A Geneticist’s Roadmap to Sanity

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***Introduction and Summary***

*A superficial look at the state of the world today is nearly enough to make people lose their sanity. After seeing that most major religious organisations are embroiled in fanaticism, wars of religion, racism, pedophilia, sexual abuse and/or morally distasteful business practices, and that most of today’s largest and most powerful nations are headed by corrupt leaders, populist demagogues, liars, bullies and/or dictators, it is imperative that experts, professionals, journalists and whistle blowers speak up and disseminate the truth. As a retired scientist and medical geneticist, my present outlook on human existence is very different from what I was taught in childhood and adolescence. I do not pretend to hold the entire truth, but I am still honest, I still wonder why we have not yet managed to end all wars and to get along together on our small planet, and I still believe there is hope for humanity.*

*In this article, I will discuss the logical principles underlying our existence, and the basis of happiness. I will briefly touch on consciousness, free will, religion, ethics, suffering, the mind-body duality problem, timelessness, the multiverse and human destiny. To facilitate this presentation, I will first have to argue that mathematical Platonism is a logical necessity if any concrete universe is ever to exist, and I will introduce the abstract, virtual and concrete modes of existence (in philosophy) corresponding to information, energy and mass (in physics).*

*This article can be seen as a summary of my personal Theory of Everything.*

**The beginning**

Before any concrete universe takes form, there is nothing, just a void. The set of everything that exists in that void is empty, and forcibly abstract.

**Infinite, abstract information**

Curiously, set theory states that all of mathematics can be derived from an empty set: a second set can contain the empty set; a third set can contain the second set, a fourth one the third, etc., all the way to infinity, thus accounting for all numbers. Numbers necessarily come with rigorous relationships such that 2+2 must equal 4, and the square root of 81 must be 9. Similar inescapable rules determine the set of all primes, geometry, the Pythagorean Theorem, trigonometry, multiple dimensions, imaginary and complex numbers, calculus, probabilities, vectors, matrices, functions, fields, etc.

These abstract concepts do not need space-time to exist; they constitute innate information, timeless and infinite; they take no room, do not change and do not evolve. Their strict logic implies that the sum of two numbers will always give the same correct answer in any concrete universe that may eventually develop. Order and logic are primordial and inevitable, at the very core of existence.

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*It turns out that an absolute void is impossible, as it will always contain an empty set and some innate information. This principle is reflected in quantum physics where empty space is teeming with the constant production of virtual pairs of particles and antiparticles that randomly pop in and out of existence.*

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**Quantum field mechanics and the emergence of concrete matter**

A mathematical and logical imperative latently exists in abstractness. Abstract field equations and their theoretical vibrations are a permanent part of this coherent arrangement. Some of these vibrations produce discrete quanta: the quarks and gluons, precursors of elementary particles and crucial for the inevitable emergence and expansion of a concrete universe in a finite and discontinuous space-time.

Because space and time are relative, an observer in any concrete universe experiences the changes that are taking place in its vicinity, but from the point of view of timeless abstractness, all remains static. This is a consequence related to the dilation and contraction of space and time in the theory of relativity, and to the absolute rule that time stops at the speed of light.

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*From the point of view of abstract information, there is no sudden creation. Just as 2+2 = 4 is a permanent feature in abstractness, without the necessity of a step by step procedure, such is the emergence of the concrete universe. It may take us time and effort to solve a complicated equation in our concrete world, but the equation and its correct solution are simultaneous in abstractness where time does not exist. From the point of view of abstractness, the entire evolution of a concrete universe, from beginning to end, is apprehended all at once, like an equation and its solution, timelessly.*

*Think of a two-dimensional graph of highway speed against time. The graph you hold in your hands is static, but car drivers who produce such graphs have a very different and lively experience.*

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**The non-Everettian multiverse**

The emerging concrete universe is not alone. Countless other universes are spawned by alternative vibrations, computations and truncations within those permanent abstract fields; these universes are independent of each other, all different, but all finite, with a beginning and an end, without any possibility of contacting each other.

