Junction

Intro

Greetings, at the time of writing this book I am 27 year old Jarrit Wayne Sachan. A musician with an Advanced Diploma in Power Engineering from Georgian College and a certified 4th Class Operating Engineer. This is my first book I have ever written so bear with me here; I started writing it during the Pandemic of 2020 and finished in 2021. Originally it was going to focus on Venus, Earth and Mars with an emphasis on fungi's ability to survive space and travel between these planets of which were all habitable at the same time at some point in history (you'll see). It is more of an archive than a story: I hope there is something for everybody here. My diploma and certificate are posted at the end of the last chapter of the book.

By all means I am not asserting that absolutely everything in this book is true; some of it is just a story: some of it is not. It might seem random but there is some linear story telling believe it or not. The point is to make you wonder about things like the nature of reality; what's possible and what we as a species may have forgotten. The lines between reality and thoughts
are purposely blurred at times. "It is the mark of an educated mind to be able to entertain a thought without accepting it" apparently this was said by Aristotle however there is no evidence of that.

Don't get too caught up on an idea or how some information is presented: just keep reading. Hopefully the book gives you some insight from the tales within tales that you can google and Youtube till your hearts content. I hope its articulation will spark the imaginations of all who read.
Fact often far outpaces anything we could come up with in fiction. The interpretations between readers will vary.

The book is supposed to make you laugh; make you cry; make you hate me: but above all share information that I have come across over the years that I personally either found interesting, hilarious or downright spooky. WARNING: Chapter 12 is graphically dark and not for the faint of heart. I probably should not have put it in this book. However I felt it was part of what this book is and had to be included. Even if it were just word salad you still need to eat your vegetables.

I want this to be a book you take with you to the internet. In many cases I have sourced the link for my information directly beside it for those who are reading online. It should be very easy to quickly check the source with a simple copy/paste. I'm not perfect and probably missed adding a source or two. By all means go look up for yourself the outlandish claims of the people I reference. I will have the url links in the Sources Cited at the end for you to type into your web browser search engines. It is going to be a challenge to present the ideas, stories and information in a way that will not be dry or exaggerated. Of course, in this day and age someone will be offended and berate the points without investigating them.

This book contains stories within stories: hence the name Junction. Chapters sometime contain seemingly endless inter-connected implications with each other of which I am sure some are delusions: others not so much. Nevertheless, minding the level of discernment between what may be fact and what may be fiction are central to enjoying the experience of this book. When fiction steps out of the darkness and becomes fact our perceptions of reality change. We all see patterns that are not there sometimes; and read too deep into things sometimes. Yet sometimes; just sometimes: we catch glimpses of our all-encompassing reality.
"If you've seen one, you've seen them all" - proverb.

Disclaimer: please do not sue me: I do not take credit for the photos. They are mostly stock photos from the internet. I will fix any mistakes and errors in subsequent copies of the book should there be some. It is random, zany and speculative. Coincidences permeate our reality: never underestimate serendipity. I hope the reader will be able to flip to almost any page in this book and just start reading without needing too much context. There would be no point in writing this book without expecting conflict: the whole book really is not for the faint of heart. It is for people who keep digging into the endless ocean of knowledge: my fellow Libras.

Werner Karl Heisenberg - Courtesy of Bettmann

“The first gulp from the glass of natural sciences will turn you into an atheist, but at the bottom of that glass God is waiting for you”.

Werner Heisenberg

Pioneer of Quantum Mechanics

It might seem a little Pseudo-y but I am not a quack.
Makes for good reading.

Chapter 1 - Seeds of Life

Mushrooms can grow under water and survive in space. If there was a species that could transverse neighbouring planets in the events of large impact events (such as the creation of the moon as is speculated) then mushrooms could certainly spread life in such a situation. Two such mushrooms noted to be able to survive space were tested by blasting them with unreasonably high doses of radiation. The Fungi "…*Aspergillus* and *Penicillium*… survived being blasted with 1'000 gray of X-ray radiation, 500 gray of heavy ions and large doses of UV radiation.." (Marta Cortesão -US National Library of Medicine National Institutes of Health).

