

The Great Story According to Paine

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This paper is a version, *my version*, of The Great Story, which, according to the website http://www.thegreatstory.org/what_is.html, is

“**The Great Story** (also known as the Universe Story, Epic of Evolution, or Big History) is **humanity's common creation story**. It is the 14 billion year science-based sacred story of cosmic genesis, from the formation of the galaxies and the origin of Earth life, to the development of self-reflective consciousness and collective learning, to the emergence of comprehensive compassion and tools to assist humanity in living harmoniously with the larger body of life...[it] encompasses meaningful ways of telling the history of everyone and everything. The Great Story is humanity's **sacred narrative of an evolving Universe** of emergent complexity and breathtaking creativity — a story that offers each of us the opportunity to find meaning and purpose in our lives and our time in history.”

Prologue

We don't know anything about before the beginning, or if there really was a "before."

All we know is that, if you look deep into space through telescopes of various sorts and study the light and other radiation that you see, it appears that at a certain point in the past, there isn't anything we can tell about "before that."

But at that point, it seems that time started, and there was everything we now know, although not in the form we know it now. We just can't tell what was before that.

At the very beginning, everything was so simple: simple physics, simple chemistry, simple interactions between spirits (assuming there are indeed spirits) and matter, because it was all so simply arranged, and everything was close together and much more energetic. But it was still simple. Then, as the universe expanded and cooled, the various basic forces unfolded, and eventually permanent atoms started forming—who knew that would happen? Or what would happen next?

Worlds? Life? Manipulative intelligence? Really complex stuff. It's been a real learning experience for all involved, ever since.

Personally, I think the spirits said to each other, "Wow! Let's see what we can do with this!"

Part One

To tell the Great Story of the universe, there are three things we must first understand, or at the very least, consider: our experiences, our memories, and our models.

The experiences are just that, the ongoing flow of sensory inputs into our consciousness. Memories are what we can recall about those experiences—we experience memories in much the same way we experience the original sensory inputs. Finally, the models are the stories we create to make sense of what we experience and remember.

We start with the seemingly simplest: that which we actually experience.

The Senses and Consciousness:

Five senses, at the least, have we: sight, sound, scent, taste and touch; there are others, some common but less obvious (balance, position, acceleration, heat and cold, and so on, related to our primary five senses or the structure and function of our bodies), and still others less common, less reliable, but valid nonetheless (magnetism, electricity, barometric pressure, and so on, perhaps even to telepathy, precognition, prescience, and the like—the basis of which we do not at present know, though we may suspect and eventually one day learn).

With our eyes, we see the world in which we live. As humans, this is how we mostly know the world, perhaps 85 percent of our sensory input comes through vision.

With our ears, we hear the sounds in that world. Almost all the rest that we know comes through our hearing.

With our nose, we catch scent of the world.

With our skin, we feel the surface of the world with our individual surface.

With our tongues, we taste parts of the world when we put them in our mouths.

Then, there are the secondary senses: balance, acceleration, position, heat, cold, and so on.

Then there are the other senses, the extraordinary ones—sensation of magnetism, electricity, etc.

And what is it we experience through our senses?

-The earth of rock and soil we sit, stand, walk, run, and lay upon;

-The waters that fall from the sky, run upon the land and gather in puddles and rivulets and rivers and lakes and oceans, and pass through the soil and rock of the earth;

-The air that we breathe in and out every moment we are alive, that carries the waters from the ocean to the lands upon the winds, within the clouds that sometimes storm and bring rain or other precipitation, that we feel as breezes and winds and our breaths when we are close to one another;

- The living that we see and experience each and every day we live, made up of earth and air and water, some of which live in the land, on the land, in the water, on the water, in the air, on the air;
- The day, and the night, and the times in between;
- The cycles of the moon, and the sun, and the seasons they reflect in weather and climate;
- The blue sky of the clear day, and the blue-black star-filled sky of the clear night, and the deep darkness of the moonless night and deep clouds;
- The experiences of wakefulness in the wondrous world which we inhabit and includes all the above, and the experiences of sleep and dreams, which may include these, but also other worlds;
- The experience of health, and of illness that occur in both waking and sleeping; the needs of the body (pleasure and pain, hunger and thirst and the satiation of both, heat and cold, stiffness and flexibility, arousal, alertness, exhaustion and elation, and the emotions that we feel: love, joy, fear, hatred, and so on), the experience of the thoughts that we have, the rituals and other things we do, the relationships we engage in...all the natural functions of living and dying as a social creature living among our kin...

It is with these senses that we perceive the reality in which we live, the things we experience.

We have, of course, learned more in the last few hundred years, so that we now know that our senses are quite limited, and that many other species experience senses like ours in much broader and different ways, and that many experience have sense systems that we have no apparent correlation, such as the heat detectors of pit vipers, or the pressure-sensitive lateral lines of fish.

Our eyes detect electromagnetic radiation, but the electromagnetic spectrum is vastly larger than the narrow range that we see. We cannot see very small things (the limit under normal conditions is about 0.1 mm, or an angular size of 0.01 degrees), the very bright (or we get blinded) or the very dim (our eyes simply don't detect them). Our field of view is about 165 by 175 degrees, and we can only focus in detail upon a small area at a time, mostly directly in front of us. Our eyes have a "refresh rate" equivalent to about 25 frames per second, so we cannot detect very slow movement, nor very quick motion, either. We can see colors, created by cells that respond to specific frequency of light, which are then combined in our brains.

The sounds we hear with our ears are only a narrow range of the sounds in the environment around us, although under certain conditions we can feel with our bodies sufficiently loud lower-frequency sounds. The source must also make sounds sufficient in volume, but above a certain level, we cannot hear the sound either—although we may feel it; very painfully, apparently.

Our sense of smell is quite limited, compared to many other species, which can detect not only more different chemical odors, but in much lower concentrations. Our sense of smell is connected to our ability to breathe, while

other species detect scents with other organs, such as antennae, or even their skin.

Our sense of taste is limited to four chemicals—or now evidence is pointing to perhaps a fifth—and only if we put things in our mouths. Other species can taste more classes of chemical, sometimes through appendages or their skin.

