In Chapter IV the Interface Observations on the two schools of thought viz. Vedic and Scientific (as discussed in chapters II and III) are being discussed.

Modern cosmology is grappling with the problem of nature of primordial existence. Modern scientists could not be able to explain the state before big bang rather they said that before creation the whole universe was compact to a single point mass which had zero mass. The description of the Hymn of Nāsadiya Sūkta (X.129.1-4) runs almost parallel with the Big Bang description of the universe step by step. The first two stanzas of the hymn describe the state of primordial existence.

Evolution and involution

'Evolution, as the word is used in theosophy it means the "unwrapping," "unfolding," "rolling out" of latent powers and faculties native to and inherent in the entity itself, its own essential characteristics, or more
generally speaking, the powers and faculties of its own character: the Sanskrit word for this last conception is svabhāva.

'In theosophy evolution means that man has in him (as indeed have all other evolving entities) everything that the cosmos has because he is an inseparable part of it. He is its child; one cannot separate man from the Universe. Everything that is in the Universe is in him, latent or active, and evolution is the bringing forth of what is within.

'Involution, the reverse process or procedure of evolution. As evolution means the unfolding, the unwrapping, the rolling forth, of what already exists and is latent, so involution means the inwrapping, the infolding, the ingoing of what previously exists or has been unfolded, etc. Involution and evolution are two names for two phases of the same procedure of growth, and are eternally coactive and interactive.

Vedic text speaks of the Involution and Evolution of Brahmā, the cosmic divinity, when worlds are evolved forth from, and later withdrawn into, the bosom of Brahmā. Some people have drawn parallels between this idea and that of an Oscillating universe which
alternately expands and contracts. Outbreathing and inbreathing can refer to the expansion of the One into the many, and the subsequent reabsorption of the many into the One.¹

The evolution and involution of universe does not mean that space itself pops into existence out of nothingness, expands like elastic and later contracts and vanishes into nothingness. It is the worlds within space—planets, stars, etc.—that materialize and etherealize. Our physical senses allow us to perceive only physical-plane objects composed of the same type of matter as ourselves. But if the matter of the physical universe makes up only one tiny range in an infinite continuum of possible grades of matter, there must be countless interpenetrating worlds and planes, both grosser and more ethereal than our own, that are beyond our range of perception. The infinite totality of worlds and planes not only infill space but are space. A popular theory nowadays is that when stars above a certain size die, they collapse under their own weight to an infinitesimal point, forming a hypothetical 'black hole'.

Likewise, big bangers believe that in the far distant future space might start to shrink, so that all the matter and energy in the universe is compressed into a single point in a 'big squeeze'. In contrast to these wild theories, theosophy says that on the upward arc of evolution cohesive forces begin to relax and matter becomes increasingly ethereal, and that when planets and suns die their constituents are dispersed and enter a dormant, relatively homogeneous condition.²

At the dawn of the next cycle of manifestation, life impulses from inner realms will quicken sleeping matter into renewed activity in certain 'fertile' regions of space, following which this primal physical substance will begin to differentiate and condense into galaxies, stars, and planets. Once the various worlds or globes have been formed by the elemental and mineral kingdoms, guided by the most spiritual kingdoms, the other kingdoms of nature -- plant, animal, human, and superhuman -- can gradually make their appearance, as their sleeping prototypes on the astral plane reawaken, and physicalize, becoming once more the dwellings of evolving souls.

According to the big bang theory, the universe was created about 13.7 billion years ago. Plasma cosmologist Eric Lerner, on the other hand, has suggested that the observable universe may actually be trillions of years old. He describes a scenario in which the current cycle of evolution began over 3 trillion years ago with the stirring into life of primordial homogeneous hydrogen plasma, which then differentiated and agglomerated into astronomical structures.3

Many big bang theorists may believe that they know what was happening during the first trillionths of a second after the moment of creation of the entire universe, but as one scientist remarked, 'Every generation thinks it has the answers, and every generation is humbled by nature'.4


String theory and the Vedic texts:

'String theory' is believed to fill the gap between 'Quantum field theory' and General relativity theory. 'String theories' are recent developments in modern day physics. String theory proposes that the many different types of subatomic particles are really just different vibrations of tiny strings, like minuscule rubber bands. As the little strings vibrate, the vibrations create particles. Particles are the foundations of atoms. Atoms make up our universe and their behaviour makes up the physical laws that govern our existence. But the catch is that String theory only works if the strings have several extra dimensions in which to vibrate beyond the dimensions we see. This is similar to the range of sound vibrations of which only a small segment we can hear. These tiny strings vibrate a large variety of particles within different dimensions and these particles make up unlimited varieties of universes, all with different laws that govern them.