Psathyrella Aquatica - courtesy of Robert A Coffan

The mushroom that can grow underwater is called *Psathyrella aquatica* and is unique to Southern Oregon. Robert Coffan made the discovery in 2005 while visiting a river with his family. Found in two locations on the upper Rogue River, it is one of the most unique mushrooms in the world. Mushrooms seemingly can grow on anything, almost anywhere. The only place they do not seem to be around are both the South and North poles as well as the ocean. Although jellyfish do look a lot like mushrooms don't they?

Jellyfish - courtesy of Steven Kovacs (left)
Moon Jellyfish - courtesy of José Luis Acuña (right)

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Coral Reef Vs Coral Mushroom
(Both courtesy of no name)

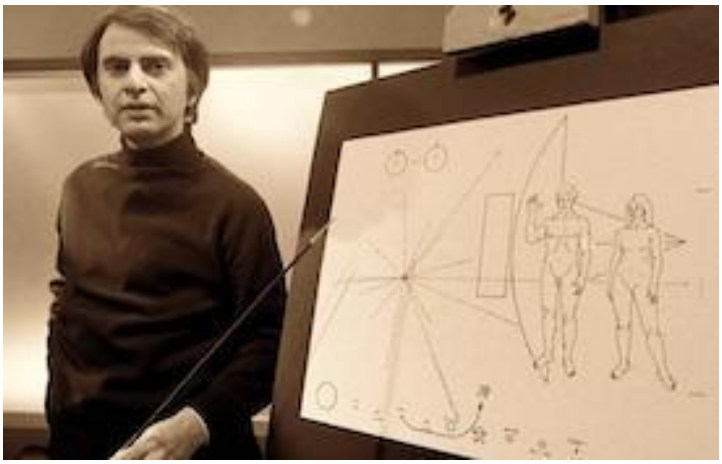
Coral mushrooms are related to jellyfish. They are both in the family Fungiidae of the phylum Cnidaria. Mushrooms are closer to animals than they are to plants and separated sometime after 1.1 billion years ago. Prototaxites is an ancient giant mushroom/fungus that lived about 430 to 360. million years ago. They could grow to lengths of 3 feet wide and 26 ft high and towered over any other land-based life form at the time. The mycelium of mushrooms (its “roots”) have been thought of as “the internet of the forest” as they connect different plants and fungi together to share moisture, nutrients, and perhaps even information somehow.

Prototaxites fossil (Courtesy of New Scientist)

Artist Rendition of Prototaxites (Courtesy of All Is Leaf)

Immortal jellyfish Turritopsis Dohnrii
Courtesy of Yiming Chen

If you are not familiar with the immortal jellyfish Turritopsis Dohnrii I suggest you google that cute lil fella. They are the only species that's been called "biologically immortal" because they can revert to an earlier stage of their life cycle and indefinitely put off old age. Water Bears survive in space too, but there are more interesting things than that. Venus, Earth and Mars could have all been habitable at the same time in history at some point.



Carl Sagan - Courtesy of No Name

According to N.A.S.A climate models (Michael Cabbage, Leslie McCarthy - NASA) it is possible that Venus was habitable for almost 2 billion years of its life. It has been suggested that as early as 700 million years ago Venus became the hostile wasteland that it is today. Venus was habitable during the same time as Earth and Mars for at least 1 billion years: possibly more. This information is far more shocking than it might seem. Venuses climate today is described as a run-away greenhouse effect and so climatologist study it. An aging hotter Sun however could have moved the "Goldilocks zone" further back in space. This Goldilocks Zone is known as the temperature at which water is in liquid form on the surface of the planet. In 2017 Earths average temperature was 14 degrees Celsius.

Recently (September 2020) phosphine gases were discovered in Venuses atmosphere. It is known that this gas can only be created either artificially in a lab or my micro-organisms. Carl Sagan back in 1967 predicted life in the clouds of Venus. However, it could still mean that there still are chemical reactions we are unaware of and this is a chance for us to study it. Either outcome is a good one for us.

