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Buddha's Universe of Devolution and Evolution Cosmologically Compatible

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1. Overview of the Breakthrough Research in Popular Format

Encountered Evolution recently? No, not the Darwinian. I mean the real one - evolution of the universe! If not, don't worry. The Buddha has done it for you.

It's in the Aggaṃṃa Sutta (Digha Nikaya, # 27).

Western Science has long been looking at the evolutionary process, and so wouldn't it make sense to see how the Buddha's characterization fares with the Western Scientific understanding? And I did. So what did I find? That indeed the Buddha's characterization is not only compatible with Western Science, but improves upon it! More than one western scholar sees *satire* and *parody* in it. But I found no satire here, but hard, objective science.

And the evidence? Here's then a Chart that shows the reality up-front. Don't panic. I'll guide you through:

1	2	3	4
Aggaṃṃa Sutta PHASE	Aggaṃṃa Sutta PHYSICAL EVOLUTION	Aggaṃṃa Sutta SENTIENT EVOLUTION	Western Science EVOLUTIONARY YEARS
MAJOR: Devolution “This world devolves ”	–	Appearance of âbhassara Beings	Evolution I 13 + billion years ago: Big Bang
MAJOR: Evolution I “This world evolves ”	No moon-sun; “All water ”	“Leaving âbhassara body” , Beings come to be in ‘the present state’ No female-male ...	Evolution II 9 billion years ago: Post-Big Bang , cooling off phase
MAJOR: Evolution II “This world evolves <i>again</i> ”	Appearance of Earth ; Appearance of moon & sun, day & night...	Beings feeding on ‘Earth savour’; Resulting change of skin colour & body coarseness	Evolution III 4.55 billion years ago Formation of earth
SUB-: Evolution I “for a very long stretch of time ”	‘ Earth savour ’	Continue feeding on ‘Earth savour’ Continuing change of skin colour & body coarseness	Evolution IV 575 million years ago: Oldest animals 500 million years ago: Plants evolving
SUB-: Evolution II “for a very long stretch of time”	Ground-pappaṇaka (mushroom-type) Badàlatà creepers	feeding on Ground-pappaṇaka Further change of skin colour / coarseness; Feeding on badàlatà	Evolution V 225 million years ago Plant variegation; Vertebrates
SUB-: Evolution III “for a very long stretch of time”	Rice	Continuing to feed on badàlatà Further Change of colour / coarseness Appearance of Rice Female sexuality & male sexuality > intercourse	Evolution VI 150 thousand years ago “Anatomically modern humans”

CHART: Evolutionary Phases and Sub-phases in the Buddha’a Aggaṃṃa Sutta in relation to Western Science

Do you note the two MAJOR phases, **Devolution** and **Evolution** in Col. 1, Rows 1 to 2? And the third, also showing Evolution. Now taking our eyes all the way to Col. 4, what does Western Science show in 1 to 3? Changes taking billions of years, the Buddha's wording, back in Col. 1 being 'this world **devolves**', 'this world **evolves**' and 'this world evolves **again**'. What shows at the third? Earth (Col. 2), confirmed in Western Science (Col. 4).

But you'll note that Western Science shows all three phases to be part of Evolution. It begins with The Big Bang, 13.5 **billion** years ago (bya, for short – let's get a little scientific here, eh!). That for the Buddha is Devolution (*samvatta* 'turning in'), followed by Evolution (*vivatta* 'turning apart') (9 bya). Next for him is 'Earth', with the 'moon & sun' – yes, that's the order in the text, appearing (4.5 bya).

Before looking at Col. 3, let's continue down along Col. 1, Rows 4 to 6. SUB-phases within Evolution. Take your eyes to Col. 4. Rows 4 & 5. We now see that the count is in '**Millions** and 6 in '**Thousands**'. Our text shows each of these sub-phases as lasting "**for a very long stretch of time**". No mention of evolution.

So then while the Buddha identifies no specific time, he makes clear the distinction between the relatively long vs relatively less long. A Buddhist calculation might be in *mahā kappa* and *kappa*, each very long.