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*A good analogy to understand the relationship between timeless information and the many finite universes it can sustain is your house and all the books it contains. Each book has a story, such as “Sherlock Holmes”, “The History of Thailand”, “How to Cook Baklava”, and “The Downfall of Capitalism”. Each book is independent of the others, and in each book the story has a time line, from beginning to end, but the homeowner can hold each book separately and consider it at once in its entirety. From the point of view of abstractness, time does not flow; it is a simple mathematical dimension.*

*Such a scenario implies that the reality of timeless and abstract information is a logical necessity if any concrete universe is ever to exist. This is in full agreement with the strong version of mathematical Platonism, the philosophical view that mathematical statements literally exist in an abstract realm independent of rational observers, so that mathematicians do not invent theorems but discover them. This should be as self-evident as saying that physicists do not invent the laws of physics but discover them.*

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**Three modes of existence**

Abstract numbers and concrete matter both exist, but in very different ways: abstractness is timeless, infinite, non-local, permanent and unchanging; while concrete matter is finite, discontinuous, and it keeps on evolving in space-time according to the law of general relativity. These two different modes of existence are linked through a third, hybrid and virtual mode: that of quantum reality with the counter-intuitive properties of abstract equations having space-time parameters.

Quantum physics is perceived as “spooky” and “weird” when the abstract and timeless component of its fields is not taken into account. This is especially obvious when one considers pairs of entangled particles emitted with opposite properties. Experimental results clearly show that the detection of one member of the pair immediately fixes the indeterminate properties of both members, even when they are separated from each other by any distance. Without timelessness, this can only be explained if information travels between the two particles at an impossible speed at least 10,000 times faster than the speed of light. But when abstractness and timelessness are taken into account, one concludes that the probability function describing the system is solved (for all particles involved) when a measurement takes place in concrete space-time. The solution is then applied simultaneously to all entangled particles together, not faster than the speed of light, but in no time at all, i.e. timelessly (with no speed involved).

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*This explanation has the advantage of circumventing the objections against alternative interpretations of quantum entanglement because it is non-local, it preserves causal order, and it holds whether the detection is made at random or on purpose, by an instrument or a conscious observer, whether it involves a single pair of particles or any number of fields or particles.*

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It is therefore important to appreciate that our Universe involves three distinct but inter-related modes of existence: the abstract, virtual and concrete modes, corresponding respectively to information, energy and mass. All three modes are real and ontologically essential for the universe to exist. This is in keeping with the modern scientific view that the entire universe can be explained in terms of information, that information is mathematically related to energy, just as energy is mathematically related to mass.

Cosmologists with a physicalist view of existence assert that the void is intrinsically unstable and that this instability makes it possible for the entire universe to emerge “out of nothing”, but acknowledging the permanent existence of infinite information and its exchanges with energy and mass, provides an approach that is less mysterious and opens the way to a rich exploration into the deep meaning of our lives in the Cosmos.

**Randomness**

Before we do so, it is important to recognise the utmost importance of randomness in our Universe. First, the emergence of a concrete universe cannot result from a conscious choice or a voluntary fine-tuning of physical properties because abstract information is immutable and does not change or make decisions. We just happen to live by chance in one of the many existing universes where life is possible, because we simply could not exist in any other universe where gravity and life is impossible.

Second, quantum mechanics is replete with counter-intuitive but well-known random phenomena, such as the random production of particle-antiparticle pairs everywhere in space-time, the probable location of electrons within an atom, radioactive decay, quantum tunnelling, the Uncertainty principle, etc.

Third, random effects blend most naturally with the strict determinism of physical and statistical laws in our familiar, concrete mode of existence. Random samples produce exact Bell and Poisson distributions; random mutations feed evolution; random mating keeps constant the genotypic proportions of a gene in a population, thus allowing freedom of choice within a constant order; and chaos theory provides us with organised randomness almost everywhere. Conscious individuals may often have limited choice, but the pervading presence of randomness and uncertainty makes it impossible for our universe to be exclusively deterministic, and for every event to be pre-ordained from the start. We do have free will, even when our choices are restricted.

**Mind and matter: triple-aspect monism**

With free will and three modes of existence, we are now far from the classical mind-body duality problem. Plato and Descartes promoted the existence of two exclusive essences, but today’s philosophers, psychologists and neuroscientists support instead the concept of a dual-aspect monism, and perceive mind and matter as two interdependent aspects of a single essence. We can now expand the notion of monism to include all three modes of existence into a triple-aspect monism.

