe, where its compressed pressure and temperature can explode into a wholly New Empty “Universe”, then it MUST constitute a continuing explosion – indeed, a never ending Explosion! The Big Bang so delivered must become an almost permanent Event. We have therefore to KEEP some prodigious amounts at the site of the Origin of the Big Bang to continue the “suck through” the necessary matter to fuel such a continuing explosion – for otherwise the producing Black Hole would cease to exist as such.

[Note: Not surprisingly some theoreticians do talk about “Evaporating” Black Holes, vanishing in their Universe, leaving not a trace.]

But let us, for the moment imagine an on-going situation with an infinite flux through the conduit continuously furnishing a new Universe on the other side, and fuelled by the diminution of our Universe through that universal SINK! Ultimately, of course, the whole of our Universe would vanish “down the plughole”, at which point the Black hole all that was remaining in, and of, our Universe would evaporate into nothingness. The whole Universe will have vanished totally, with not a trace remaining.

BUT, “on the other side” a New Universe carries on. Their Big Bang will have finally stopped as it ran out of resource from our now vanished Universe. But the new Universe can continue on its way!

But, wait a minute, it MUST surely also end up in its own super, enormous, massive and prodigious Black Hole and itself vanish up its own orifice.

Such is the Wheel of Cosmic Life! (Where is the Buddha when you need him?)

Having got all of that out of my system, let us address a few less obvious questions! Let us consider Symmetry.

If we take the Universe, as it is, we MUST address its profound Asymmetries.

Now, most scientists will wonder what on earth I am talking about, as they consider such things as the unavoidable ingredients in every possible situation.

Now, in this they are right, but for the wrong reasons! All experiments are initially not only packed with diverse determining relations, and in addition what they gather together (quite correctly) as “random noise”. But, though they can remove many of the concurrent relations by tying down certain conditions and holding constant the relevant variables, they CANNOT individually tackle the “random noise” elements,

The reasons for this are twofold! First, they simply cannot disentangle the multitude of factors causing this effect. And second, they don't have to. The reason for this is that these minor contributions are hard to disentangle for exactly the same reason that makes them EASY to remove: they are certainly *mutually contending* contributions. When a factor is NOT part of such a set, and can be easily disentangled, it can be constrained along with other bigger factors and removed from the mix. But the Mutually Contending factors, though they moment-by-moment deliver oscillations in the measured features, DO in fact tend to cancel each other out, and therefore can be to a great extent removed by merely AVERAGING all results. When a large number of results are averaged the mutually contending features do indeed cancel each other out and the required dominant relation is left standing clear and extractable.

Now, though this SOLVES the experimental problem of isolating the required and dominant relation, it says NOTHING about the individual contributions of the Mutually Contending Set. And the trouble is that they are assumed to occur quite naturally as a product of unequal development, *even if* the initial, basic determining laws are the same for all! As they appear to cancel out over time we cannot merely average them away and ignore their contributions. To do that means that we assume that they ALWAYS have no overall effect. **But that is certainly WRONG!**

Such things do not appear without separate and different causes. The fact that they can under certain circumstances, form a handle-able set stresses the holistic nature of Reality, where everything affects everything else, BUT that does not mean they will **always** be ignorable! They have multiple causes from very different laws: they just happen to be those that don't in the given circumstances DOMINATE and being by a great measure the majority of factors, they will overall be mutually contending, especially as non mutually contending factors are so easy to recognise and organise away! As a non-treatable remnant, they MUST be mutually contending.

In any non-experimental situation – that is in unfettered Reality, ALL causes and relations will indeed be present, though in different gradations of Dominance. These mutually contending components DO NOT arise naturally WITHOUT A CAUSE: they are the result of multiple causes which in different situations will NO LONGER be minor or members of the then current mutually contending set. They can and do become the sort of dominant relations that are the primary determinators and that we strive to extract.

Now what are the conclusions we are forced to make from all of this?

Surely, they point to the fact that either multiple, mutually contending factors MUST have been present at the very instant of the commencement of the Big Bang. OR if they weren't, what could possibly cause them to be around now? NO interfering extraneous factors could have been brought in from outside: all must be internal.

How then do the Fundamental, initial, basic relations at the start of the Big Bang turn into contending factors?

Part IV: Better Alternatives?

Continuing the story, the Big Bang is supposed to emanate from a Physical Singularity- a Dimensionless Dot – a true origin with NO prehistory! Indeed, we are told that it actually creates all of Space for itself.

How then can it be composed of myriads of contributions? And, being entirely **alone**, what extraneous factors can “muss it all up a bit”? As the beginning of everything with **nothing** else present and NO prehistory, how can the Big Bang be anything but **purely & wholly symmetrical**?

With NO history of contention, NO causes, and NO actual **room** (remember, it comes from a dimensionless dot), it can ONLY be absolutely symmetrical. Its content, coming from that pinprick in the middle of absolutely NOTHING, simply **must** drive outwards equally in all directions – what could possibly make it behave differently? There simply can be **nothing** to cause any variations – NO obstructions, and NO inner contention and certainly absolutely NO **context!** All will obviously move outwards radially in perfect straight lines. And the fact that every direction will be surrounded by exactly equally distributed directions, all with identical content, means that any inter-relations will simply **cancel out**. Everything will carry on moving outwards along the same initial radial paths, all the time getting further away from everything else **forever**.

“Thank God!” the cosmologists must regularly utter, “for random noise”. For without that there would be NO eddies, NO collisions, NO aggregations, NO resultant forces, and NO stars, Galaxies or even Planets! Indeed, NO US! You can see why it is a “banker”, can you not?

But equally to allow all the asymmetries and aggregations, and everything else that certainly **did** indeed happen, it is clear that the Origin of our Universe from a Dimensionless Dot into Nothingness **must** be a total fiction. It is amazing that anyone considers it viable to the smallest degree. It as stupid as saying that all explosions, of every possible type, also come from Dimensionless dots, for if we extrapolate backwards everything **seems** to emanate from a single point. So, it is certainly a **frig** – a simplification too far, and of NO real use in **understanding** the Universe as it is **now!**

But, if we allow a pre-history to our Big Bang, everything changes!

First, it will certainly have happened in an **already existing space**, with pre-existing things happening within it. Some inevitable sequence of events must have concentrated vast amounts of “stuff” in one fairly confined space (NOT a Dimensionless Dot, of course) – somewhat like normal aggregation, but on a colossal space – like a Black Hole, but **never** any kind of Physical Singularity.

NOW, such a situation (in real space) could well have passed some crucial threshold (as regularly happens in many, many known situations within our Universe), which would, as you would expect, terminate the incessant concentration and trigger some violent Change, from inwards concentration to outwards explosion! It is, after all, very common! You would expect the cataclysmic concentration to trigger an explosion, as the conditions for the former are exceeded and the dominant and forceful influences are reversed.

Why, oh why, was there a reason to INVENT a Dimensionless Dot – a Physical Singularity? The answer is obvious. It is because that is what you always get **in the limit** with an equation! If you insist that equations are our **only** reliable source of the Essence of Reality, then with abandoning Explanation (such as I am attempting to demonstrate here), you have **only your equations**, all of which change into singularities as they blow up at the boundaries of their Domains of Applicability.

Surely the model presented by a Supernovae, though not identical, must be closer to this amazing event than the usual consensus - maths-only version of the start of the Universe?

For, in such a similar form, there would be contained causes, contending factors and great unevenness throughout. Is that NOT a better model for the Big Bang than the MYTH that I have been opposing here? Not all parts would be identical, but the passing of the threshold probably happening at slightly different times in different places, would together precipitate the huge change throughout. Just like a sufficiently heated pan of liquid, it would start to turn to gas in many separate localities, and these would initially fail to destroy the status quo. But, once the “boiling” has started, the contents would soon ALL be involved and the conversion completed. Though such analogues are **never** the full story, they are infinitely better than Physical Singularities and Parallel Universes. And, why is this the case? It is because they are grounded in the Real World. We know about such things, they are not mathematically based abstract speculation, **but real!**

I have to ask, “Why, with all the evidence for the many kinds of lesser reversals throughout the known Universe, was it imperative to throw all such models away, for a Big Bang **like nothing else**, and substitute a totally unbelievable,

inexplicable, history-less alternative, that cannot make any sort of sense?”
What imperative demanded the creation of everything from **nothing**?

Surely, it can only be the remaining traces of a purposive creator, or the modern day equivalent - “unavoidable” logic of mathematical Reductionism?

And there is still more!

What can we say about any such Event be it a terrestrial explosion, a Big Bang, or anything in between? We can, without contradiction, say that it is a cataclysmic Event, wherein **positive feedback** MUST be involved. The sudden and powerful Form of such an occurrence must involve an initial process triggering off many similar processes and thus “running away”. What is more, (unlike an avalanche, the energy for which is mostly the **potential of position** in a precarious physical situation) these sorts must release Energy in truly vast amounts. In other words, I can consider NO such Event that starts big and subsides. Instead they **must** start small and rapidly get big as more ready and waiting material is similarly tipped into its own vast release of stored energy to multiply up the avalanche. But all such processes require both resources AND Energy (which both could reside in the same thing but not necessarily). What is special about any such Event **in totally empty space** is that it has NO **context**, and no “dampers-down” – nothing to inhibit the continuation of the process. Hence it must, unless it has an inexhaustible, infinite source, finally RUN OUT of such a necessity, and finally cease to be self-generating.

This does NOT mean, however, that it will “slow down and stop”, because there is nothing to cause such a cessation. In Space, once there is no further impelling force, the explosion will simply continue to spread out **at its finally attained speed** (indeed, its maximum speed that it will have attained under its initial applied force).

Now, many can, and do, dispute this, They aver that all the mass of the Universe, **acting as if at its Origin position**, will attract the leading-edge **backwards**, and slow everything down. But, just as the momentum of all the exploding material will be spread out over wider and wider regions, so also will the distances back to the origin increase, and hence the gravitational force will get diluted too.

But, notice that all pure radiated Energy from such an Event must always greatly outstrip all **materials** also moving outwards. The radiation, travelling outwards at the Speed of Light, must go on forever. Indeed, if there had been previous Events such as **our** Big Bang in the very distant past, that radiation, travelling at such a speed, must by now be dispersed over almost inconceivable volumes of Space, and with **only** its initial Energy, must by now be dispersed to immeasurably small amounts at **all** points.