So far so good? Good!

Row 1 under Western Science shows the Big Bang. So what's that? Here's what you'll find in the Wikipedia: "At this time, the Universe was in an extremely hot and dense state and began expanding rapidly." Although in the Agganna itself the Buddha says nothing about it, elsewhere, in the Anguttara Nikaya, he talks of the 'seven suns' drying up all water and burning up everything else – land, plant life and animal life. Hm!

"After the initial expansion [Big Bang], the Universe cooled" (Wiki). What does the text say? Yes, 'All water' (Col. 2). Right on! It adds that 'no moon and sun' were to be seen either. The smoke of the Big Bang was thick enough to shut it out, making it 'pitch dark'.

When we read in Row 3 under Western Science 'formation of the earth', Buddha tells us how 'a savoury earth spread over the waters'. Not only. Moon and sun appear, too. And day and night. Magic? Noooo.. As the dust cloud of the Big Bang expands and settles down, the sun appears, and voila, there's sunshine and daylight. Of course, the day ends with the night, when the moon appears.

575 **million** years ago (mya), Western Science tells us (Col. 4, Row 4), 'Oldest animals' appear with 'Plants evolving' 500 mya and 'Plant variegation' 225 mya, along with vertebrates. Looking at Col. 2, we see no one to one match in the text. However, we'll note that the Buddha talks of plant variegation of three types. The first is 'ground *pappataka*', a 'mushroom' like plant. Next is a creeper: *badalatā* – note the term 'latā'? (Reminds you of *nārilatā* 'human creeper'?) The label could mean 'wish-fulfilling creeper'. But there's no wondering about the last type: *sāli*, meaning 'rice'. Could well have been a type of kurakkan (Sinhala) 'finger-millet', with a variety of names in Indic languages (e.g., Ragi in Karnataka). 'Seed on seed', the text says.

Sure, not enough variety to fill a supermarket, but not bad, eh, for an emergent plant life.

Now Western Science says nothing of what happens to the animal types that emerge alongside plant life. The Buddha, however, is specific. As the Beings begin to enjoy the food, 'for a very long stretch of time' (translation: mya) in relation to each type, two things happen. They become coarser, and their skin colour changes (down Col. 3). Both can be linked to new cells beginning to grow.

Let's note that, at the beginning, there were 'no females or males' (yes, listed in that order) (Col. 3, Row 2). But when Western Science introduces us to "Anatomically modern humans" 150 **thousand** years ago (last Row), the Buddha introduces us to 'females and males' getting their '*linga*', and let's hear this one, engaging in intercourse! For how else can there be a continuity of the species? Well, here're his words:

‘The female *linga* appeared in the female, and the male *linga* in the male. The female looked at the male just so long as did the male at the female. Looking at each other for long, passion arose in them, *burning all round* entering their bodies. Because of this burning, they indulged in sexual behaviour. Those other Beings, seeing them indulging in sexual behaviour, threw earth (at them), some ash, others cow-dung, (saying) "Away with your filth, away with your filth!", [adding further] "How could a Being do such a thing to another Being?"’.

Sexual evolution! Or should we say ‘sexual revolution? This, then, is how Evolution appears, in the Buddha’s characterization, at the doorstep of the human being.

But how did it all begin? Taking our eyes back up Col. 3, Rows 1 & 2, the text introduces us to ‘âbhassara Beings’ in the Devolutionary phase, continuing to be in the Evolutionary ‘present state’.

Oops! You haven’t met âbhassara Beings, have you? Alright, let’s meet them then.

Here’s the Buddha introducing them to two Brahmin youth looking to be ordained under him:

There comes a time, *Vàseñña*, when somehow or other, at times, after the passage of a long time beyond, this world devolves. In this devolving world, as is the norm, ‘There happens to be existing in this devolving world âbhassara-Beings’. There they remain *mind-based, self-luminous, moving through space, feeding on rapture*, for a very long stretch of time. Somehow or other, after the passage of a long time beyond, *Vàseñña*, this world evolves. In this evolving world, as is the norm, having passed away from their âbhassara-bodies Beings come into the present state. Here they remain, *mind-based, ...* for a very long stretch of time.