In 'String theory', the elementary particles are thought to be excitation modes of elementary strings. However, the strings in string theory are floating in space-time. Nonetheless, they have tension. We are used to thinking of fundamental particles (like electrons) as
point-like 0-dimensional objects. A generalization of this is fundamental strings that are 1-dimensional objects. They have no thickness but do have a length, typically a billion-trillion-trillionth of a centimetre ($10^{-33}$ cm). This is very small compared to the length scales that we can reasonably measure, so these strings are so small that they practically look like point particles. Now what some of our ancient texts say about the elementary composition of this 'Universe'? "Sun and the rest of the universe are woven in string. What is that string that is Vāyu?" (SB.8.7.3.10)

Katha-upaniṣad 2.2 says that Vāyu has entered the universe and taken the shape of every object in the universe.

In Vedic Sanskrit 'Vāyu' does not mean air but is some thing different. 'Vāyu' is something, which is al' pervading. Śatapatha Brāhmaṇa gives a definite clue as to the meaning of 'Vāyu' when it says that 'What is that string is Vāyu'. It further says that whole universe is woven in 'String'. Now the 'String theory' is also being discussed by 21st century physicist. Some people may laugh and say it is a long shot and those ancient people may just have mentioned something like 'String' by mistake. So what modern day scientists are finding out
now may well have been described by Rṣis in sacred ancient scriptures.

String theory is gaining popularity in the scientific community and has mathematical and experimental data to show its veracity. But what if we don’t have mathematics and physics to explain this unusual concept of multiple universes? We use analogies in simple language.

“To say nothing of this planet earth, the whole universe, with innumerable planets throughout the galaxies, is comparable to a single mustard seed in a bag full of mustard seeds. “ — Chaitanya Charitāmṛta (Adi) 5.22

“The numberless universes exist together in foamlike clusters...” — Chaitanya Charitāmṛta (Adi) 5.22

“Indeed, māyā[our universe] appears to be floating like a pot filled with mustard seeds.” —Chaitanya Charitāmṛta (Madya) 15.176

“...the total universes in the external potency of the Lord are compared to a bucketful of mustard seeds. One mustard seed is calculated to be a universe itself. In one of the universes, in which we are now living, the number
of planets cannot be counted by human energy.” — Purport to Srimad Bhagavataṁ 2.6.18

John Barrow, Professor of Mathematical Sciences at the University of Cambridge, ‘the 2005 Templeton prize winner’ and the author of 17 books explains it in this way:

“The other issue here is when people say, ‘Did the universe have a beginning? Will it have an end?’ Suddenly we’ve got a more complicated situation. We can think, in a cartoon-like way, about the multiverse, rather like great foam of bubbles expanding, and we live in one of the bubbles. When you say, ‘Did our universe have a beginning?’ There are really two answers. It’s possible for our little bubble to have a beginning. It can pop into existence in some kind of vacuum fluctuation, and it may, or may not, have an end. The bubble may burst, or collapse. But yet the whole foam in this scenario does not have a beginning. So, it’s like an eternal process continually giving rise to the appearance of bubbles, some of which disappear, some of which persist. So, our bit of the universe, our mini-universe, has a beginning, but the whole multiverse does not.”
Vedic Seers believe that there was someone who had created the Universe from Vacuum (Shunya) and in Chhāndogya Upaniṣad it is stated that vacuum (Shunya) does not mean nothingness. Vedic seer gave the analogy of nothingness (Shunya) with the primordial state of matter as ‘gahanaḥ gabhirām’ and the primordial turbulence as ‘salilām’ (Nāsadīya Hymn X.129). In order to clarify that there existed no time, the statement made is – ‘na rātryah ahna āsit’ i.e. there existed neither night nor day. There was ‘no sat and no asat’ which respectively means there was neither existence nor non-existence at that time, and in the Vedic philosophy the words ‘sat and asat’ would not have a distinct existence but would be blended and lost in the ‘ONE’ invisible, immaterial, incomprehensible ‘FIRST CAUSE’ in the intervals of creation, and in the beginning the ‘FIRST CAUSE’ was undeveloped in its effects, and existed before either inactive matter or active spirit, considered as distinct, it is not intended to be said that no cause or origin existed before creation.