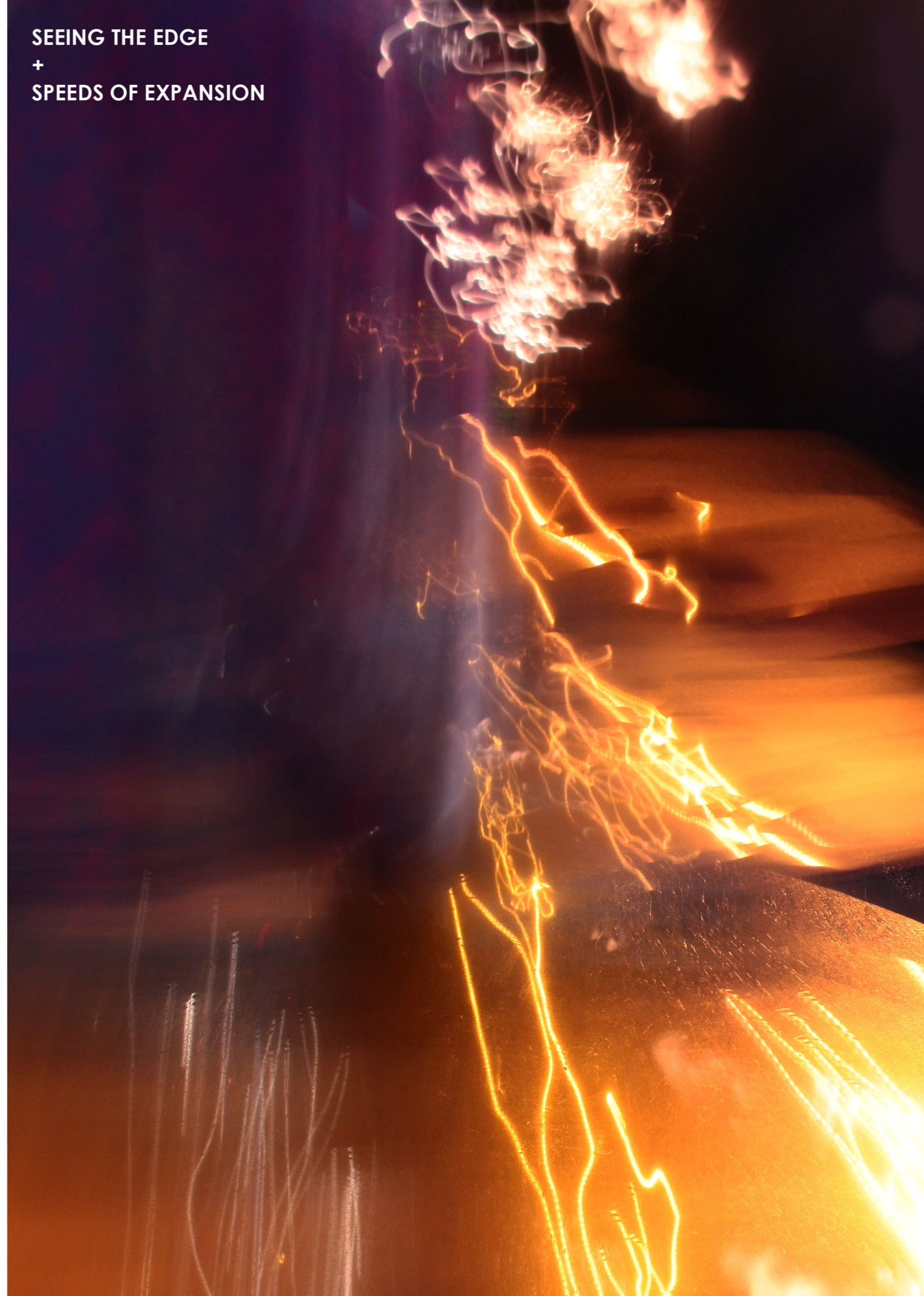
Indeed, elsewhere I have postulated that Space, as such, must be filled with the remnants of such prodigious explosions in every single, tiny part. I have called these “space-filling” entities **Empty Photons** and have managed to explain many phenomena in terms of their “Empty”, yet still functioning, E-M capabilities, which can be immediately activated by the tiniest trace of applied energy. These Empty Photons **become** the “ether” – the medium for E-M propagation. Indeed, these entities don’t even need to move. They are **not** communicating physical oscillations, but E-M disturbances passed on to one another by **Induction**, and the whole of the propagation properties can be straightforwardly thus explained.

Even the Photo Electric Effect does not need moving and impacting photons carrying quanta of energy. The phenomenon can be explained by quanta being passed from one stationary Empty Photon to another. Even their “emptiness” seems obvious if there are quanta of energy – these latter will be determined by their capacity.

SEEING THE EDGE

+

SPEEDS OF EXPANSION



6. Seeing The Edge + Speeds of Expansion

The launch of two new series about the Universe in the History TV Channel has brought the usual consensus crap on Cosmological theories completely up to date, and therefore allowed me to tackle all the currently in vogue inventions without the usual contending put-downs that I was dealing with “old stuff”. Any attempt to criticise is rather illegitimately terminated by the in crowd with, “We don’t say that these days”, before you had been able to get anywhere.

But now, here are certainly all the latest clever ideas to paper-over the many inherent contradictions (and indeed yawning holes) in the fairy tales that are Modern, Quantum Physics-inspired Cosmology. I personally have been addressing the “viewed” Universe for some time, and considered that I had already delivered what I had considered to be the “knock-out blow”, but I have to admit that I was still worried that my rather crudely arrived at estimate of the actual speed of expansion of the Material Universe might well be inaccurate, and if so would tend to scupper the main conclusions. Any gang of believers would immediately pick up any such error, and once more good ideas would not be given a proper airing.

So this little paper will bring in various alternative (and widely differing) estimates of the Speed of Expansion, and show that the main arguments and indeed conclusions are independent of the specific figures chosen. The idea is to cover every base, and thereby allow the whole of the argument to be laid out before the opposition has (as usual) upped and left!

My assumption in the preceding papers on this issue was that the Speed of Expansion of the Material Universe since the Big Bang has been at an average of about one quarter of the Speed of Light (C). To establish a range of quantitative conclusions I have decided to add to this estimate two others. So my full set are:-

C/4, C/10, and 9C/10

These should bracket the real speed somewhere in this range. In addition I have considered that the actual duration of the initial **driven** phase was comparatively short compared with the current estimate of the age of the Universe – which is at or about 14 billion years old. This would allow the use of averages without being led to far astray.

But here I don’t want to repeat my original arguments. They are available in previous papers. Here I will concentrate only on the consequences of the various possible speeds of expansion ONLY.

Placing our own current position towards the near edge of the Universe (which if incorrect can easily be corrected), we can concentrate on the position of the far edge of the Universe beyond the position of the actual origin of the Big Bang. My assumption of C/4 for the speed of expansion would put our present position after 14 billion years a 3.5 billion light years away from the origin position of the Big Bang. The significance of this is that any light from the current position of the far edge of the universe would be coming from 3.5 billion light years beyond the Big Bang origin point, and would take therefore 7 billion years from NOW to get to our current position Obviously that is no good to us! What edge we can see NOW would have to be the right distance from us for its light from both WHEN and **where** the Universe had reached to arrive at our position **now!**

If this is a bit confusing, join the club. It took me quite a while to suss it out.

So what do we really need to know?

We want to know exactly where (beyond the position of the Big Bang) the Edge of the Universe must have been for its light to be reaching us **now**. Let us call this unknown distance beyond the BB a distance x billion light years.

Let us repeat my earlier calculation to establish the method, before I apply it to my two new estimates of the speed of expansion.

As it is easy to get lost in these seemingly simple calculations, I will start by giving symbols to the relevant variables that we will use.

These are:

The Speed of Light = V_L and to make the calcs easy we will make it equal to 1

The Time since the Big Bang T_{BB} and this has an agreed value of 14 billion years

The Speed of Expanding Matter V_E and for my first guess this was $V_L / 4 = 0.25$

The distance of the now-seen-edge X

The Time for the edge to get to X T_X

Now this T_X is the crucial thing because it figures in two different calculations. One is about relating X , V_E , and T_X , while the other considers the passage of Light from X to the position of the Earth **now**.

From the first consideration we get $T_X = X / V_E$

While the second consideration gives $T_X = T_{BB} - (T_{BB} * V_E + X) / V_L$

Now, if this equation needs explanation we have in brackets (distance to us + distance to Edge) and dividing it by the Speed of light Gives the time we need.

Now equating these two equations and substituting in the values decided on above we get

$$X/0.25 = 14 - (14 * 0.25 + X)/1$$

And with a little reorganising we can determine our unknown X, which turns out to be 2.1 billion Light Years.

Now this was a surprising figure to me! Though the Universe has been expanding from a Dimensionless Dot for some 14 billion years, when we look through our telescopes into the far distance beyond the site of the Big Bang what we see is a mere 2.1 billion light years beyond the BB position. Which puts the “seen” edge at only 5.6 billion light years away, and what we see is where the edge was 8.4 billion years after the Big Bang, though its light has taken 5.6 billion light years to reach our current position. (Note $8.4 + 5.6 = 14$).

Some conclusions can be drawn if we take the assumed speed of expansion used to be correct.

First, if we penetrate any further in that same direction than 5.6 billion Light Years we will see absolutely **nothing**, for from the time that we see in those regions the Universe will not have reached that far by **then**.

An apology: If you find this trivial, forgive me, I did not! Though perhaps all Cosmologists would find absolutely no problem with such calculations, I certainly lost my way several times. If, on the other hand, you too had difficulty, join the club. If you hang in there you will soon see the Light! And understanding these calculations will be necessary for the next phase, in which I use a couple of different assumptions for the Speed of Expansion of the Universe. I have above assumed an average speed of expansion, and a single, very simple equation:-

$$\text{Speed} = \text{Distance/Time}$$

The problem isn’t the maths: it is knowing what you are doing!

I equated the time for the universe to expand to a certain size given by the “seeable” far edge of the Universe, with the time for the light from that edge to get to us NOW! As with all models, mine is as full of simplifications as any other, BUT I am aware of that. I do not elevate it to a position of Absolute Truth. It is at best a Didactic Model, and should contain enough objective content, which should allow us to proceed further.

Let us do **just that**, by using our defined model with a couple of other estimates of the speed of expansion of the Universe.

Case A has been outlined above.