A closer look at the entire Cosmos with its three inter-related modes of existence makes it readily apparent that both quantum physics and the concrete universe are contingent on, and emerge from, the mathematical rigour and logical principles of timeless information. That obligatory impact is not restricted to quantum theory and the laws of physics, but extends further into the theory of evolution, the development of consciousness and the emergence of artificial intelligence. All these follow strict logical rules. The evolutionary progress is often random and chaotic, it occasionally leads to blind alleys, but there is a strong presumption that the final outcome can be logical and orderly, since our understanding of natural laws is relentlessly improving. The more knowledgeable and conscious we become, the more capable we are of acting in accordance to the logical principles underlying our existence.

**Knowledge and consciousness**

In addition, we must not forget that Earthlings are not alone. There are billions of planets in the observable universe and it is reasonable to assume that many of them were, are, or will be inhabited by other sentient beings trying to understand why in our concrete universe there is something rather than nothing. Presumably, this state of affairs goes on well beyond the limits of our observable universe, in the unreachable expanse where countless other societies did, do, or will ponder the same mysteries with the same mathematics and the same logic.

The expansion of timeless, abstract and infinite information goes even beyond our universe into the countless other universes spawned from the same or other abstract fields, some with very different intelligences, different chemistries and different laws of physics, but always with the same logical foundation. We can only wonder at the scope and extent of knowledge accumulated by all those universes, as we will never encounter them, but the knowledge they accumulate is not any greater than the infinite abstractness we share with them and have access to.

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*If we were to compare the set of everything that exists to a human organism, timeless information would be the flesh and bones, energy would be the heart, muscles and internal organs, while the concrete universe would be the brain where thoughts and consciousness take place. Just as an isolated brain cannot be conscious on its own, a concrete universe cannot be conscious without access to its infinite background information.*

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Any entity is conscious when it processes information and is aware of doing so. In that sense, the set of everything that exists (*i.e*. infinite information, all energy and all matter in the multiverse) is eminently conscious because it processes everything there is to know and consequently knows itself in its entirety. The concrete multiverse reflecting on and analysing the infinite information it derives from is the epitome of self-reference and suggests that any piece of matter that processes information and is aware of it must be conscious to a certain degree. A human being processing a certain amount of information is obviously more conscious than an octopus, a squirrel or an ape, and much less than the upcoming artificial intelligence.

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**Religion**

*People of faith will be tempted to claim that their God is exactly what Infinite Abstractness is. The claim is reasonable since both Science and Religion have always been searching for the same ultimate explanation. If organised religion could let go of the fairy tales it teaches about creation myths, dressing codes, diet requirements, land ownership, racial supremacy, sexual repression and male superiority, all the rest would be fairly similar, especially the resulting morality, justice, and rules of hospitality, friendship, love and ethical behaviour.*

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The main difference between Infinite Abstractness and most, if not all, anthropomorphic gods is that Abstractness is timeless while gods are eternal. Gods progress in time; they can get into action, create a Universe at will, speak to and listen to people, make choices and even change their minds. Abstractness cannot and does not do that. Abstractness is absolutely immutable; it applies to everything and everyone, all time periods, all cultures, and all universes. It can account for quantum field mechanics, solar systems, the fractal growth of ferns, the murmuration of starlings, traffic congestion, economic algorithms and social mathematical models, but it does not meddle.

**Ethics**

This means that conscious beings everywhere must rely on their own ingenuity to figure out not only mathematical theorems and the laws of physics and biological evolution, but also work out what constitutes proper ethical standards. If everything that exists constitutes a single essence (with three inter-related modes of existence), we cannot rely on external factors or deities to concretely show us the difference between right and wrong. Questions of ethics and morality become amenable to scientific scrutiny as we enter the domain of secularism and humanism where the validity of moral judgements is on par with that of scientific theories. We can disregard mistaken religious censorship to firmly conclude that the earth does revolve around the sun, that continental drift and the evolution of species stand on solid scientific grounds, that global warming is real, stoning to death of rape victims is wrong, war and capital punishment are unethical, racism is abhorrent, family planning is a human right, homosexuality is not a sin (and not a crime), the right to bear arms in today’s cities is nonsense, sports and music can be enjoyed in public, and the tooth fairy does not exist.