Carl Sagan first proposed in 1961 that Venus could be terraformed with some fictional or futuristic technologies. It is now known that Venus could have had habitable conditions long enough to develop complex life. The possibility of intelligent life having ever evolved on our neighbouring planet is there. It is currently about 471 degrees Celsius (880 degrees Fahrenheit) on the surface of Venus right about now; so any trace of life there is thoroughly obliterated.

Life on Earth started some 3.5 billion years ago in single-celled organisms. Mars could have been habitable 4.48 billion years ago (No Name - Western University) after a significant number of giant "life in-hibiting" meteorites had ceased striking the planet. Mars may have had life on it 1.3 billion years ago. A meteorite named Yamato 000593 from Mars had evidence of water and possible biotic activity. N.A.S.A rovers discovered that it is possible that Mars had conditions suited for life once based on rock samples (NASA Content Administrator - NASA). Sulfur, nitrogen, hydrogen, oxygen, phosphorus and carbon were found but they seem to lack a definitive date for this scenario. Venus stopped being habitable some 700 million years ago. The dates for Venus, Earth and Mars sharing a time in history when life could have existed on all these at the same time is not impossible. There is even evidence to suggest Earth's moon was also habitable roughly 4 billion years ago and could have had two distinct periods of habitable conditions for live to survive on it (Matt Williams - Universe Today).

What possible early life survived on comets going between these planets? Could that be part of what made the life we see today so complex? If that's true what would that mean for life that evolves in more solitude; with no neighbouring planets that have life bearing potential? Could meteors and comets carrying life from the neighbouring planets have influenced the Cambrian explosion (which occurred roughly 485 - 541 million years ago)?

What would it mean if mushrooms acted like seeds of the galaxy? They are capable of storing themselves in water molecules and survive in a multitude of inhospitable environments while capable of terraforming the terrain. Like the seeds of plants, meteors have long been suspect been planting life throughout the galaxy. The exact origins of life among all the random meteors all out in space could hardly ever be determined.

It’s kind of scary when you consider just how advanced they might be. Let me reiterate a few things at the end here. Oldest fossil evidence is that Mycelium had its form 2.4 billion years ago (lava dust in 2.4 billion years ago they found fungal mycelium called The Ongeluk discovery). The mushroom fruiting body potentially had its form 500 million to 1.2 billion years ago (Gondwangaricites magnificus gen. et sp.). They have varieties that can live under water and survive space. Turritopsis Dohnrii (the immortal jellyfish) is directly related to mushrooms in the family Fungiidae: a classification of animal of the phylum Cnidaria which includes both jellyfish and mushrooms in its classification.

Chapter 2 - Stoned Ape Theory

Terrance Mckenna - Courtesy of No Name

Terence McKenna's stoned ape theory suggests that psychedelic mushrooms and their psychoactive ingredient psilocybin played a role in developing human consciousness. Ingesting or rejecting mushrooms as a clan as apes do would have been common. At least 22 primate species out of the 230-270 kinds eat mushrooms. Humans and chimps have a common ancestor somewhere from 8 and 6 million years ago that we evolved differently from. Hunter gathers who branched out into the Savanah had definitely encountered Psilocybin Cubensis mushrooms as big as dinner plates. What do you look for when you are a hunter? Footsteps and poop. The most significant mushroom growing out of poop: especially of the larger mammals that would have roamed the African Savanah; Hippos; Deer; Elephants; Antelope etc is Psilocybin Cubensis.