Case B

Here we will assume that the speed of expansion is a great deal slower, at 1/10 the speed of Light. The changing only this parameter in the equation I used earlier we get:-

$$X/0.1) = 14 - (14*0.1 + X)/1$$

$$\text{So, } 10X = 12.6 - X$$

$$\text{And, } 11X = 12.6$$

So **X = 1.1** billion Light Years beyond the site of the Big Bang

And as all other values dependant on this new assumed speed will also change, our position at the near Edge of the Universe will be only 1.4 billion Light Years our side of the site of the Big Bang and we will see the edge of the Universe at 2.5 billion Light Years distant, as it was only 2.5 billion years ago. So we are seeing that far edge at the position it had reached 11.5 billion years AFTER the BIG Bang. Looking any deeper in that direction will see NOTHING, as light from those areas will not have reached us yet. While everything that happened in the Universe up to that time will have long since passed our various positions on Space to be lost in the distance beyond our positions.

Case C

Here we will assume that the speed of expansion is a great deal faster, at 9/10 the speed of Light. The changing only this parameter in the equation I used earlier we get:-

$$X/0.9) = 14 - (14*0.9 + X)/1$$

$$\text{So, } 10X = 9(1.4 - X)$$

$$\text{And, } 19X = 12.6$$

So **X = 0.66** billion Light Years beyond the site of the Big Bang

And as all other values dependant on this new assumed speed will also change, our position at the near Edge of the Universe will be 12.6 billion Light Years our side of the site of the Big Bang and we will see the edge of the Universe at 13.26 billion Light Years distant, as it was 13.26 billion years ago. So we are seeing that far edge at the position it had reached 0.66 billion years AFTER the BIG Bang. Looking any deeper in that direction will see **nothing**, as light from those areas will not have reached us yet. While everything that happened in the Universe up to that time will have long since passed our various positions on Space to be lost in the distance beyond our positions.

Let us briefly restate these results.

$$\text{Case A: } V_E = 0.25, \text{ and the distance of the Edge from us} = 5.6 \text{ billion Light Years}$$

$$\text{Case B: } V_E = 0.10, \text{ and the distance of the Edge from us} = 2.5 \text{ billion Light Years}$$

$$\text{Case C: } V_E = 0.90, \text{ and the distance of the Edge from us} = 13.26 \text{ billion Light Years}$$

So looking 14 billion Light years into the distance (which is also 14 billion years into the past, or the INSTANT of the Big Bang, we would see absolutely NOTHING for in all cases except the last there will be nothing to see. If the latter assumption is correct we would see back to a mere 740, 000 years after the Big Bang occurred.

The actual Speed of Expansion of the material Universe is hence crucial, AND we will only be able to see close to its beginning if the material speed of expansion (the average speed of all moving Matter is in excess of 167,400 miles a second (nine tenths of the speed of Light!

NOW, let us INSIST that we do not invent myths such as “inflation” and “speeds of expansion faster than that of light”, or the now popular “distortions of Space, which allow the appearance of such speeds”.

Let us use straightforward scientific methods to see if what is being asserted currently about “seeing the Edge” is valid or not. We need a sound estimate for the average speed of expansion of the Universe.

Now, according to the latest Cosmological Series on the History TV Channel, all sorts of methods have been used to find this out – from “lenses” of difference surrounding our local bit of the Universe, to facts about supernovae, and others using Cepheid Variable Stars, not to mention various considerations of what can be derived from measurements of Red Shifts.

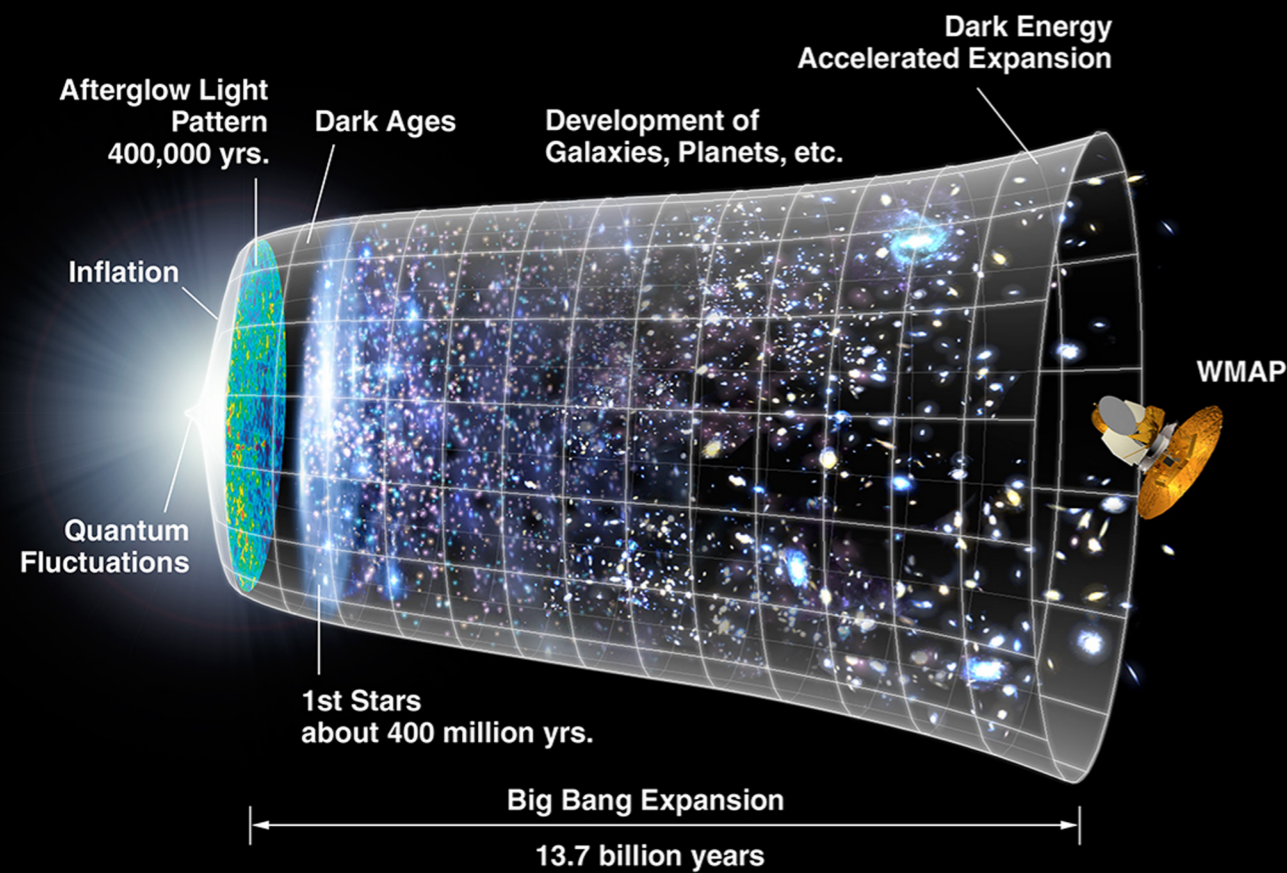
We must reject the Dark Force, which is supposed to be causing the Whole Universe to accelerate apart. For anything to have such an effect on absolutely Everything in the Whole Universe is surely nonsense. Such a force must have been acting for 14 billion years, non-stop, and how does such a thing relate to its opposite (**gravity**) of which there is abundant irrefutable evidence?

To judge the current consensus we must recognise their philosophical basis. These scientists “believe” that mathematical relations, which they always call **Laws** and elevate to be the Prime Movers of all of Reality, can be the ONLY determinators of Reality.

Thus, **only** such Forms are considered, and if that means we must speculate about Parallel Universes, Physical Singularities and other such “ideas” then “so be it”. The mathematical tail **must** be allowed to wag the Reality dog, and nothing else will be considered legitimate.

All this is the reason that these theories end up where they are. But, it IS junk, and they WILL lose!

7. Mathematical Speculation in Cosmology



MATHEMATICAL SPECULATION IN COSMOLOGY

Appended to this paper are a small number of extractions from the Internet on questions that I have been addressing in quite a different way to the consensus in this area. I accessed them for two reasons: I wanted to be clear of the populist version of the consensus and I thought there might be points that I had yet to address, and such a trawl might deliver them. So they are not a special selection of quotes that either fulfil my aspirations, nor are they the most sophisticated opposition to my position. They are a kind of amateurs' version of the general way these things are seen. *[Note: I am tempted to go off on a diatribe about why these contributors bothered – and it is an interesting idea, but that is not my purpose here.]*

Readers should anyway find their own cases, and make up their own minds on what they have to deliver.

From my perspective, this tiny set of quotes does clearly reveal where these “scientists” are coming from, and that it is NOT Science! It is clearly and irrefutably from the ground of Mathematics alone!

Every contribution that seems to be addressing a valid question – in other words it does seem to be attempting to explain things, but the argument uses ONLY mathematical-type relations and formulae for that purpose. They seem to be totally unaware that mathematics cannot now, and never will, provide explanations. Formulae are descriptive Forms: they can never tell us “Why” things are the way that they are, but only, “How”. They are, initially at least, mere extractions from past measured data, which are then used for prediction purposes.

Prediction, no matter how accurate, does NOT mean that embodied in it is an explanation of why things happen the way that they do, but, on the contrary, only describes accurately and succinctly HOW they happened in the past, and will similarly continue to happen in the future.

We don't ascribe gynecological expertise to someone who identifies pregnancy in a young woman, even when after a few appropriate questions they can give accurate predictions as to when the child will be born. What is involved here is merely past knowledge of WHAT will happen and when. Nothing more!

No causes are contained within any formal equations. Such things are indeed abstract relations only. They do not cause anything! Now, I must admit however that from time immemorial Mankind always endows each and every one of his discoveries and inventions with profound generalised significance, and one of the two major Schools of Philosophy – Idealism, believes precisely that Reality is actually driven by ideal forms! How this occurs is not addressed. The essence of everything is seen to be in its Form alone. BUT, the supporters of this trend never seem able to dissociate Universality from Essence!

For all Forms recur in thousands of completely different and unrelated areas of Reality. This demonstrates the Universality of Form! But it is clear that all these occurrences cannot have the same causes! They merely display the same Form! To make such abstract Forms into Causes is certainly Idealism, and that is NOT the driving Philosophy of Science.

For in Science a directly contrary philosophical standpoint demands concrete causes for everything! A bag of pragmatic formulae that can be fitted to particular circumstances is Technology, and NOT Real Science. Thus it must be emphasized that these so-called “scientists” have abandoned that well-established and fruitful Materialist approach, for a much more magical idealistic one. Whenever Pure Form is extracted, it can indeed be eternal and unchanging in itself – that is in the World of Pure Forms alone – there is nothing wrong with that! Indeed, Mathematics is the study of Pure Form when separated from its concrete embodiment in some aspect of Reality. The Real World of such concrete embodiments is dumped for the Ideal Form of itself alone.