Our sense of touch requires contact of our skin, and is not particularly accurate, and like the other bodily senses (heat and cold, pain, position, balance, etc.) are largely subconscious or semi-conscious. All are easily exhausted if the stimuli continues unchanged, and most of them are about the condition of our own bodies, and our position and motion in space, and much less about what is going on in the environment around us.

There are many other senses that other species have that we don't share, or if we have them, we are largely unaware of the information they collect for us.

We've learned how to detect many of these other sources of information, through artificial instruments, but we still do not directly detect them ourselves, and to understand them, we must convert them into stimuli that we can detect visually or audibly, or in other symbolic manners.

Those senses feed into our nervous system, our brain, where it is processed into the experience of consciousness.

Memory

But it is not by sensation alone that we experience our world. It does not happen that we experience our sensations, and then they are gone: we also form and experience memories of our sensory experience. Memories tell us what was, what we experienced before, earlier in time.

Our minds collect and set the memories of our experiences (including our thoughts and conceptions and models), imprinting them onto a map of sorts of our environment and our experience—something that is done automatically, part of the inherited systems of our biology, selected through evolution and not through conscious choice.

This is also done by the systems of apparently all other living things, including creatures lacking a central nervous system, such as plants and even single-celled bacteria.

Conceptualizing and Models

We share with other living things sensory experience, memory, and at least to some degree, conceptualization and model-building. We seem to share a sense of self (although not necessarily “self-as-other”), a sense of space, a sense of time—all things that are created automatically by our bodies, which do so on the basis of inheritance and experience, without conscious input.

And finally, we create symbols (concepts) to represent our experiences and memories, and build models with those concepts of the world that we experience, to make sense of the current experience and our memories by placing them within a framework that is created based on our prior experiences.

We can then remember these concepts, these models, just as if they were an experience—in fact, we can have vivid experiences of these mental creations, and, we can take actions to make these imagined experiences actually occur. Humans are capable of doing this so well that we can sometimes safely ignore our own actual experiences in favor of our imagination and consciously-devised conceptions and models.

The most important to us humans are the models that we build through language. But for humans, language is the key; it allows us to create models that are abstract, in which we can easily substitute one kind of thing for another kind of thing. Through language, we can create memories of things we have thought, things we have imagined, things we have created, but not experienced—things that might be, could be, might have been, might yet be.

That is, through language, we create stories. We also create stories through dance, and music, and sculpture, and drawing and painting, and sometimes all of these together. And we remember these stories.

All together now...

These are the natural functions of the human, and it seems, every other living creature, from the single-celled on up to the largest multicellular creatures, at least to some extent. This is the function of living. The senses tell us what is happening “now,” and the models we build help us make sense of the memories and the current experiences...and tell us what may have happened before, what might be happening now, and what could happen in the future, or could have

happened before (or now someplace else, or in the future), if only we or others had made other choices.

So we need to recognize and understand these three, for without sensory experience, there is nothing to remember or explain; without memory, the experiences themselves are transitory and without purpose beyond immediate reaction and survival; and without models—both our automatic and conscious models—to classify memory and new experiences, the living would be constantly bewildered by the constant novelty of new experience.

With those three elements, we can begin to tell the Great Story of how we came to be—and know what might be physically true, and what might be true in other ways—and what is probably NOT true—about how we came to be. Experiencing—Remembering—Understanding: that is the order of the story that we tell.

For being human, the one common experience we have, outside of the environment, the world in which we live, is the society, the family, the community into which we are born and raised. Humans do not occur in isolation, do not live solitary lives apart from other humans—We are social beings, and if we are not raised and nurtured and stroked and loved we do poorly, and we do not survive long...and if we do survive, we do not develop normally.

And what do humans do, as a family, a community, a society? We tell stories with our language, with our conceptions and symbols. We not only tell stories, we paint pictures and make sculptures and dance and make music and sing. All of them tell stories of what we have experienced, yes, but also of our

memories and conceptions, what we think might have happened, or might happen. We sing them, and play them, and dance them, and sculpt them, and draw them in words and images that suggest and communicate by agreement what we experience. “And I heard a million voices singing; acting to the story that they had heard about...” (Anderson and Yes, 1975, *Tales from Topographical Oceans*).

Ray Bradbury had Jeff Spender, a character in *The Martian Chronicles*, say of the Martians:

“They blended religion and art and science because, at base, science is no more than an investigation of a miracle we can never explain, and art is an interpretation of that miracle. They never let science crush the aesthetic and the beautiful.” (*—And the Moon be Still as Bright, The Martian Chronicles, Ray Bradbury*)

Religion, in this line of thinking, is nothing other than the *appreciation*, an *acknowledgement*, a *recognition*, of our EXPERIENCE of that miracle we can never explain.

The origin of this idea was apparently Albert Einstein’s short 1931 essay about his personal philosophy. If he borrowed it from another philosopher, or came up with it himself, I do not know—although he said and it is widely acknowledged that his views were heavily influenced by or similar to Spinoza’s reasoning about god and nature. In the essay, Einstein said:

“The most beautiful thing we can experience is the mysterious. It is the source of all true art and science. He to whom the emotion is a stranger, who can no longer pause to wonder and stand wrapped in awe, is as good as dead—his eyes are closed.

“The insight into the mystery of life, coupled though it be with fear, has also given rise to religion. To know what is impenetrable to us really exists, manifesting itself as the highest wisdom and the most radiant beauty, which our dull faculties can comprehend only in their most primitive forms—this knowledge, this feeling is at the center of true religiousness. In this sense, and in this sense only, I belong in the ranks of devoutly religious men.

“It is enough for me to contemplate the mystery of conscious life perpetuating itself through all eternity, to reflect upon the marvelous structure of the universe which we can dimly perceive, and to try humbly to comprehend even an infinitesimal part of the intelligence manifested in nature.” - Albert Einstein, in *Living Philosophies*

We humans, at least, experience life, experience the mystery of the universe, and we tell stories, to ourselves and to each other; that we *do* know, because we experience these stories ourselves, we remember them, and we create and understand them, we *explain* them. We tell ourselves stories so that we know:

WHO we are and who we are related to;

WHAT it is we as individuals and groups did, are and do, and will do and will be;

WHERE we came from and where we are now, and where we are going;

WHEN we came from there, and when to do those things—then, now and in the future;

HOW we came to be, and how to do those things; and

WHY for all of these answers.