But, you ask, who the dickens are these âbhassara Beings? Now now, let’s watch our language. Let’s be respectful. But that’s exactly what I asked myself reading the Sutta in Pali. âbhassara Beings are humans whose meditation has taken them to the level of the second *jhāna*. Upon death, they end up as âbhassara *Brahmaloka*.

But where? Remember how they are said to be ‘mind-based, self-luminous, moving through space’? Exactly. In the **sky**. Being mind-based means they are sentient beings, with a mind and body. But, how, up there?

You now owe me a million dollars. For that is the million dollar question I’ve answered. An âbhassara Being is nothing but a **photon**!

A what?

Oh sorry. ***Photon is an electric energy in space but with no mass***, and if you ask Einstein, he’ll define it as a ‘*quantum of energy*’, quantum, of course, meaning ‘packet’. So how come I packet this packet into a photon? Oh, that was easy. All I had to do was brush up my Pali, and break up the word âbhassara. You can do it, too. So let’s do it together. Here we go: **â + bhàs + sara.**

â- = ‘hither’

-bhàs = shine

-sara = arrow.

In plain English, ‘Hither-bound shining arrow’. If you’re reminded of a shooting star, you got it right. Let’s note the Buddha’s line, ‘In this evolving world, ... having passed away from their âbhassara-bodies, Beings come into the present state.’ Exactly! So these are beings that have come to ‘this world’, meaning this Evolutionary Phase, from an earlier world of a Devolutionary phase.

Now these Beings land on earth when the earth appears in the new Evolutionary phase. Photon-the-sky-being now becomes land-being. These Beings may not be at your dinner table, but they do have to have their food. ‘All beings are food-based’ doesn’t the Buddha tell us? Remember from the chart the three types of food that appear over the millions of years: pappāṭaka, badalatā and rice? This, then, is their food.

You’ll remember something else, too, from the Chart. As they eat these different types of food, their bodies get ‘coarser’. Read that to mean that they are putting on fat and muscle to support the growing bones, and getting an increasingly complex body structure. It is the final product of this process of growth over millions of years that the Buddha now introduces to us as human beings, having sex.

This brief overview, then, suggests the following:

1. That the universe goes through a cycle of Devolutionary (*samvañña*) and Evolutionary (*vivañña*) Phases.
2. That there was sentient life in the universe *prior to* the existence of the earth.
3. That the origins of such sentient life vis-a-vis the earth of the *present* Evolutionary phase was in space!
4. That with the appearance of the earth there came to exist conditions conducive to sentient life.
5. That over time, to be counted in billions, millions and thousands of years, sentient life culminated in human life (and society, as later in the text).

So now, how’s all that for accuracy, huh! While Western Science is specific as to numbers - billions, millions and thousands of years, the Buddha is more detailed in terms of plant life and human life. The reason is obvious. The Buddha’s description of evolution of the physical universe is only as a backdrop to the story of how ābhassara Beings ends up as human beings.

Complex enough? But I hope that by now you have an idea, if still foggy, of the Buddha’s view of the process of evolution of the universe, from Devolutionary phase to Evolutionary phase, the growth of beings in relation to food types and the beginning of family life. So we can see that the Buddha is not talking about evolution just for the sake of explaining the universal flow, but to set in motion the evolution of man in his relationship with nature.

If you’re still in a dizzy, just close your eyes, take a deep breath, return to the Chart, and take the eyes through the Columns and Rows, in measured step. The picture will appear before your eyes before you know it.

Not only do we, then, see the Buddha as scientist, but also that he goes beyond Western Science, which begins with the Big Bang, a first cause. Though not said in so many words, isn’t a creator God implicit in it?

Now imagine that for an objective science!

Should that surprise us? After all, beginning with all the way back from Greek times, up to the time of Einstein, western scientists believed in God, and what they were trying to do was figure out God’s secrets. By contrast, the Buddha gives us a cyclical universe, with no beginning, no end. Here then is the improvement on Western Science.