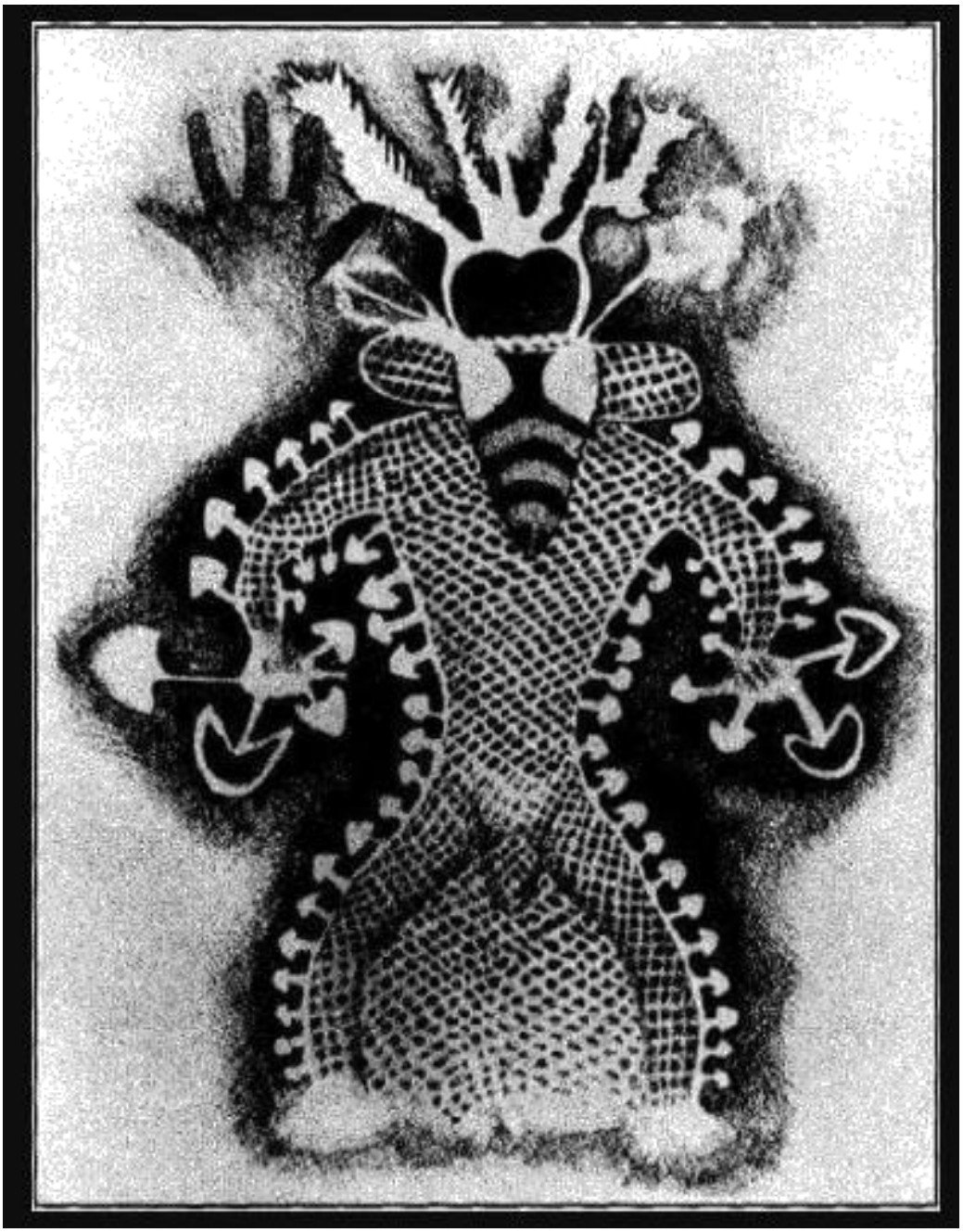
Psilocybin Cubensis is one of the most potent magic mushrooms in the world. Put yourself in this situation: you are hungry; you are with your clan; you do not know how to preserve food yet so you eat as many as you can. It was common to overindulge in the food you could find as an evolutionary mechanism: most would not know where their next meal would come from. Some mushrooms only last a few days in good weather. The brain capacity of our ancestors who branched out to the Savanah doubled in size within a 200 000 to 2 million years timeframe. It's not out of the question that our ape ancestors would have experienced magic

mushrooms not just thousands of times, or millions: but billions of repeated psychedelic experiences spread out among the tribes over hundreds of thousands if not millions of years.