We call stories such as these myths. We are mythic storytellers. The individual experiences life as the center of the story that they live, they experience and remember and model, and sometimes tell to others—at least in part. And the same is true of the family, community and society in which the individuals live: we naturally place ourselves at the center of the Big Stories we tell ourselves and each other.

The problem is that, because we are each and all story-experiencers and story-tellers, we do not, and cannot, stick just to what we know through our senses, or even our memories. Facts by themselves are not so interesting.

I am so well ensconced in the habits of being a thinking human, a conceiving human, that I cannot help but start to tell the story by including what I suspect, what I think we know because my mind/brain/spirit does its job of building models of how the world operates and wants to tell the story, along with what we really do know. Of course, what we know today may in reality be mistaken, or incomplete. In the future we may have to change our stories.

And all that we really can and do know is our own individual sensory experiences; everything else—what we individually and collectively conceive, is conceptual speculation based on memory of experience. Maybe well-founded

speculation, with lots of carefully collected and tested evidence (experiences) to back it up, but speculation nonetheless.

My speculation, at this time, at this place, in this life?

To begin, I think we are a body having experiences. I think we may also be spirits having body experiences, but this is a topic for later.

But, what is our body? It's a pattern of matter and energy that is not constant, that changes over time—although the overall pattern and energy level remains close to the same, changing significantly only through age and experiences. From conception, it grows until birth, and continues through infancy and childhood into adolescence, and then into adulthood. We reach our plateau in our 20s, and extend that through our 50s, 60, 70s; and then we decline, senesce through our later years, and eventually fail altogether.

Through this long-term arc of individual history, we change, although in some respects, also remain the same. We recognize, for example, that we have almost total replacement of cells in the body roughly every 7 years—but the implications for this are not well thought out, at least as far as I've seen—but then, it's been only about a century since anyone realized that this was the case.

What biologists and chemists have realized—but the implications still are not well understood, in my opinion—is that the atoms that make up our cells and our bodies are replaced much more quickly than the cells themselves. All of the hydrogen and oxygen atoms in your body at this moment, for instance, will be gone, replaced by other atoms, in a matter of just a few weeks. The carbon and nitrogen (the four making up the most common constituents of our bodies).

Others, such as phosphorus, iodine, iron and zinc (along with all the other natural elements in tiny quantities), take somewhat longer to cycle through the body. The longest-lasting atoms are calcium atoms in our bones, which may last in the body for about 20 years before being replaced.

Thus, we are quite literally **NOT** the same person today that we were even a few weeks ago, much less 10, 20, 50, or even—if we are lucky enough to live that long—100 years ago.

But once we reach maturity, the pattern remains little changed for all the flow of atoms and the dividing and replacement of cells. Our bodies, therefore, are not constant things, but patterns of matter and energy *flow* maintained over a period much longer than our attention span.

We think we are a body, but it's better to recognize that we are a process, a pattern, a flow of matter maintained by a flow of energy carried in that matter. In that sense, we are little different than clouds, which are the visible portion of a process that we cannot otherwise directly detect.

We are not separate, isolated entities, but nodes in a network of nodes that capture and modulate that energy, storing it temporarily in material forms and energy patterns that must be constantly updated, or they decay away—they are consumed and reused by other nodes in the network to maintain their forms, just as we consume and reuse other nodes to maintain our own forms and patterns.

What then is our mind, our consciousness? It does seem to be a part of that ongoing pattern, an amazingly consistent pattern of response to

environmental inputs (such as the matter and energy that we consume and that constructs our bodies and flows out again, the sensory input, etc.) that allows us to be an ongoing person, with intelligence, personality, habits, preferences, learning ability, and so on, over an extended period of time—our lifetimes. Is that an emergent property of that pattern of matter and energy that is our body?

Or, is mind indicative of something that is sometimes called "higher" consciousness, an astral body or nature, a soul or spirit, something that isn't emergent from the matter and energy we experience, but is that we can experience but has not yet been empirically demonstrated to everyone's satisfaction?

Many people claim to have experiences that would seem indicative of the presence of spirit, of something that is not entirely described by our current knowledge of matter and energy. Some argue that these experiences are simply misunderstood aspects of our material nature. Others argue that something else is going on.

For the people who think we humans have a spirit/soul, why is the thought almost entirely singular? It's the dominant construction of the soul/spirit in Christianity and other Western beliefs, and seems to be the case in most Eastern traditions as well.

But some cultures, I've heard, think people have multiple-part souls, up to maybe a dozen parts, each often associated with specific aspects of the body, the mind, or the functioning of the individual. The ancient Egyptians, for example. I don't see why we don't consider having hundreds, thousands, millions,

or even more parts of spirit/soul—just as we do with tissues and organs of the body, or cells, or atoms...After all, for example, each human body is made up of approximately 60 trillion cells...not counting the bacteria and others that ride along with us.

And if there are lots of spiritual parts, what is to prevent some from going off to the "higher" planes of existence, some being absorbed by other beings, some being dissipated into the environment, others hanging around to "haunt" the places where the individual lived and/or died, and others being moved on to inhabit another person?

I don't have answers. I've got questions that have developed over time as I left being a monist and then a dualist until I've become a pluralist. And going from empiricist to realizing that there might be things that would be beyond what we can detect and know through our normal senses and empirical processes.

We base so much of our thought on the matter and energy we know and experience. From our sense experience alone, we know there is matter and energy, but it has taken hundreds of years of work to establish what makes up matter, and what kinds of energy there are—and frankly, what we experience is only an illusion, and only part of what actually goes on.

We now know there are four kinds of "forces," that govern the subatomic and classical-level worlds and give rise to the 115-plus elements and all their isotopes, and all the aggregations of matter and sensations of energy we are familiar with—including those we can't directly experience or detect. But

everything we detect with our normal senses and even with our instruments are this kind of “normal” matter and energy.

But only comparatively recently have we realized that all that matter and energy we know and experience is less than 5 percent of what exists in the universe.

There is something, and perhaps it is really several somethings, that we call Dark Matter, and that it makes up about 5.5 times more of the universe than does our “ordinary” matter. We know that it exists because we have detected the very small effect it has on normal matter.