When neither being nor non-being was (no sat aseet, na asat aseet), the ‘ONE’ breathed, without air. But then, ‘Kāmastadgre samavartādhi’ – desire first moved it. This ONE, we call Puruṣa, Sriman Nārāyaṇa,
And God. And this is ‘sat’ – Existence, along with knowledge and Bliss, part of the nature of the divine.

In the Nāsadīya Hymn (RV.X.129) and in the hymn to Viśvakarman (RV.X.82) there is a clear indication of a Supreme power i.e. ‘Tadeka’ who has controlled his mental energy and given birth to desire or ‘Kāma’, and this ‘Kāma’ i.e. desire is the sign of self-consciousness, the germ of the mind, ‘manaso retah’. Desire is more than thought. It is the bond binding to the existent to the non-existent. Desire is the essential feature of this self-conscious ‘Puruṣa’.

This ‘kāma’ may be the ‘sphota’ or may be the biggest bang (as stated in AV.19.5.21). These expositions of Vedic seers are very much in conformity with the Big bang theory in which George Lemaitre proposed that at some time in the past the universe was crowded into a very small volume. Lemaitre referred to this state of the universe as the primeval atom and assumed that it was instantaneously created from that zero volume primeval atom.

The Nāsadīya hymn RV.X.129 attempts to narrate a story of creation, but we notice that at almost every step it pauses to question its own assertions. The hymn
explains the origin of the universe as the evolution of existent from non-existent. The hymn reflects the emergence of the universe from nothingness, and finds that it can make no definitive statement regarding the creation of the universe. The Vedic seer begins by attempting to imagine and describe a time when the universe as we know it did not exist. He attempts to describe a time before creation and hence begins with the profoundly paradoxical statement:

"there was no existent and non-existent then."

The poem then goes on to imagine the coming-into-being of a solitary power, "that One," who is self-sufficient in that it breathes "windlessly," only by virtue of its own will. That One, we are told, arises through the power of heat – "tapas" – a word generally associated with the heat, glow, or power generated by acts of austerity. But even though that One was born, the poem suggests, by means of an inherent capacity for both self-sustenance, and austerity or self-abnegation, its very first emotion was one of desire. Desire came upon that one, says the hymn, leading us back to an idea that found buried even in the English word "passion": a certain passivity or helplessness in the face of that which passes over one; the sense of being acted upon by something alien-interior or
even exterior to the self. A.A.Macdonell glosses the verb adhi sam avartata and derives it from the root vrit (turn), which with the prefix Sama takes on the meaning of “coming into being.” Adhi, however, renders the verb transitive, he says, giving it the meaning of “coming upon” or “taking possession of.”

This gloss seems to be etymologically more accurate than the one provided by Sāyaṇa, who gives as a synonym samyakajayata—“appropriately (properly) born.” Sāyaṇa’s gloss, however, is not surprising: his reticence in the face of most references to desire (Kāma: also lust, or love) and his impulse to restrict the more unruly implications of this word is often evident in his comments.

Following Macdonell’s translation, we could say then that the hymn suggests a rather complex concept of desire: on the one hand, desire is almost an external force that comes upon, or takes possession of one, but on the other, it is also the “first seed of mind”—the first emotion produced in the mind. Thus the sentiment most proper to the mind is yet not quite mind’s own.

We might also note here that the word “seed” renders the phrase perhaps even more ambivalent, for though “seed” could refer to the first germ of thought, the first production of the mind, it could also be understood as that which in fact produces the mind, gives birth to the mind. The line has generally been understood in the sense of the former reading; thus Winternitz writes, “This ‘One’ was already an intellectual being; and as the first product of his mind – ‘the mind’s first fruit’ as the poet says – came forth kāma, i.e.’sexual desire, love’ as we see, winternitz also changes the usual meaning of retah (seed) to “fruit” in order to arrive at this unambiguous reading. The standard meaning of retah does not really suggest ‘fruit’- Monier-Williams (SV) gives as its meaning “a flow, stream, current, a flow of semen, seminal fluid, and sperm, seed” and most translations follow this definition.

Sāyaṇa reads Kāma as sīśkṣa – “the desire to create”-predictably, but here also quite justifiably. Nevertheless, it seems clear that the hymn makes a strong statement about the relationship between thought, production (creation) and desire. That is to say, it recognizes that without a prior interest, or interestedness, no production, not even the production of thought, can occur; but it also correspondingly places in
question any knowledge that we might gather as a result of thinking, and in particular, any knowledge which our speculations about origins might yield: "who truly knows? Who might speak (declare) here / whence was it born? Whence this creation?"