In this sense I have heard people describe psilocybin like a “radiation” for the mind of sorts. Some mutations in the mind would occur some would be beneficial some would not. Traits that mutate out of this evolutionary selection process that went on for potentially millions of years should be traceable. But that is just a wild way of looking at it. Visual acuity would have been affected and impacted hunting and gathering. Psilocybin has been proven to reduce fear and change how your brain reacts to it (also increase empathy). Overcoming fear and having empathy are leadership qualities that would have helped the “tribe” or “clan” leaders of the apes we descend from. Reducing anxiety is a notable experience as well.

Have you ever done mushrooms? Were you able to stop laughing and talking nonsense? In this sense the development of language would also have been affected. Psilocybin feels like it dissolves boundaries when under its influence. Religious experiences through ingestion of copious amounts of psilocybin are not out of the question. Seeing “imaginary” visuals and attaching meaning or some subject to them as a result of early man’s interaction with these drugs would have happened. A variation or change in the way these apes perceived reality McKenna argued was instrumental to our development to humans.

For those who are unaware: the alkaloid THC under a microscope looks like little fruiting mushroom bodies. The earliest physical evidence we have of people smoking weed is 2’500 years ago in Asia. Stories of cannabis intake go back significantly longer than that in the oral traditions of the Vedas in India. They describe an Indo-Aryan fire ritual where they would drink Soma. Soma was a heavily intoxicating drink which may have contained; Amanita Muscaria; Psilocybe Cubensis; Peganum Harmala and Ephedra Sinica. It is also possible that it contained Poppy; Phaedra/ Ephedra and Cannabis.



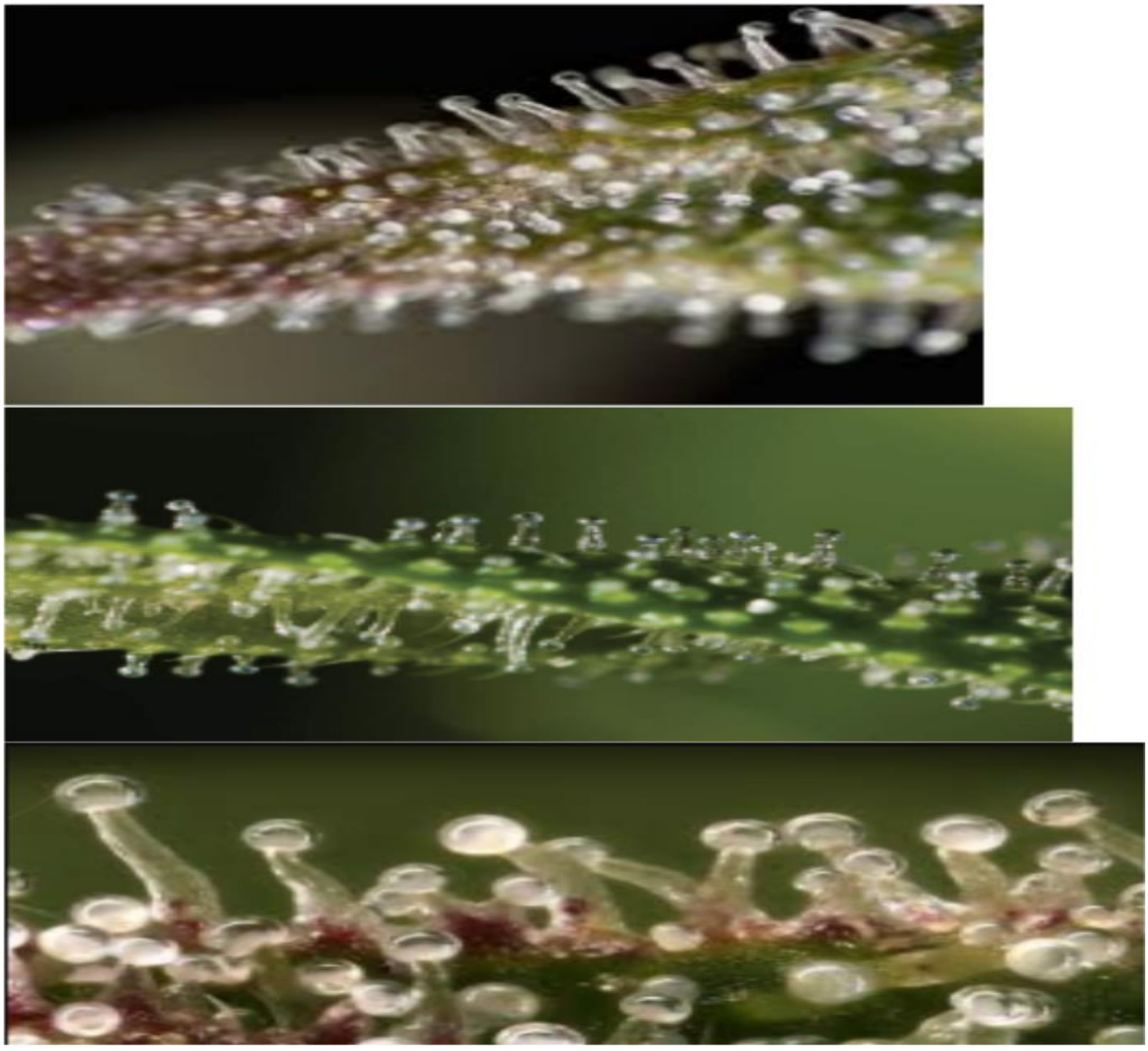
Tassili Cave Drawing - Courtesy of Kat Harrison-Mckenna