We currently have several ideas, but little evidence, about what this Dark Matter could be: it has not yet been detected directly. Part of this Dark Matter, some theorize, forms long filaments in deep space, creating the scaffolding upon which our ordinary matter then collects to form the stars and galaxies and galaxy clusters of the universe. There may also be smaller “hair-like” filaments of dark matter connecting the sun and planets, and other contents of our galaxy together. But it’s a hypothesis that hasn’t yet been verified.

And then, most recently, we’ve discovered the apparent existence of what we call Dark Energy--and we really have no clue as to what that is, but that it apparently makes up more than two-thirds of the universe, and is causing the expansion of the cosmos to accelerate.

Story tellers

So, we are the tellers of epic stories, who think we are singular, permanent “things,” when in reality we are temporary assemblages, temporary processes, temporary patterns of matter and energy and perhaps, spirit.

Even the stories we tell based on science are myths. The story of the universe, as told by science, is just an epic tale in which the major players are conceived of as impersonal forces, and in such a story, individual persons—such as ourselves—are inconsequential fleeting characters at best, at the edge of the Great Story, who by experiencing, remembering and understanding, can at least tell ourselves that Great Story of it all.

The story of cosmology and cosmogony, of biology and biogony, of life and memory and experience as told by science is little different than the myths told by our ancestors long before we came to our current understanding of the universe and our place within it. The tale told through science still answers those basic questions about who we are, when and where we came from, what we do, how we do it, and why—and little more.

Of course, others may tell stories, too, in the way of their kind; certainly, we think that perhaps elephants and cetaceans among all the species on Earth today may have something akin to our languages. We still don't know for sure.

But even those that do not seem to have language like ours may still tell stories among themselves, in ways we cannot fathom because we have learned to use language and thoughts almost to the exclusion of actually using our senses and memories.

Part Two

All that is, whether material or immaterial, is/has spirit.

And no, I do not have a good operational description of what I mean.

Graham Harvey says that all that exists, lives. I personally would accept that, but most people educated in the Western traditions will not: living matter is different than inert matter. Even a lot of the Eastern traditions might not. But as an animist, I'll go with the idea that everything either is, consists of, or contains something that we can call spirit. (Please see *Becoming an Animist* for further discussion).

As far as I can tell, all languages use the same parts of speech, set to the same basic set of linguistic rules: we use nouns to group things together into sets of things that are alike in some manner, separating them from those they are unlike. We use verbs to talk about action. Adjectives, adverbs and prepositions tell us about the relationship between the objects and actions.

As a provisional classification, action is the defining trait of spirit. Nouns are things; Verbs are spirits. Spirit is volition.

This is a conception about the universe, a model, but it is based directly on MY experience of the senses: MY experience of spirit in my observations and interactions with the universe around us, followed by my memory and my model-building. And actually, apparently a lot of other people view the world this way, so it's not just me. Lots of people report having experiences that seem

to involve more than just the matter and energy that we think the cosmos is mostly about. Maybe those people are mistaken, but maybe not.

Just as with everyday objects, some of those spirits are small—indeed, some are almost imperceptibly tiny, and I'm sure some are below our ability to perceive at all—while others are larger; some are huge by comparison to us, and still others are so vast as to lie at the limits of perception and comprehension. It is likely that there are others that are entirely beyond our ability to perceive or conceive.

Just as with everyday objects, some spirits are easy to observe, others are not. Some interact with humans, and may do so in positive or negative ways. Most others are indifferent in their interactions. But many, many more do not normally—or maybe ever—interact with people.

This is not to say that at this time we know what spirit is: it simply is, and we experience it. We can think of spirit as a thing, but it may be many different things. And since every “thing” has/is spirit, it is difficult to classify what spirit might actually be.

Part Three

There is value in the story told through science, for the methods of science do allow us to conceive of things to seem quite reasonable and backed with evidence and reason in explanation of what we experience. The sciences allow us to know and do things that just a century or two ago were beyond comprehension.

But there are limits to science and reason, and the story we tell using them is not the only story that can be told, and others may justly lay claim to be at least as accurate, and perhaps more accurate, than the Great Story told through Science. The records of our history—oral histories, and those that have been written down in the last 5,500 or so years and that still survive—reveal a wide variety of stories that have been told in the past and those that are still told now. Many of these are interesting, and enlightening. But even they are not the whole of the story that could be told.

I am endeavoring here to tell another version of the tales, another story of Who we are, How and Why we came to be here, What we are doing and perhaps should be doing, When we are and When we came to be, and Where we came from, Where we are now, and Where we might be going.

It is a Big Story, a Great Story, an epic, a myth. It is built on the story told by modern science and other realms of human knowledge in the early years of the 21st Century of the so-called Common Era, in an area of the Planet Earth known as North America, by an individual who has lived and

experienced, and remembered, and conceived thoughts, for more than six decades.

But this Great Story includes another aspect of reality, one not acknowledged by the science of the times, but is well-represented in the stories of other traditions. It is the story of a natural universe that is alive in spirit, the kind of world known and experienced by animists and shamans in more “primitive” cultures. It is borne from experience, and is expressed primarily through the arts, rather than the sciences.

For it is my experience that, being born into a society in the throes of science and technology and humanism (as well as a monotheistic Christianity), there is more to the world than conceived of in the philosophy of the times, as the one called the Bard once had a character say.

It is not the philosophy of the other established religions of the world, either, for the fact is that “primitive” peoples, lacking the conceptions of modern society or even early civilization, lived in constant daily touch with this other part of reality, the living universe of spirit. Always and only in relation to their local environment, but they saw truths that we moderns often today miss. More “advanced” peoples often still maintain some connections, but these have apparently become less and less influential, even less influential as we have become the modern, “Enlightened” world.

But for some, perhaps even many, there is still a call of these other stories, that fulfill their mental and emotional and social needs in ways that the wondrous but dry story told through science is unable to fill.

It is not that science is wrong, and these other stories are right, or that those other stories are wrong and science is right: both kinds of stories are both right and wrong, true and false, partial and whole—in differing ways.

Part Four

Thirteen Point Eight Billion years, plus or minus about 140 million years.

Or, for the scientifically inclined: 1.38×10^{10} , +/- 0.014 years. Between 13.66 and 13.94 billion years.