But instead of Mathematics continuing as the essential Handmaiden of the Sciences, it is frequently, and rapidly, promoted to the role of Queen of the Sciences. It usurps Reality's Necessity with Form alone!

We are drawn away from the useful, pragmatic, simplifying, analytic and decidedly abstract methods that facilitate prediction, but which can, of themselves explain nothing!

Remarkably, such odd ideas are imported from outside of Science. In a sense such conceptions are unavoidable without a scientific approach to the World. It is where all musers, dreamers and “philosophers” must inevitably end up! It is the refuge of those who don't understand, but feel that they can describe with poetry and profundity.

In fact true scientists start when a relation has been isolated, extracted and abstracted from Reality. While Technologists feel the path before them is to USE such gains, the Scientist sees it as his task to explain why things are as they are, and why they display such Forms.

And, most crucially of all, NO Form is sufficient of itself! All phenomena are aspects of Reality as an integrated Whole, and a bag of formulae is merely a bag of tools. The scientist has to integrate clearly all closely-related phenomena into a coherent and comprehensive system. Now without Explanation this vital aim is impossible. Scientists seek explanations as the necessary elements to enable such broad, meaningful understanding of whole sections of Reality and to reveal its essential nature.

Now, surely all of this is indisputable, so what is going on in Cosmology?

The problem certainly lies elsewhere. For though Explanation is essential, it can be, and sometimes is, based on false assumptions, and indeed many (perhaps ALL) older theories can be so based and hence MUST be overturned by new discoveries and new knowledge.

It is true that NO explanations are eternal and ever lasting!

And so it should be! Science is a method, and NOT the Absolute Truth. Its strength must NOT be measured by some comparison with a desired Ideal or Absolute. Its value lies in its in two of its qualities: they are its ever-present correctability and its objective content. Though never totally sufficient, proper scientifically derived theories are never unfounded speculation. They do reflect Reality in crucial ways. They have what we call objective content!

A wall built from such “bricks” will STAND, even if its bricks are not entirely true. They contain enough of what is needed to carry all that is needed for the integrity of the “wall” The only measure of scientific theories must be derived from the standpoint of the largest possible overall view – as close as we can get to a targeted World View.

NOTE: Now in the midst of this explanation of Science, I have to contrast it with Mathematics. Surprisingly, Mathematics does deal in Absolute Truth! All its forms are indeed eternal and everlasting, and by the methods of the ancient Greeks Theorems can be proved to be The Truth. Now, this sounds pretty impressive, until you realise that all of this is only TRUE within the World of Pure Form – within Ideality. As soon as these forms are taken out of the Ideal Tool Bag and attempt to be used in the Real World, all bets are off. None of it is Absolutely True in Reality, but only in an ideal, purely formal world of abstract relations!

Now, scientists have to speculate on “Why?” by addressing the totality of what is known and understood in the area being considered. And, as time proceeds, such areas grow in size and range. While every mathematical equation is on the one side universal and eternal, such things are in concrete Reality decidedly particular and very clearly limited in scope.

Absolutely detailed and appropriate conditions have to be provided for each and every equation used in the Real World. Only in such a constrained context can the equation even approach being “true”. But, scientific Theories are much broader and more general, if they are truly scientific and not mere Forms in a deliberately constructed context. They do indeed fit together as a sort of “wall” – an integrated Whole! To compare the mathematical method with this, we must see it as more of a set of Stepping Stones (each in its own different and constrained context), towards some pre-determined objective. A totally mathematical method is merely abstract and formal, while the stepping stone version is entirely technological. Such pragmatism must be contrasted with an attempted all-embracing theory, which in spite of its flaws is scientific and improvable!

Now, we have to ask, “Why did the former gain ascendancy over the latter? Surely it is a no contest situation?” The obvious reason that it did happen is concerned with efficacy and prediction, but that cannot be the whole story, and it wasn't! The main reason for the present state of affairs was the general failure of many classical theories in Physics, which called whole expanses of explanations into question.

But, such has ever been thus! Mankind cannot “mainline” to Absolute Truth directly, but must find productive (even if mistaken) paths to proceed.

To throw the baby out with the bathwater, and “blinker” your “science” into mere Form is surely totally inexcusable! But, the flaws in the bases of Classical Physics were important. The real questions must NOT be to turn our backs on ever understanding things, and instead crouch over what “working instructions” we have. On the contrary, we must reveal the reasons for the flaws in the classical standpoint and address them. “Give up now, you'll never do it!” is a credo to be ashamed of, and never the Salvation of Science.

7b

Appedix - Extracts from the Internet

Can objects move away from us faster than the speed of light?

Again, this is a question that depends on which of the [many distance definitions](#) one uses. However, if we assume that the distance of an object at time t is the distance from our position at time t to the object's position at time t measured by a set of observers moving with the expansion of the Universe, and all making their observations when they see the Universe as having age t , then the velocity (change in D per change in t) can definitely be larger than the speed of light. This is not a contradiction of special [relativity](#) because this distance is not the same as the spatial distance used in SR, and the age of the Universe is not the same as the time used in SR. In the special case of the empty Universe, where one can show the model in both [special relativistic and cosmological coordinates](#), the velocity defined by change in cosmological distance per unit cosmic time is given by $v = c \ln(1+z)$, where z is the [redshift](#), which clearly goes to *infinity* as the redshift goes to infinity, and is larger than c for $z > 1.718$. For the critical density Universe, this velocity is given by $v = 2c[1-(1+z)^{-0.5}]$ which is larger than c for $z > 3$.

For the concordance model based on CMB data and the [acceleration](#) of the expansion measured using supernovae, a [flat Universe](#) with $\Omega_{M0} = 0.27$, the velocity is greater than c for $z > 1.407$.

[Back to top.](#)

The **metric expansion of space** is the averaged increase of metric (i.e. measured) distance between objects in the universe with time. It is an intrinsic expansion—that is, it is defined by the relative separation of parts of the universe and not by motion "outward" into preexisting space. Metric expansion is a key feature of Big Bang cosmology and is modeled mathematically with the FLRW metric. This model is valid in the present era only at relatively large scales (roughly the scale of galactic superclusters and above). At smaller scales matter has clumped together under the influence of gravitational attraction and these clumps do not individually expand, though they continue to recede from one another. The expansion is due partly to inertia (that is, the matter in the universe is separating because it was separating in the past) and partly to a repulsive force of unknown nature, which may be a cosmological constant. Inertia dominated the expansion in the early universe, and according to the Λ CDM model the cosmological constant will dominate in the future. In the present era they contribute in roughly equal proportions.

The metric expansion leads naturally to recession speeds which exceed the "speed of light" c and to distances which exceed c times the age of the universe, which is a frequent source of confusion among amateurs and even professional physicists.^[1] The speed c has no special significance at cosmological scales.

Perhaps a more complete assessment is that the *interpretation* of the metric expansion of space continues to provide paradoxes that are still a matter of debate.^{[2][3][4][5]} The prevailing view is that of Chodorowski: "unlike the expansion of the cosmic substratum, the expansion of space is unobservable".^[6]

Speed of Light, Density, Expansion of Universe

12/6/2005

name Jerome G.
status student
location NJ

Question - In General Relativity, Einstein cedes that the speed of light is functionally related to mass density. Is it possible that as the universe expands, the speed of light itself is "speeding up"; or, conversely that in the past the speed of light was "slower" and thus the galaxies that we observe today are much further away than we think they are? And that the mathematical contradictions implicit in the "big bang" may be resolvable?

There have been speculations about the constancy of the fundamental constants, e.g. the speed of light. In fact, there is a book "Faster than the Speed of Light" by Joao Magueijo (a mainstream theoretical physicist), that specifically addresses the consequences of varying speed of light and/or other "fundamental constants". The debate gets pretty heated, and sometimes personal, but there is nothing scientifically wrong with asking "what if" questions. Speculation is a valid part of the scientific process. Many scientific theories begin as more speculation than ordered logical mathematical constructions. In particular, quantum theory, and the theory of relativity were both considered "speculation" by many contemporary scientists in their early days. Having conceded that, the weight of the scientific data supports the constancy of the fundamental constants such as the speed of light, the fine structure constant, the charge on the electron etc.

There are 5 "fundamental constants that are absolutely necessary: the speed of light, the gravitational constant, Planck's constant / 2π , Coulomb force constant, and Boltzman's constant:

See http://en.wikipedia.org/wiki/Planck_units

But lest you think that there is total agreement about what and how many 'fundamental' constants there are see:

<http://xxx.lanl.gov/abs/physics/0110060>

or do a "Google" search on the term "minimal set fundamental constants", and enjoy the discussions.

Vince Calder

If the Universe is only 14 billion years old, how can we see objects that are now 47 billion light years away?

When talking about the distance of a moving object, we mean the spatial separation NOW, with the positions of both objects specified at the current time. In an expanding Universe this distance NOW is larger than the speed of light times the light travel time due to the increase of separations between objects as the Universe expands. This is not due to any change in the units of space and time, but just caused by things being farther apart now than they used to be.

What is the distance NOW to the most distant thing we can see? Let's take the age of the Universe to be 14 billion years. In that time light travels 14 billion light years, and some people stop here. But the distance has grown since the light traveled. The average time when the light was traveling was 7 billion years ago. For the *critical density* case, the scale factor for the Universe goes like the $2/3$ power of the time since the Big Bang, so the Universe has grown by a factor of $2^{2/3} = 1.59$ since the midpoint of the light's trip. But the size of the Universe changes continuously, so we should divide the light's trip into short intervals. First take two intervals: 7 billion years at an average time 10.5 billion years after the Big Bang, which gives 7 billion light years that have grown by a factor of $1/(0.75)^{2/3} = 1.21$, plus another 7 billion light years at an average time 3.5 billion years after the Big Bang, which has grown by a factor of $4^{2/3} = 2.52$. Thus with 1 interval we got $1.59 * 14 = 22.3$ billion light years, while with two intervals we get $7 * (1.21 + 2.52) = 26.1$ billion light years. With 8192 intervals we get 41 billion light years. In the limit of very many time intervals we get 42 billion light years. With calculus this whole paragraph reduces to [this](#).