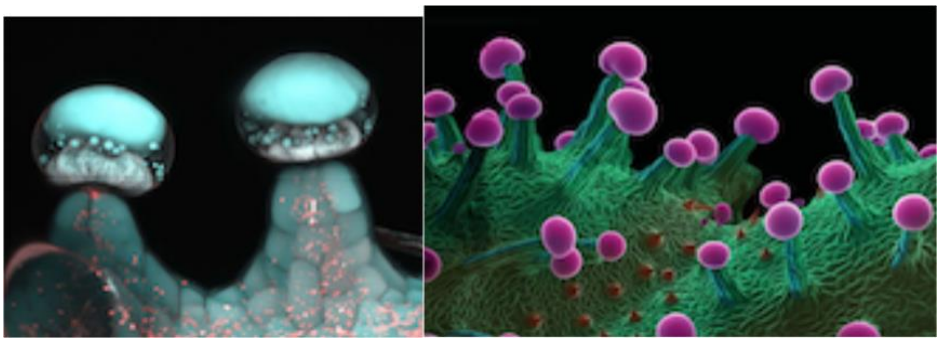
Supposedly the oldest representation of Hallucinogenic Mushrooms in the World comes from the Sahara Dessert “some 7000 - 9000 years ago” (Giorgio Samorini - Semantic Scholar). While its worth mentioning that use of hallucinogenic mushrooms have been recorded in cultures around the world there are people who speculate about their abundance in antiquity. Specifically, when the world was going from glacial to inter-glacial periods and the entire world was experiencing melt waters from the

massive ice bergs which would have produced new rivers, streams and lakes. The weather determines a great deal of many varieties of mushrooms ability to survive. A wetter climate and a wetter world in the middle of glacial melt off could have had an abundance of mushrooms worldwide.

Pictures of THC under microscope (Tetrahydrocannabinol) of marijuana.

Top picture courtesy of Michael Clinton
Middle picture courtesy of No Name
Bottom Picture courtesy of No Name





Multiphoton microscopy image of stalked glandular trichome. Samuels Lab/ UBC - Courtesy of The WeedBoard (Left) Grandular Trichomes - Courtesy of No Name (right)

There is a fungus called Ergot: and we harvest its alkaloids to make LSD (Lysergic acid diethylamide). Ergot grows on rye, wheat and related plants. Ergot poisoning can cause a wide range of extremely damaging effects on the body. Severe illness or deformities from gangrene; mental or physical pain; gastrointestinal to central nervous system damage. In medieval times it has been recorded in Europe of examples where bakeries used wheats tainted with ergot: resulting in the towns people getting both horribly sick and hallucinating. They called it St.Anthonys fire and was constantly present in the Middle Ages.