That, according to our current best estimate, is the number of years ago when our universe began to unfold—or whatever it did. Expand. Explode. Exist. There really aren't the words in our languages that seem to adequately describe all of what we know coming into existence from...well, whatever there was, before our universe came to be.

Whatever it was, we weren't here to perceive it (and if we were, would we remember it and be able to describe it from memory now?), and the only way we can conceive of it now is through abstraction.

That is roughly 13,800,000,000 years ago. If a person lives to be 100 years old—unusual, but not unheard of—that is 1/138 millionth the time the Universe has been around. Give or take.

Which is 5.04×10^{12} days ago; that is, 5,040,000,000,000 days. Just a hair over 5 trillion days. If a person lives to be 100 years old, they live for 36,525 days.

Which is 1.2097×10^{14} hours ago; that is, 120,970,000,000,000 hours. Almost 121 trillion hours. If a person lives to be 100 years old, they live for 876,600 hours.

We could go on to look at minutes and seconds, but the number is already so far beyond comprehension that it makes much more sense to just say, “Once upon a time...” Or, “In the beginning...” Or, “Long, long ago....”

Yes, we understand what hours, days and years are, because we created them to help organize and understand our experience, so we experience them. And, when we’ve experienced enough of them, we might be able to get a grasp on what 100 of them might be like, as a bunch: a hundred seconds is not even two minutes; a hundred minutes is not even two hours, just a part of a day; but a hundred hours is more than 4 days; and a hundred days is just over three months, or slightly over a quarter of a year. Then, 100 months is 8 years and 4 months.

But then we get to years; 100 years is longer than 99.9 percent of humans live, have ever lived. A person of 50 might comprehend “as much more time as I’ve already been alive,” but people who live to 100 say that really doesn’t do it, either.

Maybe in the ballpark, but not exactly, because the WAY we experience the first 10, 25, 50 years is different than the way we experience the NEXT 10, 25, 50. We are young for the first part, middle-aged for the next, and finally older for the last part—the exact divisions between the parts are not important, just that we understand that the experience is different.

So, maybe we can start to get a glimmer of a century...but then to stack together 138 million centuries is just an abstraction, something we cannot

fathom as an experience, even though we can put a number on it. There are only 52,596,000 minutes in a lifetime of 100 years, for example.

And, as noted earlier, we are not the same person at any two points in that experience.

And that's just time that's already happened; the universe might last for hundreds of trillions of years, or even forever. Or, it might all end tomorrow. We don't know, but it certainly looks like the universe will last a lot longer than it's already been around.

Part Five

The place we call our universe was around for about 9.3 billion years before our sun and solar system and our planet formed.

That's just more than two-thirds the current age of the universe. So, at least as we think of them today, minutes and hours and days and years did not exist until well after the Earth came to be. Before that time, some, perhaps even most, of the atoms that make up our sun and our world and our selves had been part of one or more other stars, before being returned to the interstellar medium through stellar wind, and eventually gentle and even explosive dispersive events.

Some of the atoms may have gone through several rounds of being stars before becoming part of the dust and gas cloud that eventually condensed into the solar system. Most of what is part of our solar system now, will likely remain as part of our solar system for the foreseeable future—many hundreds of trillions of years, it seems.

At least, until the Big Rip, if those models of Dark Energy are correct, or until the Big Freeze, if that model proves true, or until protons and neutrons break down, and even black holes evaporate.

We know of several possible ends to the universe, none of which would happen within a hundred billion years.

But all those atoms, and the components of those atoms, existed from near the beginning, roughly 380,000 years after the start, when the universe

cooled enough for protons and electrons to form hydrogen, some helium, and a trace of lithium atoms.

Later, some hundreds of millions of years later, stars began to form, and some atoms were forced together in the cores of stars to become heavier elements, which were then spread out into the cosmos when the stars exploded, only to be recycled again and again—until they became part of the cloud of gas and dust that eventually formed our Sun and planets and Earth and us.

We know what we experience; what we do not know is what it is like to not be human; to be other kinds of living things, even to be single-celled life, to be the first life; to be “unliving” masses of matter and energy; to be dust and gas among the stars, and before that, to just be gas in a young and expanding universe before there were stars or anything else except hydrogen, helium and a little bit of lithium.

We do not know what it is or was like to be an incipient universe, under whatever conditions the universe was before it became, before it started.

But Once Upon A Time, Long, Long Ago, In the Beginning, we were that. And from then until now, we have been part of stars. We have been interstellar dust and gas. We have become a planet, and the living upon it, and we have at long last, after maybe 4 billion years of evolution on earth, become humans, beings who think abstract thoughts and tell stories about those thoughts to each other, all based on the sensory experiences our evolved bodies and minds let us perceive and remember and conceive about.

And we can do more than create and tell our stories, sing our songs, dance our dances...we can modify the environment so as to record all this, and to creatively come up with things that have not existed before. So, we're *STILL* just one of the stories that could be told.

Not all of the matter and spirit in the universe gets to become part of a planet, much less life; in fact, very little of it does. It almost makes one wonder if life is really the purpose of the universe, or just a side product. Maybe the universe is here to create black holes. We just don't know.

Part Six

Ordinary matter and its associated energy makes up less than 5 percent of the contents of the universe, at least according to current cosmological thinking.

Roughly 28 percent is what is called “dark matter,” because we can’t detect it by any means currently except by its gravitational effects on astronomical scales.

Finally, about 68 percent of the content of the universe is thought to be “dark energy,” a kind of maybe reverse gravity that is causing the universe to expand more and more rapidly as it grows in size—a state of affairs that might eventually rip everything in the universe apart down to the atoms and subatomic particles.

Let me say it again: we do not experience either Dark Matter and Dark Energy. What we do experience is ordinary matter and energy. Dark matter and Dark energy are simply invisible to us in our day-to-day existence.

At least, as far as we can tell at present. Maybe later.

According to those who study dark matter, billions of particles of it may pass through us every second, ghostly, invisible, almost never bumping into our regular atoms. These may be tiny particles, similar to the particles we’re familiar with...but just not interacting with those we’re familiar with, except through gravity.