Another way of seeing this is to consider a photon and a galaxy 42 billion light years away from us now, 14 billion years after the Big Bang. The distance of this photon satisfies $D = 3ct$. If we wait for 0.1 billion years, the Universe will grow by a factor of $(14.1/14)^{2/3} = 1.0048$, so the galaxy will be $1.0048 * 42 = 42.2$ billion light years away. But the light will have traveled 0.1 billion light years further than the galaxy *because it moves at the speed of light relative to the matter in its vicinity* and will thus be at $D = 42.3$ billion light years, so $D = 3ct$ is still satisfied.

If the Universe does not have the critical density then the distance is different, and for the low densities that are more likely the distance NOW to the most distant object we can see is bigger than 3 times the speed of light times the age of the Universe. The current best fit model which has an accelerating expansion gives a maximum distance we can see of 47 billion light years.

[Back to top.](#)

How can the oldest stars in the Universe be older than the Universe?

Of course the Universe has to be older than the oldest stars in it. So this question basically asks: which estimate is wrong -

- The age of the Universe
- The age of the oldest stars
- Both

The age of the Universe is determined from its expansion rate: the *Hubble constant*, which is the ratio of the radial velocity of a distant galaxy to its distance. The *radial velocity* is easy to measure, but the *distances* are not. Thus there is currently a 11% uncertainty in the *value* of the Hubble constant measured directly by the Hubble Space Telescope. John Huchra gives a [good discussion](#) of the historical uncertainties in the Hubble constant since even before Hubble's work. There is now a more precise but more indirect determination from *WMAP* observations of the CMB anisotropy.

The estimated age of the Universe has been increased by the observations of an accelerated expansion of the Universe. The current best value is 13.7 ± 0.2 billion years from *WMAP*.

Determining the age of the oldest stars requires a knowledge of their luminosity, which depends on their distance. This leads to a 15% uncertainty in the ages of the oldest stars due to the difficulty in determining distances.

Thus the discrepancy between the age of the oldest things in the Universe and the age inferred from the expansion rate was always within the margin of error. In fact, in 1997 improved distances from the HIPPARCOS satellite suggested that the oldest stars were younger, and the *WMAP* results in 2003 suggest that the Universe is older, so the discrepancy has disappeared.

[Back to top.](#)

8. The Creation and Expansion of Space Itself

Papers 1 & 2

In a previous paper on the truly amazing ideas of those currently supplying the consensus in Cosmology, I referred to whole series of their “explanations”, which they supplied in answer to the many and evident contradictions in their patchwork of “theories”. It seemed to me (but not to them), that these were not mere “gaps”, which would be filled in later by others based on new evidence, but, on the contrary, were unavoidable cul-de-sacs generated solely by their erroneous standpoint. The tenor of such “explanations” was demonstrated at the end of that previous paper **-Mathematical Speculations in Cosmology (14/14/09)**, via a series of quotes on these matters gleaned from the Internet. Surprisingly, I found most of these excerpts by doing an Internet Search on the very questions which I felt were those that would scupper their position. Indeed, the titles of these contributions promised quite clearly that they would provide answers sufficient to allay all doubts. But, as you may have guessed they missed the point entirely. For them, there was only one place to look to clear up every single one of these pressing questions.

Did you think it was the Heavens? No! That was certainly not the first place that they would look!

They looked to find all the answers entirely in the **World of Equations – in Ideality!**

With great confidence they delved deeply into Ideality “knowing” that **IT** was the repository of all Truth, and that as these formulae actually “drove” the whole Universe, where else would they need to look?

And what would be their tools? Did you think that the answers would be achieved by Light or Radio telescopes or perhaps by specially constructed robotic measuring spacecraft? Wrong again!

They used pencils and paper!.

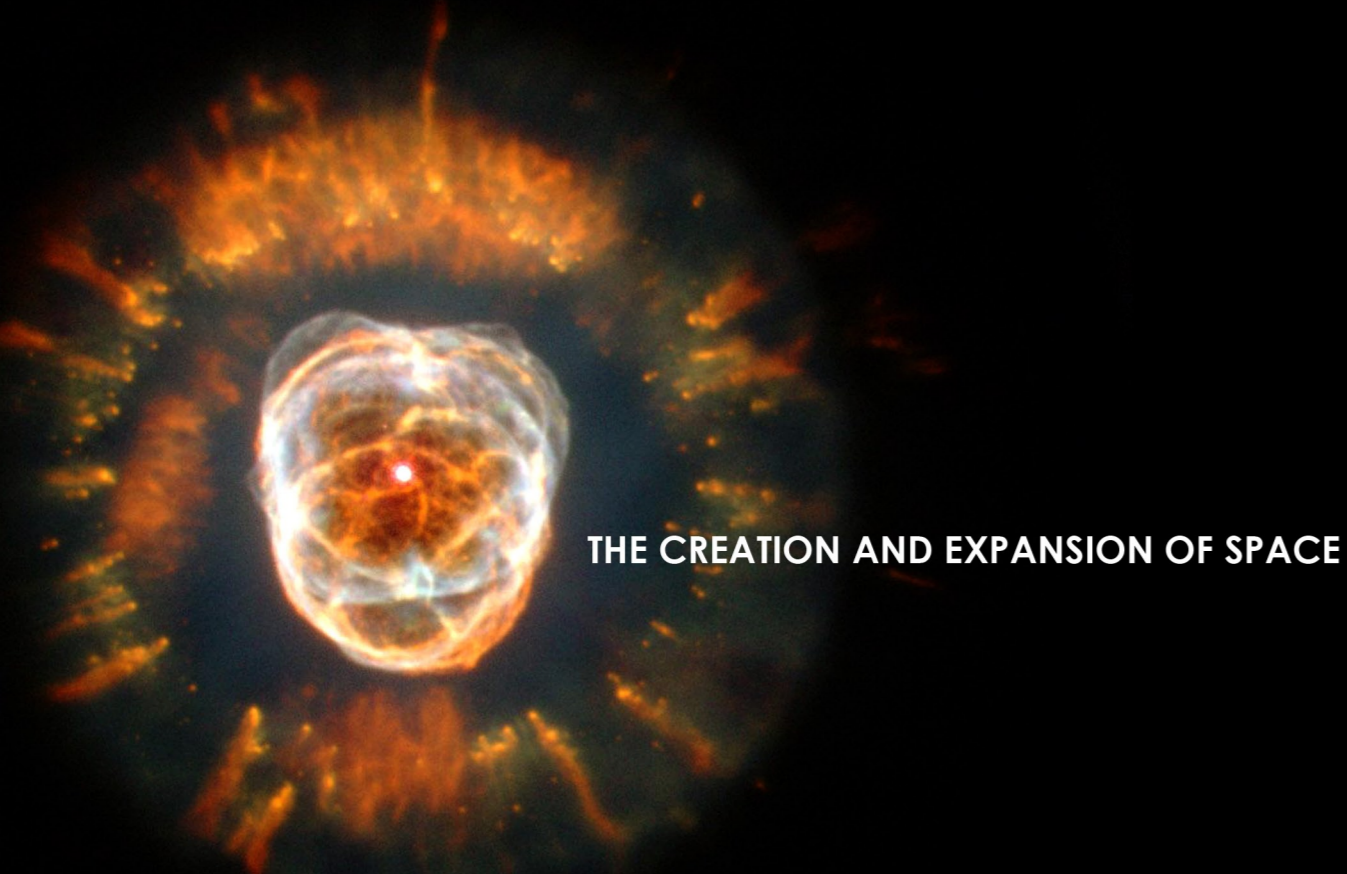
Now they didn't find the answers already there – just waiting to be picked out and delivered to the doubters. No indeed! Our Cosmologists knew from experience that they had to **extend** the superstructure of Ideality somewhat, (which is quite legitimate in that world of Pure Form alone). But what they did was (even for them quite remarkable), they changed the abstract concept of Space in Ideality so that it **could** EXPAND. This trick meant that everything in this Form of Space would be carried with it as it expanded, Even though they were NOT moving in this way intrinsically. Any movement that they were actually undergoing would have this non-moving feature added to it. By this means the separation of features in the Cosmos seemed now to be much faster than here-to-for, and there even seemed to be speeds greater than the Speed of Light for the **material entities** involved in this pseudo-movement.

By now, you must be seeing what I mean! All things are possible in the World of Pure Form. To be acceptable, the criteria involved for anything to be legitimate in that sphere are ALL connected with their being mathematically representable **in a consistent way**.

But can you just transfer formal conceptions as a whole from the World of Form to Reality? Because, that is certainly what they do! Can you test whether Space expands in this formal way in the Real World? No, you cannot! As I have stressed innumerable times “No mathematics delivers any sort of explanation – NOT EVER! Mathematics is a **description** of pure forms **only!** Its existence is wholly confined to Ideality. When some handy form fits phenomena in Reality, that is ALWAYS because we make sure it fits by tailoring the context to “complete the fit”. We frig Reality to FIT Ideality!

Now, let us not run away with ourselves. Taking things like “Space” as some formal entity, which has such properties as above, is exactly what Mathematics is supposed to be for. It enables such a conception to generate **in Ideality** (with a great deal of care) a self-consistent system. It takes a formal fragment and allows the very maximum consequences to be extracted from it. Such things are NOT possible in Reality, but they certainly ARE in Ideality. And this is a major advantage. Instead of a small speculative fragment, there is a chance that a many more complex, yet consistent, systems can be revealed.

Not matching things from Ideality to real World phenomena is much sounder, if what you are exporting is a bigger and consistent set of relations. And, of course, the opposite is also true. It can easily be seen to NEVER fit where you thought it did! Ideality is the **Theatre for Experiments in Form**.



THE CREATION AND EXPANSION OF SPACE

What do you think Computer Simulations are? They are precisely that!

When mismatches occur between Ideality-sourced Forms and Reality, it is sometimes possible to CHANGE REALITY to fit! Yes, I did say that! But, what I meant by it was that, if some system from Ideality was to be useful in the Real World, the Real World context had to be rigidly controlled to MAKE IT FIT to the *ideal* model!

But, and this is a very big BUT, you can't do that with the Real Universe. Indeed, you can't do ANYTHING with the Real Universe – at least those elements of it that are the substance of Cosmology! Cosmology is basically observation-only. So though factories all over the World are controlling situations so that Forms from Ideality fit and deliver required outcomes, such things **cannot** be done in Cosmology.