So not only was ancient ape/man potentially eating copious amount of magic mushrooms: but anatomically modern humans had been ingesting the fruiting body of the fungi ergot intermediately (and for people who take LSD: purposely) for as long as we have been eating grain. Lastly the alkaloids of many plants: such as THC in marijuana; takes on the appearance of a fruiting body of a mushroom. However, THC is not a fungi but a compound created by the plant. It is interesting to note that later on in this book stromatolites are mentioned where mineral deposits had formed mushroom-like bodies. There seems to be a theme in nature where the structure of a fruiting body (mushroom) appears out of the blue at times seemingly random and inappropriate for what it is.

Courtesy of Wikipedia

Kekeon was a drink of various descriptions ancient Greeks used to consume. It was known for its psychoactive properties and was a favourite of Greek peasants. In the Homeric texts the ingredients are wine; barley; and grated goat's cheese. Oddly enough alcohol is used to distill the alkaloids out of mixtures. They probably were not aware of that and most likely were not doing that.

Chapter 3 - The Primordial

The plants we see today hardly resemble their original forms from 1.538 billion years ago: but the mycelium today resemble their ancient forms from 2.4 billion years ago. The animals we see today hardly resemble their original forms from 1.547 billion years ago: but many of the mushroom fruiting body forms still resemble their ancient selves forms from 500 million to 1.2 billion years ago. We are more closely related to fungi than any other kingdom. Long before trees gained any height Mushrooms towered over them.

420 to 350 million years ago mushrooms like Prototaxites were 26 feet high while the tallest trees at the time were only a few feet tall. How strong must these mushrooms have been to withstand the weather? Would this implicate very mild weather or incredibly strong mushrooms? The largest fungal fruiting body recorded growing today is Phellinus ellipsoideus; it was 20 years old and weighed somewhere between 400 and 500 kilograms (880 and 1’100 lbs). It was discovered in Fujian Province, China.

What would the Cambrian explosion for mushrooms look like? What would be the equivalent of animals taking their first step from the ocean to land be for mushrooms? How far could we go with a concept like this? Is it possible that such an event took place sometime between the two oldest fossil records we have for them (mycelia; Ongluck discovery 2.4 billion years old; mushroom: Gondwangaricites magnificus gen. et sp. 113 - 120 million years old)?

Sometime between the oldest evidence of mycelium forms and mushroom fruiting body forms could we find evidence of mushrooms crossing into unexplored evolutionary waters? Is it possible that mycelia fruited plants and animals as fungal bodies? While it is known that Fungi predates animals and plants; we have yet to find a mushroom or fruiting body that predated the known time when animals and plants branched off from fungi: despite finding mycelia which far predates this event.

“Cyanobacteria that collected in “mats” or “colonies” formed Stromatolites-mushroom-like structures several feet high in shallow water where tides brought continual supply of nutrients. Leis and Stinchcomb (2015) have assembled a gallery of evidence showing that stromatolites were a dominant form of life for two billion years in every part of the world. Examples from Pilbara Rock in Australia date to 3.4 to 3.5 billion years BP (Walter 1983); from South Africa, 3.5 - 3.6 billion years BP (Knoll and Barghoorn 1977). Stephen Jay Gould (1989) remarked that stromatolites were “the highest form of macroscopic complexity” in the Precambrian world 3.5 billion years ago. But around 500 million years ago they wanned under competition from other life forms, and they are rare today, though some still thrive in a few remote locations, most notably in Sharks Bay in Western Australia where they are exposed to low tide.”
Barry Wood University of Houston
The Making of India “A 4 Billion Year Story”

Although they are not related to fungi the bodies the bacteria create with mineral deposits appear mushroom-like in nature. It sometimes feels like an echo or a shadow to me when we see mushrooms in a place where they do not belong. Why THC or Cyanobacteria would create mushroom like structures is beyond me. In biology a general rule is that “structure determines function”. The way something is arranged enables it to perform its tasks or function in whatever way it was intended to.