For the original scholarly version (87 pages), please type in Canadian Journal of Buddhist Studies. Or here’s the URL: <http://jps.library.utoronto.ca/index.php/cjbs>

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2. A Few More Comparative Details

We have seen above the parallels between the Buddha's lay of the land of the evolutionary process and that of Western Science, but in broader terms. Let me then share with you some more details.

It was noted that the Big Bang in Western Science is the Devolutionary phase for the Buddha. By definition, of course, a Devolution suggests an *earlier Evolutionary phase*.

Not much said about the Devolutionary phase, however, in the Aggaṃṃa Sutta. But luckily for us, we find the Buddha talking about it elsewhere (Anguttara Nikaya, IV 101):

There comes a time, Bhikkhus, when rain does not fall for many years, for many hundreds of years, for many thousands of years, for many hundreds of thousands of years. When rain does not fall, seed life and vegetation, medicinal plants, grasses, and giant trees of the forest wither and dry up and no longer exist. (Bhikkhu Bodhi translation, 2012, 1071-3).

Next he speaks of a 'second sun', again 'after a long time', when 'small rivers and lakes dry up and evaporate and no longer exist'. Moving along through the 3rd to the 6th sun, he eventually comes to the seventh sun:

With the appearance of the seventh sun, this great earth and Sineru, the king of mountains, burst into flames, blaze up brightly, and become one mass of flame. As the great earth and Sineru are blazing and burning, the flame, cast up by the wind, rises even [up] to the brahma world...

Here, then, we have the *end* of the Devolutionary phase in the Buddha's thinking. And, let's note here for future reference, that the blaze goes only 'up to' or 'as far as' the Brahma world, i.e., leaving it unscathed. But before we move into the Evolutionary phase, let us see if Western Science has anything to say.

The Sun does not have enough mass to explode as a supernova. Instead it will exit the main sequence in approximately 5.4 billion years and start to turn into a red giant. It is calculated that the Sun will become sufficiently large to engulf the current orbits of the solar system's inner planets, possibly including Earth.

Even before it becomes a red giant, the luminosity of the Sun will have nearly doubled, and the Earth will be hotter than Venus is today. Once the core hydrogen is exhausted in 5.4 billion years, the Sun will expand into a sub-giant phase and slowly double in size over about half a billion years. It will then expand more rapidly over about half a billion years until it is over two hundred times larger than today and a couple of thousand times more luminous. This then starts the red giant branch (RGB) phase where the Sun will spend around a billion years and lose around a third of its mass. <http://en.wikipedia.org/wiki/Sun#After_core_hydrogen_exhaustion>

While this is not literally seven suns, but a single sun getting much bigger and hotter, it speaks to much of the effects of the process: "over about half a billion years until it is ... a couple of thousand times more luminous." And "engulfing ... the earth".

In this Devolutionary phase, says the Buddha: "There happens to be existing in this devolving world ābhassara-Beings".

"Oh", you ask, "But didn't everything go up in flames under the scorching of the seven suns"?

Glad you asked. 'No' is the answer. Ending up as the âbhassara Beings means they come to be in the âbhassara Brahmaloaka. The seven suns, as noted, stops at the *boundary* of this Brahmaloaka. So the âbhassara Beings can be said to come in their shining armour, 'energy' being the shine.

If the phase is said to last about six and a half billion years, as in the above lines (you can do the math), we may note the Buddha's words, "This world evolves again". Decay is what we have here, under the principle of 'change' (*anicca*), or as in Western Science, 'entropy', 'a driving force for physical and chemical changes (reactions)' <<http://www.science.uwaterloo.ca/~cchieh/cact/applychem/entropy.html>>.

Continuing with our text, we'll remember that the Buddha says that the âbhassara Beings are 'self-luminous' and 'sky-traveling'. So clearly, it can't be in a human form that âbhassara Beings exist. Interpreting them as 'Hither-come-shining-arrows', they have been identified by us to be photons - 'quantum of light', 'quantum of energy'.