Chhāndogya Upaniṣad (VI.2.1-3) says: In the beginning the universe was in existent. Onetime it is said that Existent was in the non-existent and existent was evolved from non-existent. But existent from non-existent is not possible. So the universe was in the form of existence. This existent Puruṣa thought that he should multiply and he should take birth. Then he creates Agni and from Agni water etc.
The Mystical Meaning of Fire (AGNI) in the Rgveda and the Big-Bang Theory of the Creation of the Universe

There are two traditions of Indian, essentially Hindu, spiritual thought - Shruti (direct experience) and Smriti (recollection). The mystical discourses of the Upaniṣads and the revelation of the Rgveda are part of the Shruti tradition. With the recital and methodical translation of appropriate mantras from the Rgveda and passages from the Upaniṣads, Prof. Satya Prakash Saraswat, Professor of Computer Information Systems Bentley College, Waltham explains how the ceremonial fire (AGNI) of Vedic worship symbolizes the sacred and supreme spirit that Generates (G), Operates (O) and eventually Destroys (D) the universe. In the Rgveda, AGNI is called the "first born of creation," and represents the pure and primordial energy of the universe that was created at the moment of Big Bang. At this moment two "numinous" forces, "Prakṛti," the creative power of the Supreme Spirit of the universe, and "Puruṣa," the omniscient and all-pervasive mind of the cosmos, united to create the "phenomenal" universe. The Rgveda tells us that this primal energy later transforms into (1) the energy of life (Vaishvānar Agni), (2) the energy of

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thought (Pragyā Agni), and (3) the Radiation energy (Taijas Agni).

A well known cosmologist, Steven Weinberg in his well celebrated work, “The first three minutes” has stated that the beginning of the Universe from a singularity in an expanding space-time called the big bang has become the most widely accepted theory on the origin of the universe in which we live.

In 1973 Edward P.Tyron proposed a theory that could overcome some of the problems of this model. He suggested that, “our universe is a fluctuation of the vacuum, where vacuum fluctuation is to be understood in the sense of quantum field theory”.

In 1978, R.Brout.F.Englert, and E. Gunzig published a paper entitled “The creation of the Universe as a quantum phenomenon”. They proposed a model that described the process originally suggested by Tyron.

For them the vacuum state, the state of nothing from which the universe begins, is flat empty space. Their model shows how the initial creation of a few particles causes space to become curved. This gives rise to a cascade of more particles giving rise to an expanding space, the big bang.
In 1982, David Atkatz and Heinz Pagels added to this theory by proposing that universe originated as a quantum tunneling event. In their scenario the origin of the Universe is similar to the decay of an atomic nucleus when its particles tunnel through the barrier that ordinary binds them the nucleus.

Alex Vilenkin was bothered by the idea that these mathematical models still presupposed an existing space before the creation of matter. He proposed the de Sitter instanton, as a mechanism for creation of the universe out of nothing. It is analogous to the creation of a positron and electron pair. However, instead of two particles coming into existence, a space is created, from which the universe can arise through the inflationary process. The universe arises spontaneously out of nothing only corresponds to the views expressed in RV, X. 129.

**Hymn 129 of the Ṛgveda speaks of this, by a being which seems to create itself:**

Then neither Being nor not-being existed, neither atmosphere, nor the firmament, nor what is above it. The One breathed windless by its own power. Nought else but this existed then.
In the beginning was darkness swathed in darkness: all this was but unmanifested water. Whatever was, that 'One' coming into being, hidden by the void, was generated by the power of heat.

In the beginning desire which was the first seed of mind over-covered it. Wise seers, searching in their hearts, found the bond of Being in Not-Being.

In this hymn the One, may refer to the creator god Brahman, his breathing and desire bring the world into existence. Before this was a void which can be described only by a paradox, Being nor not-Being.

What was God doing before he created the world? The philosopher and writer (and later saint) Augustine posed the question in his "Confessions" in the fourth century, and then came up with a strikingly modern answer: before God created the world there was no time and thus no "before." To paraphrase Gertrude Stein, there was no "then" then.6

6. Before the Big Bang, There Was . . . What? By Dennis Overbye
The Hiranyagarbha Sūkta (RV.X.121.7,8) and SB (11.1.6.1-3) clearly reflect the concept of point mass i.e. Golden Egg as assumed by George Lemaitre in his Big bang model of the Universe.