Now having cleared up that important aspect, we are presented with something that we might think we can answer about the Universe. That question is “What is Space?” It is such a basic and “elementary” question that we don't usually even concern ourselves with it. “Surely it is merely the **stage** on which all cosmological events occur?” And, can be considered as merely property-less and empty! Now as it is said to expand of itself, it can scarcely conform to our initial **non definition!**

For it to expand, it cannot be ONLY the “absence of Matter”, that was our initial and primitive, reference-type of conception. **How can emptiness expand? And what could it be expanding into?** Now elsewhere, and for quite different considerations, I have attempted to redefine the nature of Space in a **semi-classical** way. My main consideration then had to be its evident and inherent Electro-Magnetic properties. For in Space we have seeming nothingness that will react immediately to the insertion of the tiniest iota of E-M disturbances, and then actually transmit them onwards in all directions literally for ever.

Now scientists, such as Newton, could therefore only conceive of such things if Light was corpuscular. For “particles of Light” could with sufficient speed, carry on for ever through “empty space”. Indeed, what else could they do? There would be nothing to stop their onward progress at an unaltered speed. But Hooke quite rightly immediately demanded an explanation of the indisputable wave-like properties of Light, such as interference, which were surely totally incapable of being explained by a shower of particles. Newton historically lost the argument, and for many, many years the concept of the “ether” was accepted, which involved a mass-less, weightless, charge-less all-pervading medium, that performed all of Hooke's wave-like variations.

But this fabulous ether could not be detected, and was dumped as yet another fiction.

But, that still meant that we had clear and complex properties associated with the Pure Nothingness that remained as “Space” - clear properties that immediately jump into existence at the slightest insertion of any E-M disturbance, and which will be transmitted, literally for ever, through this total “nothingness”.

And now, most certainly, if it is said to **expand**, it must be SOMETHING! The question is, “What?”

Now, the full required question is made even more difficult by the (by now) enormous amount of evidence for E-M radiation to exist in **quanta**

Einstein's explanation of the Photo Electric Effect seemed to confirm that Light was indeed transmitted in finite “gobbits” (or quanta), and on hitting the given “active” surface in a Photo Electric experiment, these “packets of energy” could knock individual electrons out of their orbits within the atoms that made up that surface. And this releasing of such “free” electrons could then allow them to be moved along by an applied electrical potential difference to form a measureable current.

On the other hand, a totally dispersed and infinitely divisible wave-form of Light did not seem to be able to deliver this effect in any describable way.

NOTE: You have all heard of the form of contradiction wherein an infinitely dispersed wave magically condenses into a particulate point just as the surface is reached. The insurmountable contradiction surely must show that both models are WRONG, and merely aspects of the true Reality of the situation. And to be questioning why these two mutually exclusive models continue to be subscribed to, the answer must by now be becoming obvious. Each works well in its appropriate circumstances: formulae are available which can be used. The main reason for holding on to the dichotomy, is the subscription to mathematical formulae as The Essential Truth of Reality.

Such Truths cannot be dumped, but must be true but perhaps “insufficient”. The hope is that they will BOTH be subsumed into a higher, all-inclusive Form that will be discovered in the future and will deliver BOTH, each in their appropriate circumstances.

But, the size of a quantum of energy clearly depended on the wavelength of the E-M radiation that was involved. Nonetheless, there seemed to be a minimum gobbit of E-M radiation – almost like Newton's “particle of Light”, but, of course, only having **all the wave-like properties when treated as a collection**. Individual photons of Light were seemingly particulate, but displayed wave-like properties when acting in concert with many others.

Indeed, as in the all the forms of the **Double Slit Experiment**, the flashes on the detection screen were obviously associated with the arrivals of individual gobbits of energy, while the cumulative pattern built up out of such hits was exactly like what a wave would produce. It seems that the wave-like properties are only in evidence when we are addressing a whole set of these acting together over time. In special circumstances they portray “concert properties”, which are NOT explained simply and directly entirely in terms of the properties of the individual gobbits (taken in isolation).

Collections of things have these properties, which are only evident in that context. Thus the revealed properties of the individual pieces DO NOT, and indeed CAN NOT, tell the whole story. And the Reductionist assumption that the collective will always be demonstrably determined by the individual properties is INCORRECT in these cases. The very process of separation of the components, so that they can be measured individually, ONLY can reveal those properties that are **available** in such a mode. Other actually existing properties are undetectable when the particles are taken individually, but come into measurability when many are taken in concert. Indeed, they are NOT THERE when the former constraints are in action: they ONLY exist when all are taken in concert. The properties of the “particles” are not the full, and certainly NOT the determining story. They are only a part, an aspect, of the full qualities of the entity which can be taken individually, but do NOT constitute the full set.

Indeed, ALL formulae applicable in ALL context also have a version of this situation.

To even investigate a situation scientists have to constrain it rigidly, maintaining a very narrow set of conditions which define the Domain of Applicability involved. And laws determined for within that Domain are NEVER the full story either, as every single Domain boundary can be transgressed and the law then **ceases** to be correct, never mind useable. This methodology is termed **Plurality** and separates Parts from Wholes in order to delve deeper, but in so doing the process prohibits ANY transitions between Domains, and certainly does not allow of a search for the fundamental and basic laws of all Reality.

And, yet that latter assumption is universally believed. Reductionism is the basis of Pluralist Science.

Do you want a nice clear example? Boil down any law of living things to a full explanation in non living matter! Can you do it? The answer is, “NO!”, and not for the usual reasons. Life is a collective system. Its laws are NOT reducible to non living laws – EVER! To address ALL these problems you have to study the defining phenomena collectively known as Emergences. Who is doing that, I wonder!

Indeed, the pluralist trained scientist may be aghast the **bottom-up** explanations are not only insufficient, but very largely incomplete, in that determinations can also be **top-down** and **side-to-side** determinations, as well as complexes of all of these which produce what any taken separately CANNOT!. Have you had explained to you any of these things in your Science education, I wonder?

Now, could all of this throw any “light” on the nature of so-called Empty Space?

Could Space have properties which are NOT evident when we study a locality in total isolation? We know that it does in total, because otherwise, how would it transmit E-M radiation? How would it display E-M oscillations of its own, which propagates over enormous distances as a continuing disturbance?

Space itself must have collective properties, and we can explain wave propagation in terms of them. But, an individual particle of Space is not even discernable. It appears to be a **Totally Empty Photon!** That **is a** photon with E-M properties with ZERO amplitude for both: zero amounts of E and zero amounts of M- fully functional but devoid of energy. In such a state the particle of Space “disappears”: it seems to actually vanish, but in fact every part of Empty Space is packed with these “empty houses”, that can jump into energetic life at the tiniest E-M disturbance, AND pass it on – FOR ever!

The collective effect of all these Empty Photons cannot be explained in terms of the individual units, they are properties of them ALL as a Whole. We call what they produce a Medium and it compares very favourably with ANY material Medium. It is a perfect Medium!

Now, our Empty Photons are, of course, merely a **model** for the Reality of Space, but they are surely an advance on the idea of “nothing” transmitting E-M radiation. We have something like our two-sided entities with individual properties on the one side and collective properties on the other. Except that the individual properties seem absent, while the collective properties are clearly present.

Now, these ideas are, of course, at an early stage. We immediately have to decide whether Space is packed with non-moving Empty Photons, and E-M radiation merely transmitted through this collective body, or whether our old conception of particulate fast-moving photons is more accurate.

But, these ideas DO allow a new look at the Expansion of Space, for Space will now be the collection of Empty Photons, and its expansion will be some sort of growth in the number(?) of those. A sort of re-organisation of a truly empty Space into Space structured as Empty Photons with potential E-M properties. We would then have the old Empty Space actually pre-existing the new "Empty Photon Space" that we can actually see the results of. Of course, we would have the old idea of Space as the Theatre of Operations for the Empty Photon Space, which IS the Expanding Universe. The Big Bang (initially only Energy), MUST create its own path! Truly empty Space would be incapable of propagating E-M radiation as waves. To conquer such a totally passive void, the nature of the expanding volume of radiation must be more like a particulate shower. But it must have TWO aspects. First, we have the laying down of the necessary ground for subsequent E-M propagation. And Secondly, we have the actual propagation via this medium.

And if we suppose that the burst of energy ONLY from the initial Big Bang was, and is, NOT a permanent continuing feature, then that pulse of E-M radiation must pass – must **cease**. And what will remain behind? It must be the paving of now empty Photons that define the new, Big Bang-generated version of Space.



INITIAL SPEED OF LIGHT

9. Initial Speed of Light

(prior to an Empty Photon-filled Space)

With the supposition that currently Empty Space is “paved” with a medium of Empty Photons, which don’t actually move in propagation, but stay roughly where they are, and actually pass-on E-M disturbances by induction from Empty Photon to Empty Photon, THEN the constant Speed of Light becomes entirely explicable. It is the speed by which Empty Photons pass on such disturbances by induction **only**. Such a constant is therefore entirely a property of these Empty Photons of Space, and if we can conceive of a Universe **without** (indeed prior to) these entities, we **then** have a problem.

With **really-empty** Space (i.e. that **not** containing any Empty Photons – indeed actual **Nothingness**) then NO E-M radiation could be transmitted as waves! But, there would be no reason why entities could not shootout through that nothingness at **any speed at all** without limit.

What indeed would limit it? The question arises though as to what is the effect in today’s Space (now presumably filled with Empty Photons by the Big Bang) on such speeding projectiles? The Limit (imposed by Einstein’s Theory of Relativity) – that NO material object could ever even reach the Speed of Light, and that as such ever more closely approached such a speed, it would get increasingly heavier(?), may well get modified with these new ideas.(Was the **mathematical** tail wagging the **real** dog?)

Instead of presenting NO measureable barrier to traversing particles, the situation changes at high speeds, and the Empty Photons “pile-up” in some way and in this way limit the speeds involved. If this is the real reason for Einstein’s upper limit, then in truly Empty Space, with NO Empty Photons present, there should be no such limit to initial above C speeds. [Might this explain the fabled **Inflation period** at the beginning of the Big Bang?] Now these ideas will be pushing the boat out to a perhaps insupportable extent, let us nevertheless DO it, and see where it might take us!

Initially then, before the laying down of a paved-with-Empty Photons Space, the Big Bang would be powering outwards ONLY Energy into Total Nothingness. The speed could well at that stage be truly colossal – well in excess of the Speed of Light, C. (I have already mentioned Inflation!) this might not only deliver what today’s theorists require for the first stages of the Big Bang, but would also **pave** empty Space with Photons (as projectiles, which would constantly share out the initial Energy until each receptacle (the Photon) would be “effectively empty”).