Some think they aren't just single particles, though, but that dark matter is analogous to light matter, in that it forms "atoms" and "molecules," and perhaps even larger assemblies. What these do, how these behave, and whether or not they can and do interact with the material and energy we are familiar with is not yet known

On astronomical scales, Dark Matter appears to be non-uniform in distribution, at least within star clusters and within galaxies and clusters of galaxies. It seems to behave sort of like a liquid, not being compressible to any great degree. Some of it appears to be "slow moving," and thus able to be associated with specific concentrations of ordinary matter in space—such as the solar system, or the planet Earth. But if it does behave like atoms and molecules, then perhaps it can be associated with individual bodies in space—such as individual living beings or objects.

Perhaps dark matter is spirit, or the thing that causes consciousness, or souls. This is my own speculation, not someone else's, at least, not that I remember encountering.

Maybe the mystery of the "underworld" and "over-world" and the "other side, beyond the veil," and so on that so many mystics and shamans and others have reported experiencing is simply the "place" inhabited by dark matter entities.

And maybe, these dark matter entities, made up of huge assemblages of dark matter atoms and molecules—but still wispy and incorporeal compared to us—can "inhabit" a physical body by carefully grasping ahold of the body at

various points...what some would call the Chakras, for example, and experience the physical aspects of reality by doing so.

Speculation? Yes, of course. But as a possible explanation, it resolves many, many issues related to spiritual experience, without having to consign all spiritual experience away to fleeting imagination and wishful thinking of fallible or demented humans.

It is of course possible that there is nothing more to the universe but inert, unliving matter, that by random chance gets complex and creates new experiences and experiencers through emergent properties of matter and energy alone. And in doing so, it creates unreal experiences for itself, lies to itself, deceives itself, whether intentionally or unintentionally, into thinking that there is more than just inert matter and energy, and the illusions created through emergent properties that have no lasting existence.

If there were only “normal” matter and energy, it might be reasonable to assume that. However, we “know” that there must be dark matter; therefore, there is possibly more to experience than light matter and its inevitable illusions.

And what is Dark Energy? Perhaps consciousness itself, or maybe just a byproduct of consciousness? After all, Dark energy didn't start dominating the cosmos until about seven billion years after the universe got started. The first stars began to burn about 13.5 billion years ago, and within a billion years star birth...and death...was undergoing a tremendous burst, which lasted from about 12.8 to 8.8 billion years ago.

During that period, more than half of all stars that will ever be, were born, and because the larger stars burn their fuel in tens or hundreds of millions of years, by 8.7 billion years ago, at least half of all the heavy elements that will ever be created in the universe had been created. Even a billion or two years before that, rocky worlds not unlike earth would have been able to form, at least in some places, some perhaps even as long ago as 11 billion years ago. As soon as terrestrial worlds began forming, we believe, life began: things very much like bacteria, the things we call prokaryotes on earth.

Of course, we assume that advanced life and consciousness can only occur on earth-like worlds—but this may just be a conceit. Other kinds of non-rocky and partially-rocky worlds also exist, so life—complex life, conscious life—might have gotten started even a bit earlier—but not that much earlier.

And, we expect it would take several billion years for advanced life—eukaryotes—to develop through the process of evolution, and even longer to the point of complex land-based creatures not unlike those found on earth.

Therefore, the first intelligent, sentient, self-conscious creatures may have come to be a bit before 7 billion years ago, or before about 6.8 billion years after the Big Bang. By the time the solar system formed, about 4.5 billion years ago, or 9.3 billion years after the Big Bang, consciousness could have been around for 2.5 to 3.5 billion years, or maybe a little longer.

Today, conscious beings may have been around for as many as 7 or 8 billion years. The time when conscious beings became common was about the same time that Dark Energy began to dominate. We talk of consciousness as

According to Paine

J. R. Paine

being an expansion of the mind...maybe it's really mind being the expanding of
the universe.

Part Seven

As far as we can tell, everything that is associated with our universe existed—in one form or another—from its beginning 13.8 billion years ago.

It doesn't appear that anything new has entered the universe in all that time, nor does it appear that anything has (really) left the universe (black holes included). Therefore, spirit has been around since the beginning, when there was only hydrogen, helium, a little lithium, some electromagnetic radiation, dark matter, and dark energy. It is part and parcel of what the universe is.

What does appear to have happened in 13.8 billion years is that some of the constituent parts of the universe have changed form, for the most part having become more concentrated (even as the universe itself has expanded and become more vacuous, clouds of atoms condensed into stars, galaxies, and threads and clusters and superclusters of galaxies), and at the same time, more complex (simple atoms have been transformed into larger atoms, making possible chemistry, earthlike worlds, and life).

These are “emergent” phenomenon, not obvious consequences or outgrowths of the fact of the lower level of “stuff.” Atoms do not obviously entail chemistry, chemistry does not obviously entail biology, biology does not necessarily entail complex life, which does not entail consciousness, nor technology, nor spirituality.

Therefore, in one form or another, **WE** have been around since the beginning: We as light matter and energy; we as dark matter; we as dark energy; we as spirit.

Do we remember being around at the beginning? I don't think so, but maybe some do. How would we know? The experience of that time—and the amount of time since then until now—is simply unlike anything we as living sentient beings now can experience, or comprehend.

The experiences we've had since are much the same way, until comparatively recently, when we've been able to experience life as living beings. Maybe we can remember some of the things that have happened to us. But what we really don't understand is what memory is.

Regardless of what memory is, some traditions do speak of conditions that might be what it was like before the Big Bang, or the way it was in the interstellar medium, or the interior of stars: Nirvana, at-one-ment, Divine Bliss, Enlightenment, and so on.

There is a problem with the current scientific theories about how the universe came to be. Tracking backwards from today, it appears that we can reasonably go to the point of about 10^{-33} or 10^{-32} seconds after the Big Bang event.

Then we must confront the problems of the universe's apparent flatness, its visible horizon, and the absence magnetic monopoles (as well as a few other issues)...and overall, the problem of a universe that seems "fine-tuned" to allow life and us to exist. This was when the universe was about the size of an American softball, about 4 inches in radius.