Let us now turn to Western Science to see if we could get some understanding of this sky-born and self-luminous Being called âbhassara. We begin with electrons, a sub-atomic particle.

"Electrons somehow "jump" between specific orbits, and as they do, they appear to *absorb* or *emit* energy in the form of light, i.e., photons", (italics added), say scientists Kafatos & Nadeau (1990, p. 31), in their book, *The Conscious Universe*. As for 'absorbing', Einstein "argued that the energy of light is concentrated in small, discrete bundles ... or 'quanta', of energy. ... It is the energy of the individual quanta, rather than the brightness of the light source, that matters."

So it appears, then, that a case may be well made that the shine-emitting/absorbing âbhassaras are indeed 'photons'. Further,

"If photons could not crowd together in the energy of light, the light energy that fuels quantum mechanical process that lead to the evolution of chemical structures, including what we call life, would not exist".

So we could take the âbhassara Being to be a variation of (a form of) photons, in some primordial version. We may now see the connection between the Devolutionary phase ending up burning under the seven suns (as above) and the shining âbhassara-Beings. They can be said to be survivors of the burning hot Devolutionary phase, looking for a home in the newly emerging Evolutionary phase.

But the point is that there is no earth to step on to! So how does the earth come about?. In the text, at the time of the Being coming to be in the Evolutionary phase, it is, as we remember, "all water". Then, as "this world evolves again", a savoury-earth spread itself over the waters".

Western Science explains the appearance of water when the initial burst of energy of seven suns comes to be dissipated, gradually cooling off. To begin with, the sun itself contains 87% Hydrogen. Explains the UK-based Prof. Cyril Ponnampereuma, "Of every hundred atoms in the universe, ninety-three are hydrogen atoms." Further, when "our planet was formed from the primordial solar nebula, the cloud of hydrogen which enveloped it, as it revolved with the dust particles in orbit around the central dense mass, played a vital role in determining the kind of molecules present". The oxygen present, interacting with the hydrogen, "would have yielded water" (42).

A cooling process begun, ultimately ending up in 'water', there now emerges the earth - 'savoury earth spread itself over the waters'. 'after the lapse of a very long time beyond', suggestive of the billions of years prior to the forming of the earth some 4.5 billion years ago as is the current calculation for the age of the earth. This, then, is where the Beings now come to be.

How do we know? Because now they begin to taste the savoury earth, and in due course, three vegetation types.

But how did these earth food types come to be?

It was noted how the sun was the most powerful source of energy for the earth. Ponnampereuma (51-61) points out how the varied energy sources - electrical discharges in the form of lightning, radioactivity, heat energy, solar heat, shock waves generated by meteorites passing through the atmosphere, etc., would have been “responsible for much organic synthesis in primeval earth conditions”.

The *pappañaka*, creepers and rice could, then, be seen as the early products of such organic synthesis. In this connection, it is interesting to note certain developments in relation to the primitive earth that are suggestive of the three types.

Let’s do an experiment here. Say the word *pappañaka*. Again. Ground- *pappañaka*. How does it sound? Does it sound sort of ‘crusty’. Let’s see what Ponnampereuma has to say: “During the early stages of the earth’s formation, volcanic activity was probably rampant throughout its surface. As the embryonic earth began to take shape, the gravitational forces caused contractions in the crust.” So would it be surprising that the nutritive outgrowths of a crusty earth would also be crusty? It is of interest to read in the Sutta that it is pieces of the ground that the Beings first eat.

The ground *pappañaka* is described as ‘snake’s parasol’. It is with interest, then, that we read about “The strange umbrella-like shape of *Kakabekia umbellata* which flourished in the Pre-Cambrian era” (Ponnampereuma), understood to be prior to 1.8 bya going all the way back to the formation of the earth 4.5 bya, as scientist Prof. Karl Zimmer, notes.