If this is not too much of a muse, we could have initial Inflation AND the Big Bang defined Space paved with Empty Photons. This would remove the conundrums that plague Physics, explaining Wave propagation directly, but also involving Empty Photons, capable of carrying individual Quanta of E-M energy. The limit of C would be explained, not as some magic Constant of Reality, but a common or garden value for the speed of inductive transfer from Empty Photon to Empty Photon.

NOTE: The idea on the Elasticity of Space papers, of each particle of mass having an associated infinite gravitational Field associated with it, could give us another way of dealing with Wave/particle Duality. Both would always be present but be differently activated by our methods.



TIME SPACE MAPPING OF THE BIG BANG UNIVERSE

10. Time-Space Mapping of the Big Bang Universe

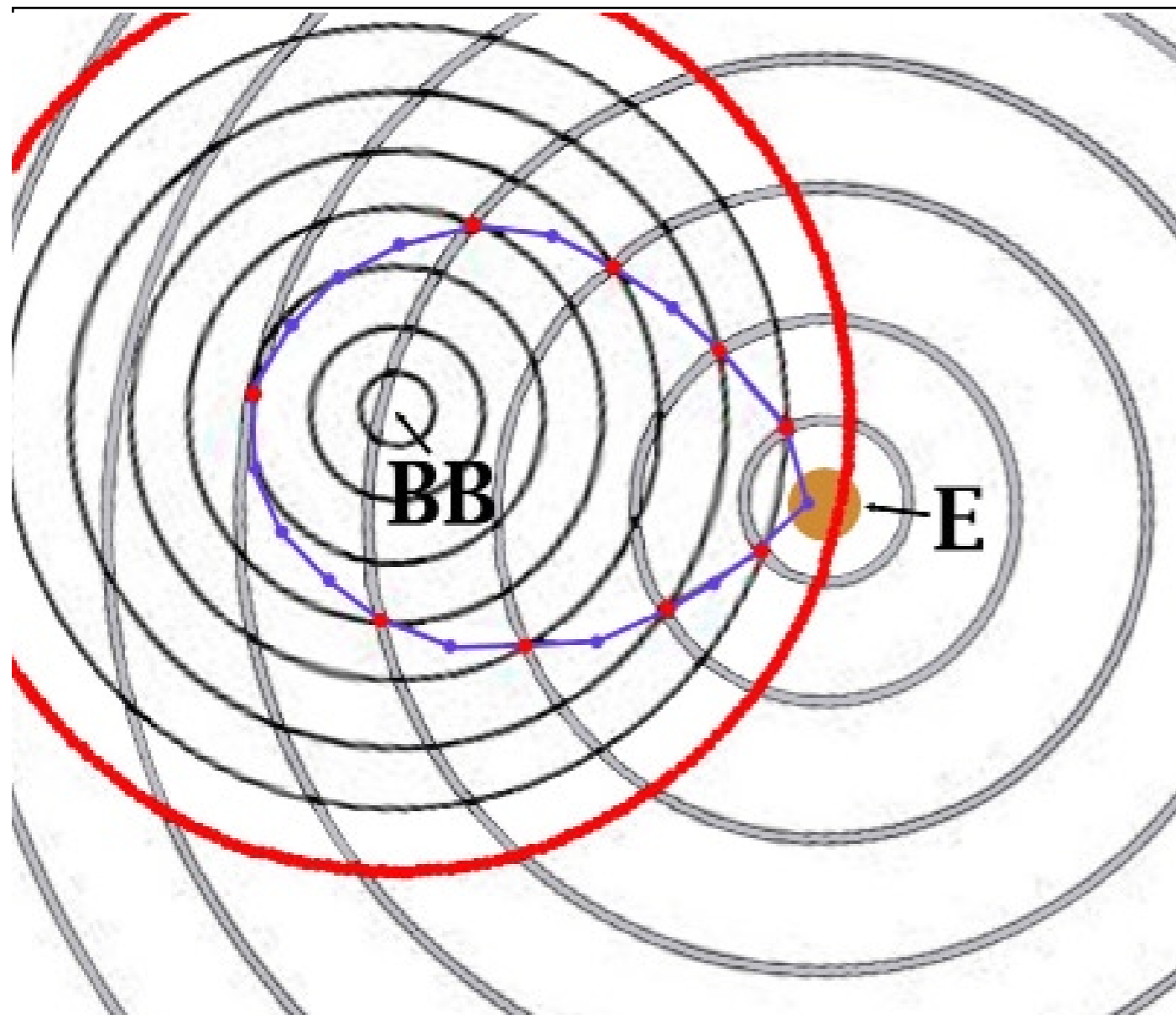
(prior to an Empty Photon-filled Space)

Now, the previous major diagram from **Can we see the Edge** (shown again here) demonstrated how we were able to construct exactly what we actually see of the Universe as we look out from our position on the Earth at the present time, and indeed, why it looks that way.

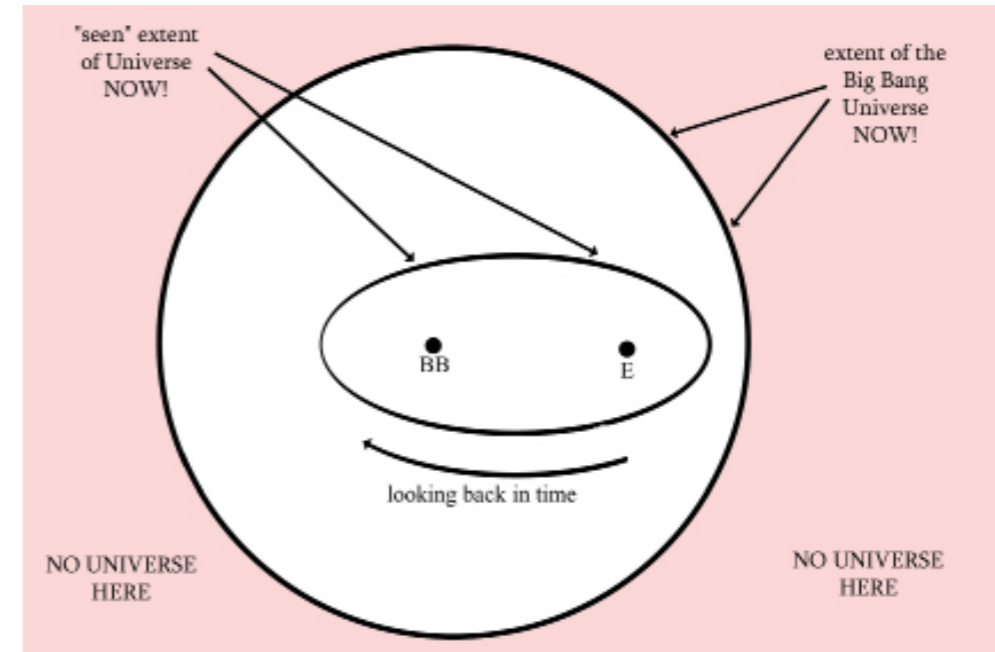
NOTE: To make sense of how we produced this figure the reader will have to study that paper.

We could (as most popularisers do) have taken a God's eye view of the whole thing, and our final figure would have been a sphere centred upon the position of the original Big Bang, but that would not in any way have allowed us to make sense of what we **actually** see as we look out now at the surrounding Universe! Another alternative (beloved of the CGI experts in Movies) would have been to deliver an animation, which, as we flew back towards the position of the Big Bang, would have also taken us back in time to arrive there just as the Big Bang erupted into existence. But that too, (though a dramatic journey) would not only have told us nothing concrete, but would also present us with an entirely impossible scenario. Such tricks are NOT for serious scientists!

The diagram actually produced was much more informative, and gave us a map to lay out in front of us as we observed the heavens, and allowed us to position what we see there within a Time & Distance map of some real use.



But such a diagram is **only** for finding the important features of the Universe as we see it NOW! We must next remove the “construction lines” and discuss the underlying Map and what it means. A simplified version is shown first.



But, on using such a “map”, we have to remember what it is.

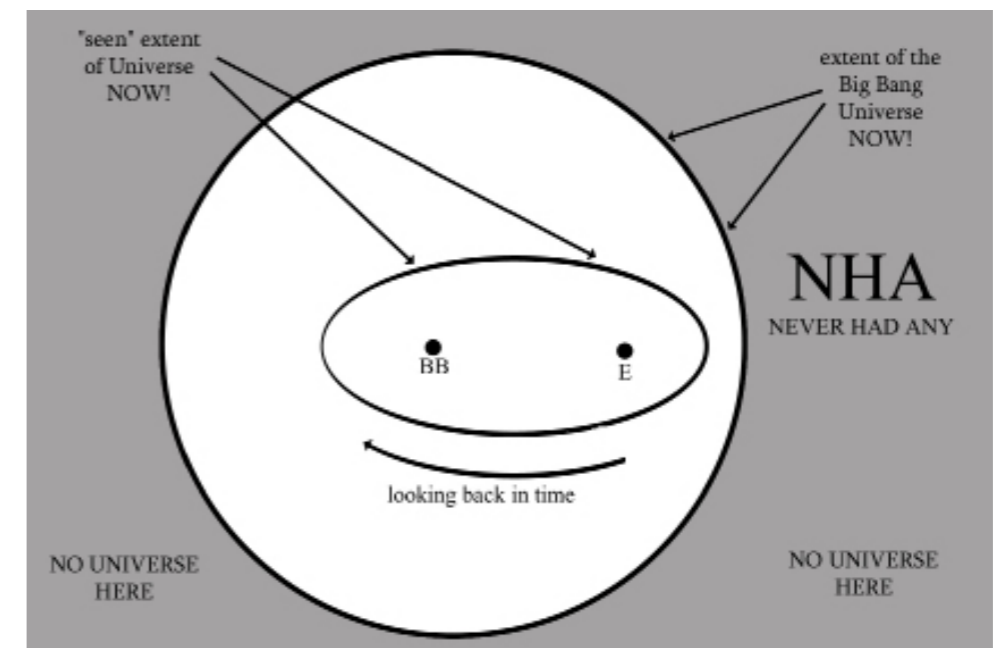
For example, let us look at the ovoid “boundary” of the Universe as it appears to us now. Yet, if we were able to **follow** that “boundary” round, and seem to observe it as a continuous edge, that would NOT be the case! We would be following round an **illusion!**

For, as we traverse that edge, we are not only moving in **Space**, but also in **Time**. The real current boundary of the Universe is everywhere much further out and totally unobservable, for its light is only NOW beginning its journey towards us. What we see of the Heavens is always in the past, and to make matters worse, it is at varying times in that past.