By working forward from the Big Bang Event, we find that, as far as we can tell, based on the physics we currently understand, by the time the universe

got to the age of 10^{-32} seconds, it would look very different than what we actually observe and/or can reasonably project. In some versions of the mathematics, the universe should have collapsed back in on itself by that time, or, if it continued, would evolve in a very different manner than what we see today. At that point, the universe should still have been smaller than the nucleus of an atom.

The resolution of the discrepancy has been the introduction of cosmic inflation, which is posited to have occurred between roughly 10^{-36} and 10^{-32} seconds following the event, in that tiny fraction of a second, increasing the infant universe's size from smaller than an atom to about the size of a softball—and then resumed its prior rate of expansion, which is what we observe to have actually happened.

This proposed sudden hyperexpansion of the infant universe takes care of most of the problems that cosmologists see...although it does introduce other problems that may be no more arbitrary than the ones it fixes. Not everyone is satisfied with cosmic inflation, not even some of its greatest supporters. It appears to be too arbitrary, too much a “just so story,” to be believable...

The alternative is that things actually went very differently before the point of the breakdown. Some of the proposed alternatives still require inflation of some kind and extent, and in some cases, deflation as well. The most common of these theories are the Big Bounce, String Theories, the Ekpyrotic (cyclical) models, and a proposal for a variable speed of light in the early universe. There are also versions of the Big Bang, using somewhat

different descriptions of the universe, that don't require inflation at all because the projections backwards and forwards match up, leaving no significant problems to be resolved (except for the questionable nature of those alternative descriptions of the universe...), but not the overriding "special conditions" necessary for inflation to occur and result in our observed universe.

Of course, if we didn't live in a universe where that very unlikely inflation occurred, we wouldn't be here considering the problem of how unlikely it was for inflation to occur...

Part Eight

Western civilization conceives of time as linear, something that has a beginning, travels in a straight, regularly demarcated line, and ends at some point in the future, even if that is a nearly infinite period, beyond comprehension.

Time started with the Big Bang, has progressed in a linear fashion to today, 13.8 billion years later, and will continue on, perhaps forever, never to repeat. However, that is just an assumption—Science has not yet been able to explain just what Time is, how it works—anything about it. It's an assumption that time is even real.

But Science has also demonstrated that our idea of time is flawed, because if you are moving very fast, or are very deep in a gravity well, time is very different than if you are moving slowly relative to the other. That is, time is intimately connected to, a part of the fabric of existence, the Space-Time.

According to the current theory, space-time began 13.8 billion years ago...that's why we have space and time and ourselves considering space-time. But again, Science hasn't really figured out what time and space really are, so we don't really know what that means, either.

On the other hand, most spiritual systems conceive of time as cyclical, roughly a circle but sometimes a spiral, so that it more or less repeats itself, over and over again: we see days, and months, and years and grander cycles; even to the incomprehensible eras of Brahman outlined in some esoteric Hindu sources.

However, there is today a more speculative version of space and time—still with virtually no evidence to support it: that the universe is incomprehensibly vast, so much larger than our visible corner (perhaps infinitely vast) that inevitably there will be places where the arrangement of subatomic and atomic particles and their history is identical to our visible section—and in fact so vast that there may be nearly an infinity of such identical spaces, plus an infinity of spaces where every possible arrangement of atomic particles has occurred, each of them exactly the same age as our universe because they are all parts—inconceivably distant parts, but parts nonetheless—of the same universe experiencing the same laws of physics, including time...

Remember, our cosmic horizon, our Hubble Volume, is about 4×10^{10} light years (about 40 billion light years) in radius; the “nearest” of these totally identical Hubble Volumes is estimated to be on the order of 10^{122} meters—tens of billions raised to googolplex-plus light-years distant.

Interestingly enough, there should be many spaces much closer where, while the rest of the Hubble Volume is different, the volume that includes the Earth and its history (e.g., the Milky Way) is identical or nearly so. It doesn't really matter how “close” they are: we can never travel there or detect anything about areas beyond our cosmic horizon under the laws of physics as we understand them today.

And we don't at this time know how “time” will end for this universe: a Big Freeze? A Big Rip? A Big Crunch? Does time come to a stop, then reverse,

or does it always stay going forward? Does it change it's pace? Does it just come to an end? We just don't know, and may never be able to know.

Theorists are now also questioning whether, in an infinite universe—or even a very large one—the laws of nature (e.g., the primary physical constants) actually are constant everywhere, when our small horizon represents only a tiny fraction of a percent of the total volume (less than 0.004, or 0.4 percent of the total *AT MOST*). The level 1 volumes may not actually share all of the properties with our section.

And in addition to all these “level 1” alternative universes, there are others (levels 2, 3 and 4) which have different laws of physics, different “time,” different “space,” and so on. And outside of the Multiverse complex there are other multiverses always popping into and out of existence, each with different laws, but entirely separate from ours.

Maybe. All that is speculation; some of it seems to be reasonable extensions of our otherwise-successful theories about the universe we perceive, but almost none of it is in any sensible way testable at this time. That means it is *beyond* Science—we can speculate, but we cannot know.

Yet, we don't know what time is, in either the linear or cyclical sense, or what “time” would mean in these different dimensions and multiverses. Science cannot at this time define it, yet it must be present. And while everyone and everything clearly experiences time, it is a mystery to the spirit as well.

Part Nine

What is a story? What is myth?

We humans are talking creatures, thinking creatures, singing and dancing creatures, drawing and signing creatures. We create stories to relate what we experience to what we remember, what we know, and what we think, and what we believe, and tell them to each other in various ways, to better our chances of survival, undoubtedly, but also to entertain and cement the bonds between us, or sometimes, to reinforce the differences between us.

I suggest that our stories are a way for us to remember, to organize our understanding in a more complex manner than can other life forms that don't use language.

Our stories follow the same patterns, regardless of our culture or language, regardless even of what we find most important to learn in life. There is always a protagonist, and an antagonist. There is always plot, setting, theme, and the other parts of story—even when we are telling history, or biography, physics, ecology, or any other kind of story.

And what we tell as stories is different than what we tell as facts: there is food here, or there was danger there, and so on, that is distinct from our stories, our tales, our myths.

Or is it? Maybe it isn't any different, really.

Part Ten

The universe started out simple, and has become more complex since then. That increased complexity has led to steps, levels, what we call emergent properties—conditions that aren't inherent in the constituent parts or obvious to occur as the complexity increases.