Now how about the ‘bound-creepers’ (*badàlatà*). Again in Western Science, we note with interest “thread-like assemblage of bacteria”, the reference being to the fossil algae, said to be two million years old (Ponnampereuma). But there is nothing to say that the beginnings of thread-like plant life did not originate much earlier, when the “earliest evidence of chemical life” appears in 3.8 bya (Zimmer). The bound creepers are also said, in the Sutta, to be ‘bamboo-like’. Now what do you make of the “rod-shaped bacteria” dating back to two billion years (Ponnampereuma), that “may be related to the modern iron bacteria”?

So we now have:

- four food types: earth-crust, ground *pappañaka*, *badàlatà* and rice;
- continuing physical changes in colour and coarseness;
- new physical development: appearance of female & male sexuality;
- new human activity: intercourse, this last relating to continuity of the species.

Thus is shown the emerging complexity in the last stage of evolution. We may note that this is the phase in Western Science when ‘anatomically modern humans’ appear.

So we now have a few more details. But even in the segment discussed, left out are other dimensions. One is the evolution of language. The other is the emergence of sentient characteristics such as craving (when eating), and anger and hatred (“Those who were good-looking despised those who were ugly: ‘We are better-looking than they are; they are uglier than us!’”). In broad terms, they show the beginnings of lust, hatred and ignorance (*ràga, dosa, moha*).

A third is how the social classes – Brahmins, Kshatriya, Vaisya and Sudra, have come to emerge. This latest actually come to be linked to the wider issue of the Sutta, namely the claims of the Brahmins to be the ‘chosen people’. The Buddha shows how this is one big fat lie, a joke. While they claim to be ‘born of Brahma’s mouth’, the Buddha minces no words in telling it like it is - that “Brahmin women, wives of Brahmins, menstruate, become pregnant, have babies and give suck”!

What you see in this paper is admittedly my own understanding and interpretation of how life comes to be, based in the Sutta, Abhidhamma and Western Science. A closer look at what Western Science has marvelously come up with painstaking research shows that the devil is in the detail. That is to say that when it comes to the detailed timing in relation to the evolution of plants, animals and humans, etc., there are devils waiting to take you on. However, it is difficult to ignore two factors – first, the division between Major and Sub, as distinguished by billions of years to millions to thousands, and second, the similarities of the shapes and features of the various forms of pre-Cambrian organic matter. Too close to be coincidental. Of course, while Western Science is working at the micro level when it comes to the physical universe and life, the Buddha is dealing at the macro level. But I hope that I have danced with the devils successfully.

But I know that, as I keep ringing in the good news, I'm in for a sound thrashing from two quarters. First from Scientists, Western and Eastern. The nerve of a *mere* Pali student, who can perhaps barely spell the word Science, if that, daring to invade Science? And from the other side is the earful from the traditional Buddhist, and Buddhist scholar, for a different reason. It is blasphemy! Why need Western Science to prove the Buddha right?

I can understand the sentiment. But, as for myself, I don't need proof that the Buddha is right. I've known it all my life. But consider this. Western scholars doing extensive studies of the Aggañña have seen it as 'satire' (Prof. Collins, U of Chicago) or 'parody' (Prof. Gombrich of Oxford). So the only way I have been able to see it as an objective and accurate picture of the universe is reading it from the perspective of Western Science. Only by stepping out of the box, into Science, funny enough, that I don't know, have I been able to outbox myself. My exercise shows me the importance of going outside of your own narrow discipline and look for cross-disciplinary study. Fools rushing to where angels fear to tread? Or am I exonerated or am I exonerated!

But there's another reason for getting out of the box. Buddhists know and respect the Buddha. The knowledgeable West takes him to be another religious teacher, which, of course, he is. But only. No ear will be lent to hear him out for what more he is - discoverer, a discoverer of the truth, of superior intellect, empirical and objective to the core. And so, if his teachings can be introduced in an idiom Western Science speaks, then, perhaps there is a chance that they just may, just, hear his words. Good enough reason? Wish me luck!

Given in particular that I come with no background in Science at all, my analysis may be full of holes, in which case I invite your valuable kind and critical comments. Please be my *kalyāna mitta* – honest, and brutal, yet intending no harm but only good. Thank you.

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<http://jps.library.utoronto.ca/index.php/cjbs>.

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