NOTE: we “cope” with these difficulties by using the units years for Time, and light years for Distance, and a star at n light years distance will be at n years in the past – so easy we don't think about it.

Each star that we see, at a particular point in Space and at a moment in Time determined by that distance, is from our own position NOW.

So the diagram also constantly asks questions of us such as:



“What exists beyond the Universe?”

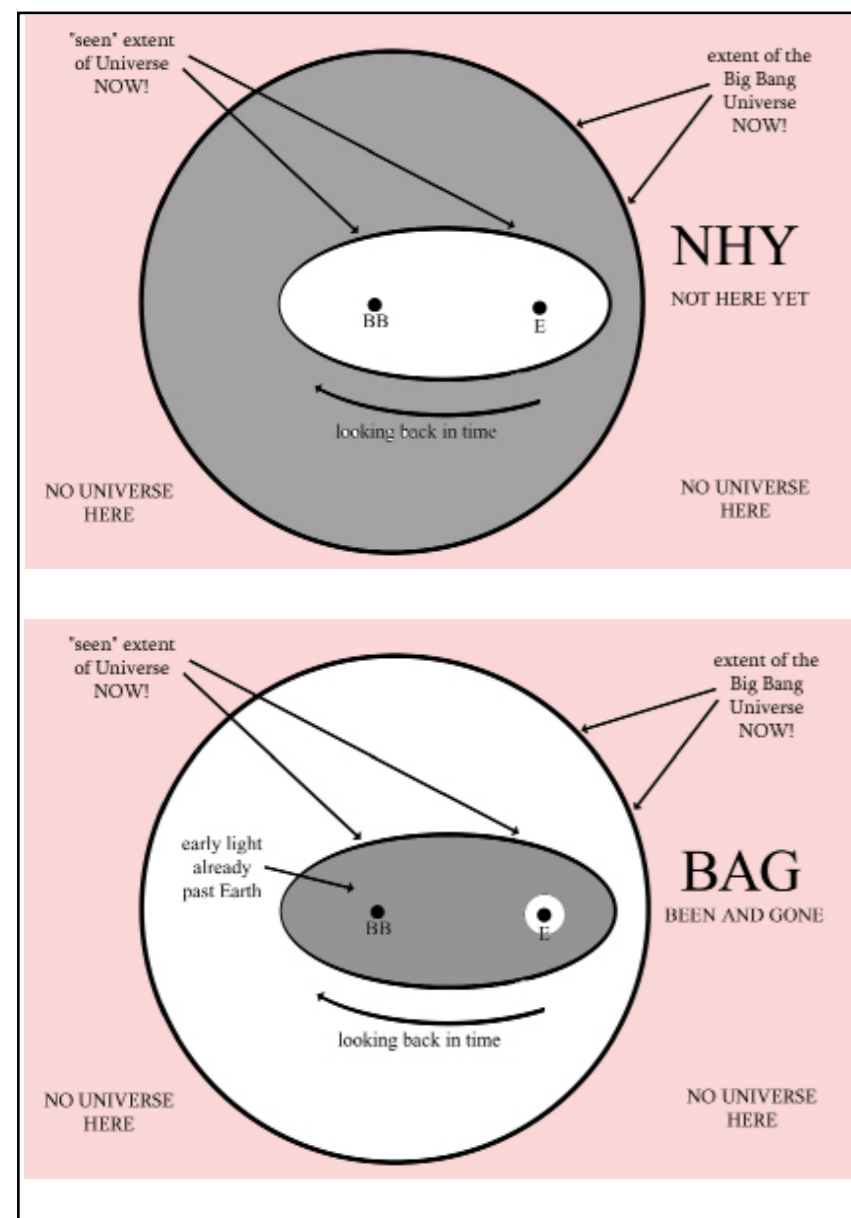
“Just what fraction of Space and Time is already lost to us, as its light will have long since passed our position?”

“What has recently happened so that its light is as yet only on its way, and will only arrive much later?”

Let us therefore begin to attempt answers to such questions by studying the “space-time continents and oceans” of our map!

The following versions simply identify the main areas.

First we colour the non-Universe region in **grey**. (see previous page) This map identifies this region as **NHA – never had any**, and we must ask, **“What, if anything will be observed there?”** This is not such a stupid question, because if anything is found in such a region, it would prove that the Big Bang Universe was NOT the start of everything, but only the start of **our** Universe. If anything does inhabit this region, its nature would answer many crucial questions about the development of Reality, and would have to be **very old indeed**.



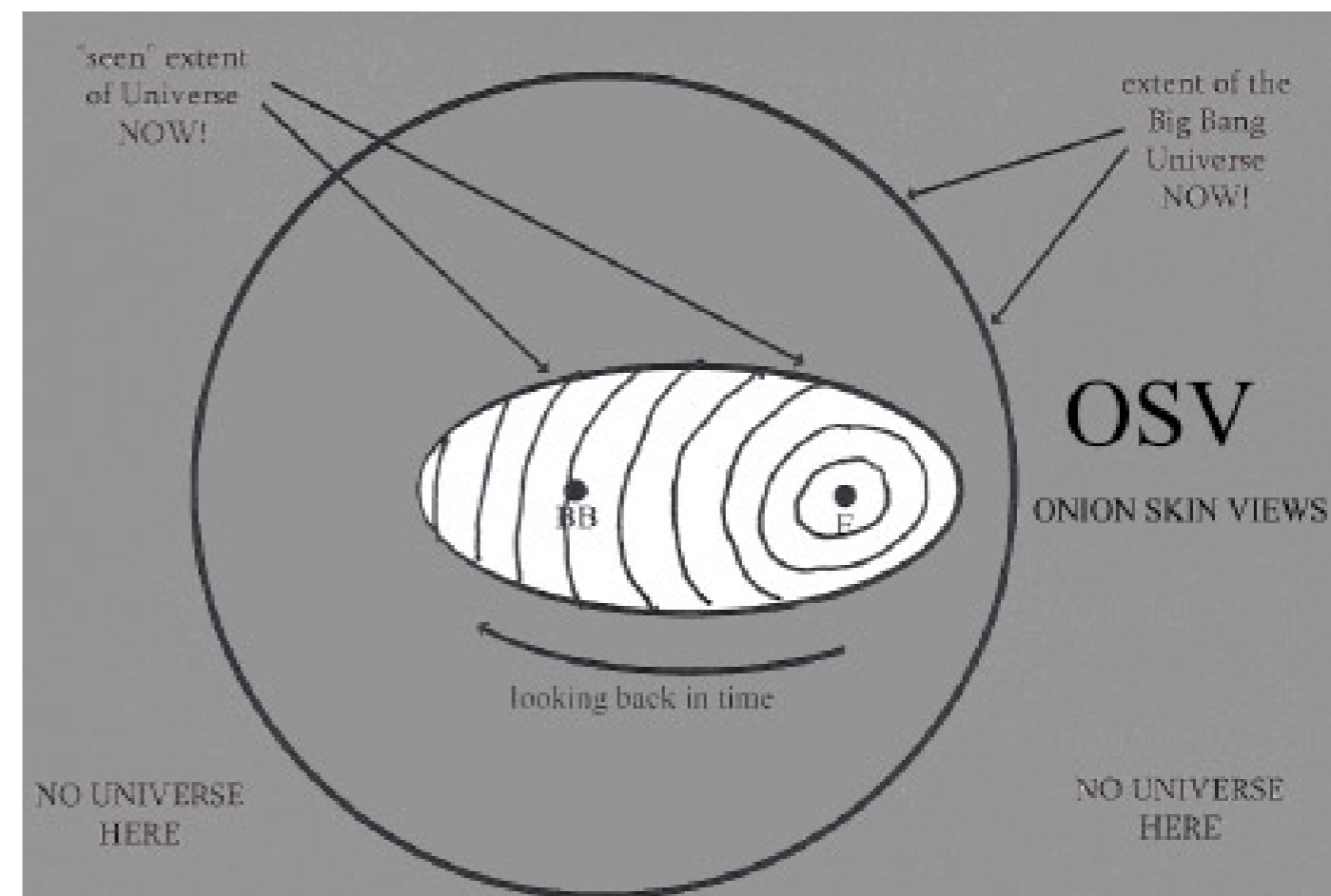
Clearly, all of the current Universe **outside** the current seeable ovoid, though it **exists**, will be **NHY – not here yet** and hence totally unknown to us (as shown in the next diagram). But, in addition, we must not consider that that is all there is in this category. Even within the ovoid we only have snapshots of all positions at particular times, and everything, even there, after that time will also be **NHY** and hence unknown to us.

Continuing with our “seeable ovoid”, every single point has its “time”, which we see NOW, and hence in addition to all the events categorised as **NHY**, we have all those **prior** to the given seen-now time, which we will have missed, because the light from those positions prior to the time we can see will be **BAG – been and gone**.

Indeed, only those positions very close to our own position will be from NOW or close to it.

Finally, within our defined seeable ovoid of the Universe we must be absolutely clear on the slivers of time available to us even there. Each distance from us (defined by a sphere centred upon our current position) will deliver a shell of simultaneous events from a given common time.

Clearly then, we can only term the seeable times and places as **OSV – onion skin views**.



We don't get much do we?

Yet this selection of times is also an advantage. For, in spite of the paucity of overall evidence, there is good data available from literally all times up to a maximum defined by the seen edge of the Universe in a given direction. So we can (as the geologists learned to do with the history of the Earth via the evidence in the layers of rock) piece together possible development sequences. NOT, of course, of a given thing traced through its individual history, but by examples of different things in different times and places, which could deliver possible phases of development.

The amazing thing about Cosmology is that, at its best, it is a very pure Science, which can be interpreted by thinking about the evidence available. Yet in spite of this “disadvantage-turned-advantage”, even Cosmology has been drawn into the same maths-led capitulation and consequent speculations of the sub-atomic physicists. Instead of delivering THE most profound historical conclusions from the “movies in the sky”, we are told of Parallel Universe, Physical Singularities, Wormholes, and things moving backwards in Time etc. etc. etc. – which are the antithesis of real enlightening Science.

11. Credits

And other Information

©2010 **Jim Schofield**

Words **Jim Schofield**

Graphic Design **Mick Schofield**

Photography **NASA / Hubble Space Telescope / Mick Schofield**

www.e-journal.org.uk/shape

Shape Journal

Bild Art

11a Woodlands Road, Lepton

West Yorkshire. HD8 0HX UK