In fact, as physicists have studied matter at smaller and smaller scales and higher and higher energies, we have found that there is apparently no basic form of matter: At the highest energies and the smallest of scales, we find (well, we haven't yet, but we suspect that it is there—if it's not, all our current theories are vastly incorrect) the quantum foam, from which apparently somehow existence sprang.

Beyond smaller than 10^{-35} meters, is the “Planck Length.” There is nothing smaller that we can conceive of at this time. And we haven't even observed that quantum foam yet.

Strings are the smallest “things” that science currently conceives of, even though many doubt that they exist: we certainly haven't detected them—and we may never do so, some speculate, as the theory makes no unique predictions that could be tested. If they exist, strings are “on average” about 10^{-33} meters in length, a hundred times the size of the quantum foam. They can, however, under some theories, be as large as 10^{-18} meters, or about 17 to 18 orders of magnitude—100 quadrillion times larger than the quantum foam.

Quarks and neutrinos and some other particles are about this size. Electrons and protons fall between this and about 10^{-15} meters; while hydrogen

atoms are about 10^{-11} meters in radius. (And what is 17 to 18 orders of magnitude larger than us? A length of about 10^{17} meters, or 10^{14} kilometers, or about 10 to 100 light years.)

Quantum foam (1) is to subatomic particles (2) (electrons, and protons and neutrons), as is to us (3), is to 50 or so light years (4). The next step is 10 to the 17th or 18th light years, when the entire visible universe is about 10^{10} light years in radius (5)—all together, 90 orders of magnitude from the quantum foam.

Or just 82 to 83 orders of magnitude to the limits of the visible universe, which is of course entirely arbitrary. But to the limits of our current data, the universe must be at least three to four orders of magnitude larger in radius than our visible portion, and is quite possibly infinite in extent.

But to even think about matter this way is to show that “matter” is not what we think it is, anyway. It’s not solid, not particles; it is energy, energy that acts like it has size and shape and mass. Mostly, these “particles” or “waves” or “wavicles” are empty space, where nothing is. Except the quantum foam.

There is nothing inherent to strings to imply the existence of quarks; nothing in quarks to suggest protons and neutrons and other particles; nothing in the particles themselves to suggest atoms; nothing about atoms to suggest molecules; nothing about molecules to suggest biology; nothing about biology to suggest consciousness; nothing in consciousness to suggest spirituality...

And yet, we see them all, growing out of the ground of the lower level, as it were; made up of the smaller. And these larger things behave differently than do the smaller. And we still don’t understand how or why.

Part Eleven

At the larger end, since we can say that the minimum size is 10^{-35} meters, then just to put us in the middle (because there is no reason to assume we are), 35 orders of magnitude larger than the meter is about 1.85 quadrillion light years.

While the light from the most distant stars and galaxies has been streaming toward us for less than 13.8 billion years, the volume of space now has a radius on the order of 40 billion light years, and a diameter of twice that. That would indicate a distance at least 100,000 times greater than the current diameter of the visible universe.

And multiverse theorists entertain much larger volumes for the universe that came into being 13.8 billion years ago than just the visible universe: it might be as small as 7.8 trillion light years in extent (of which we can only see about 40 billion light years, or about 1/2,000 of the distance to that horizon); or as large as $10_{10}10^{122}$ meters, or more than a googolplex meters or lightyears.

A googolplex is a number so incomprehensibly vast that the 15 orders of magnitude between a meter and a light year is inconsequential. In fact, the 70 orders of magnitude between the quantum foam, and distance a 100,000 times the diameter of the visible universe is inconsequential: a googolplex is unimaginably larger.

Just to be clear:

If 10^6 is a million—a one followed by six zeroes, or 1,000,000,

And at some point, we get to the place where we are at the edge of what Science can ask and answer—beyond that limit, even if we were to experience it, Science would not be able to provide answers.

This, of course, does not even include the areas where science as it's currently understood really can't provide answers: questions of ethics, of aesthetics, or politics and social relations.

Part Twelve

When science tells us about the universe we live in, it takes the point of view of an external, or perhaps impartial, if in situ, observer—at least as best it can—and describes what it observes in terms of mathematics, and sometimes, exemplars.

In some senses, this is similar to the story told of the world through art—certainly, scientists speak of the beauty of the mathematics that describes reality, and recent studies show that mathematics and art both set off response in the same areas of the brain. In both, we do not so much care about the thoughts of the individuals who arrived at the “truth” expressed in the work, it is the finished work itself we study and admire and adopt into our own lives and understanding of the world about us.

But when it comes time to describe HOW we came to know what we know through science, it is told through the tales of the trials and tribulations and hard work of individual scientists, who take on the role of hero in an epic tale of the pursuit of the light of true knowledge in a world of darkness and unknowing.

The story of the individual artist, by contrast, is often one that is told as a vignette or simple biography, because the individual is often not particularly articulate about their own insights and processes that result in their masterpieces, and they almost never do more than touch briefly in the lives or traditions of other artists in coming to their own realizations. Each is a solitary

story of departure and return of a hero and the truth that they capture during their own personal journey, and has delivered for general viewing by the public.

But in the tale of science, the story of the divinely inspired journey and eternal return is not the story of a single individual, but a relay-race of individuals, each tackling part of the problems posed by the eternal mystery that is the universe, with each succeeding generation picking up where the prior had left off, building up the edifice of knowing that is the result of the more or less particular method of science. Such was the story told by astronomer Carl Sagan in his book, *The Demon-Haunted World: Science as a Candle in the Dark*.

Well, that's one version of it. Realistically, it's only been sort of a progression in this way for the last few hundred years; before that, there were apparently many fits and starts and reversals. And analyzed as a story, the weight and depth of the history of that struggle to bring the light to the dark world is a tool to make it acceptable as knowledge to the masses, even the masses of scientists.

Even that metaphor reflects the same story as mythology: as science brings light to the dark world, so did Prometheus bring the power of fire, and just as the Titan was punished for his actions bringing knowledge and power to humans, so the scientists have always been persecuted and misunderstood and vilified by those who live by the older stories.

So, at this time, that's where my version of the Great Story stands. Not so much a story as a commentary on some stories.