In the Puruṣa hymn (RV.X.90.5,15) there is a clear indication of Big bang theory. The Puruṣa sūkta proclaims that this entire Universe is God as the Supreme power – the Puruṣa, with thousands of heads, thousands of eyes, thousands of limbs in his cosmic body. He envelopes the whole universe and transcends it to infinity. He pervaded the earth on all sides and extended beyond it as far as ten fingers. Raja Ram Mohan Roy says the ten fingers represent ten dimensions. Sāyaṇa claims that in Vedic cosmology Universe is seen as ten-dimensional. He quotes the Vāyu Purāṇa (4.74-75) in which it is said that the whole universe including moon, sun, galaxies, and planets was inside the egg and the egg was surrounded by ten qualities from outside. This can be explained by the modern scientific theory of the universe termed as String theory. According to the String theory the universe originally started as a perfect 10 dimensional universe with nothing in it as mentioned in RV.X.90. Thus the Vedic hymn (RV.X.90.5,15) clearly refers to the creation of the Universe from the cosmic
demiurge (Puruṣa) which is nothing but Lemaitre's Primordial existence.

Both in the Greek and in the Indian Philosophy we see the doctrine of the fivefold character of the elements gradually formed out of simpler conceptions. The oldest element with the Indians is water. As early as ṚV.X.129.3 the first principle appeared as a "dark undulation" (apraketam salilam). In ṚV, X.121.9 Prajāpati begets "the great sparkling waters." These again appear in ṚV. X.82.1 as the Primeval slime in which in the beginning heaven and earth were plunged; and in ṚV.X.72.4-6 as the "wave-surge," that is identical with Aditi, etc. In the Upaniṣads also the conception of the primeval waters still survives. "The waters are the body of that prāṇa!" This earth, the air, the heavens, the mountains, gods and men, domestic animals and birds, vegetables and trees, wild creatures down to worms, flies and ants, they are all nothing but this water under solid conditions. In KU 1.7 also Brahman speaks to the soul that knows itself to be identical with him:

"The primeval waters in truth are my universe (as hiranyagarbha), and it is thine."
In Ṛgveda (RV X.81 and X.82.5-6), the hymn to Viśvakarman we find that the Universe is full of water and waters of the sea contained the First or primordial germ. This first germ is the World Egg/Brahmānda floating on the primeval waters of chaos, the principle of the Universe of life. From it arose Viśvakarman, the firstborn of the Universe, the creator and maker of the world. So these two hymns to Viśvakarman runs parallel to the Big bang creation theory which assumes that the Universe is created from a point mass i.e. Brahmrānda.

Atharva Veda (X.7.42; X.7.43) talks about two different types of girls, one of whom spreads the thread and the other collects. There is neither spreading nor collecting completely. This is the way to explain Prasārana (Expanding) and Sankochana (Contracting). According to this theory the Universe will continue its Prasārana (Expansion) and Sankachona (Contraction) many times – it will be an Oscillating Universe. This is the Oscillating theory of the Universe as stated by Modern scientists and is an alternative to Big bang theory.
This concept of an Oscillating universe that expands and contracts over eons of time evokes the Vedic image of a breathing cosmos -- the exhaling and inhaling of Brahmā, the primordial creator.

In the Big bang theory it is stated that the whole Universe was confined to a single point mass that had zero volume and the whole Universe was created from this zero volume Primeval atom i.e. the point mass which is very much similar to the notion of the ‘ONE’ (Puruṣa/Tadek) of Vedic Philosophy. Though the Vedic seers have said that the effect sometimes is blended with the cause or it is lost in the cause but it must be taken for granted that all qualities, which are to be seen in the created product, must be found, at least in a subtle form. Every cause has an effect and vice-versa. The Chhāndogya Upaniṣad (CU 6.2.1-3) and Gītā also support these observations. Thus all the verses mentioned above more or less emphasizes the existence of the First Cause i.e. ONE which is Lemaitre’s Zero volume atom, and to say that something had zero volume is tantamount to saying that it is nothing. So the entire Universe was created from this ‘NOTHING’ as a result of an unimaginably huge explosion known as the ‘BIG BANG’. 

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The hymns of Hiraṇyagarbha Sūkta (RV.X.121.7, 8); Puruṣa Sūkta (RV.X.90); Satapata Brāhmaṇa (ŚB:XIV.3.2,13); the hymns to Viśvakarman (RV.X.82.5-6), clearly state that the waters of the sea contained the First or Primordial Universal germ which may be Lemaitre's primeval zero volume atom and ultimately may be the concept of pregnant zero from which the whole Universe was created.