Spores can survive the gastrointestinal track of any animal are the only thing that lives on after an animal has eaten the mushroom. We walk around and piss or crap out the spores. In this sense to the mushroom, we are nothing but vectors. The primordial being that mushroom and mycelia appear to be are not entirely self-serving or selfish: they are symbiotic. The mushroom itself provides nutrients in exchange for services by plants and animals. It attaches itself to a sturdier “mycelium” being plant roots that absorb water and produce sugars.

The plants reinforce the mycelia through the exchange of moisture and sugars (among other things). The animals (when they eat them) both spreads the spores and fertilizes them. A bit oversimplified and probably not entirely accurate but it seems like a complete cycle. Will we ever be rid of spores? “There is no way to prevent spores, and they can persist in conditions where mold itself cannot

grow. Mold spores are everywhere, both indoors and outdoors, but they are not visible to the naked eye" (Medical News - Vincent J. Tavella). There is a common saying among mushroom hunters that "there are no old and bold mushroom hunters". Even the best and most experienced mushroom hunters take great precautions.

To reiterate some numbers:

- 3.7 billion years ago single celled organism had their form
- 2.4 billion years ago mycelium had its form
- 1.547 billion years ago animals split from fungi
- 1.538 billion years ago plants split from fungi
- 900 million to 1 billion years ago fungus had its form (Ouraspaira Giraldae)
- 500 million to 1.2 billion years ago fungi mushrooms had their form
- 700 million years ago Venus became uninhabitable
- 500 million years ago the first land plants had their forms
- 541 - 485 million years ago The Cambrian Explosion Happened
- 450 million years ago Soil (topsoil) began to appear

Did the original mycelia form of which had its form at least 2.4 billion years ago fruit plants and animals to use for breaking down nutrients into the topsoil that sustains all of life as we know it today? Without topsoil humans could never have been produced from evolution. Indeed, there are many things that were it not for them our existence would be in peril. Gondwanagaricites magnificus (the oldest mushroom fossil): "suggest the divergence of the Basidiomycota around 500 Ma to 1.2 billion years [26] and G. Magnifies establishes the earliest calibration point so far for the Agarcales, with a new minimum age of 113 - 120 Ma." (Sam W. Heads - Journal).

"Dating of fungal divergences with molecular clocks thus far has yielded highly inconsistent results. The origin of fungi was estimated at between 660 million and up to 2.15 billion y ago, and the divergence of the two major lineages of higher fungi, Ascomycota and Basidiomycota, at between 390 million y and up to 1.5 billion y ago. Assuming that these inconsistencies stem from various causes, we reassessed the systematic placement of the most important fungal fossil, Paleopyrenomycites, and recalibrated internally unconstrained, published molecular clock trees by applying uniform calibration points.

As a result, the origin of fungi was re-estimated at between 760 million and 1.06 billion y ago and the origin of the Ascomycota at 500-650 million y ago. These dates are much more consistent than previous estimates, even if based on the same phylogenies and molecular clock trees, and they are also much better in line with the fossil record of fungi and plants and the ecological interdependence between filamentous fungi and land plants. Our results do not provide evidence to suggest the existence of ancient protolichens as an alternative to explain the ecology of early terrestrial fungi in the absence of land plants."

Robert Lüking - Research Gate

These are all suggested from the fossil records. Mycelium had its form almost a billion years before plants or animals did. Cellular intelligence is something mycelia contain: it is conscious and makes decisions in some way. It sends information between the plants its lives in tandem with and anything else it is connected to. It can actually raise a host plant's immunity in order to protect itself. According to the brain: the brain is the most important organ in the body. Beings whose form are akin to a neural network (which many argue mycelium is like) are among the oldest and most virulent primordial-like beings who continue to outlive anything else on this planet. This "internet" is an ancient elder of earth.

Physarum Plycephalum is a slime mold (not a fungus) that is able to solve complex problems with extreme efficiency without having a brain. If you inoculate a maze with food at the end this slime mold will eventually find it: allow the connections that got lost in the maze to die: and restructure itself to best optimize transmission of nutrients. Slime molds used to be mischaracterized as fungi but key important differences were found that I am not going to go into here: but they do have spores. The oldest fossilized one was encased in amber for 100 million years and as far as I am aware not much could be determined by its molecular clocks.