The emergence of rational ethics is a welcome evolutionary step to bring together and consolidate the efforts of various religions and philosophies often based on ancient cultures and on old-fashioned principles in need of amendment and renewal. Evidence-based mathematical models and maximum likelihood comparisons can identify the most ethical standards that minimize suffering and that lead to universal well-being and flourishing, while allowing equivalent ethical alternatives corresponding to peaks of equal height in the moral landscape.

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*The advantage of a secular and scientific approach led by experts is obviously superior to a political process where too many politicians lack basic diplomas in appropriate fields and often refuse to believe experts.*

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**Suffering**

A good start to minimize suffering and the potential for conflicts will be to agree on, implement and enforce universal codes of conduct for individuals and for governments. Suffering, misery, epidemics, fear, terror, war, bullying and conspiracy theories are mainly due to ignorance or insufficient knowledge, and can be alleviated to a great extent through relentless education. This is why teachers, professionals, journalists and all responsible citizens have a duty to speak up and disseminate the truth. We all need their expert advice.

**Happiness**

Expert physicists have determined that the discrete “particles and sub-particles” of matter and energy are best explained as ripples resulting from vibrations in quantum fields. The atoms we are made of are the products of such vibrations, and neural vibrations are at the core of our consciousness. If synchronous vibrations can give rise to entire universes and exploding galaxies, it is not surprising that we should find so pleasant the harmonious vibrations and rhythms played by symphony orchestras in concert halls or by popular pop bands at music festivals. The more we synchronise with others and co-operate with them, the happier and more fulfilled we feel. Extreme happiness always requires synchronising and sharing with a partner, a community or the rest of the world.

A spark of diversity is also essential when we share: it is the mixture of harmonious vibrations that is pleasant and satisfactory; a single note and a monotonous beat are not enough to inspire euphoria. Thousands of Nazi soldiers marching in unison may give the impression of unity but their effort is a mistaken and selfish enterprise, in conflict with everyone else.

Learning foreign languages provides an excellent introduction to other cultures and to the huge or subtle differences in other people’s outlook and attitudes. Being able to speak to others in their own language is not only very practical, but it breaks walls and inevitably breeds tolerance and understanding. It also offers different ways to approach the same idea, a definite advantage when trying to solve problems in life, in scientific research and in artistic creativity. An interesting perk is that it allows you to greatly enjoy untranslatable poetry, jokes and clever puns that would otherwise be off-limits!

To be deeply happy, we must be informed and act in harmony with the quantum field vibrations sustaining the universe, and with the logical principles underlying the three modes of our existence. So, let us consciously choose to marvel at the supreme beauty of the universe; look up and gaze at the stars, be positive and tolerant; listen to good news (there are many!); take a break from social media; play sports, develop a hobby, learn and share your knowledge; live peaceful, healthy, creative and productive lives; and work ethically, honestly and rationally for the betterment of life on Earth. And since humour is at the heart of the human condition, make sure you enjoy frequent good laughs in the company of good friends and family. Helping others should also relieve you of the temptation to believe in the ultimate futility of your short life on Earth.

**Life, death and beyond**

Eventually, all conscious beings will die; and all concrete universes will end either in a big Crunch, a big Rip, or a Big Freeze, through the annihilation of matter and anti-matter, black hole evaporation, the disintegration of everything else and the final absence of change so that time itself will no longer have any meaning. From the point of view of each concrete universe, all that will remain will be timeless information.

Fortunately, that information is infinite and permanent, and the fact that we lived remains a reality in abstractness. Even if the cosmos were to disappear completely tomorrow morning, the fact would remain that you did read this paragraph.

The contemplation of the final chapter of history and the end of time is very dramatic from the standpoint of concrete existence, but it does not make our lives worthless. The existence and history of all universes is permanently etched in abstractness: all information is kept. Lovers who gaze together at the moonlight can feel it: now and after they pass away, their joint memory will be preserved in timelessness!

The evolution of conscious and intelligent beings in concrete universes amounts to the grand awakening of all matter. Infinite information comes to life, and matter deciphers it by evolving ever more complex forms, brains and computing devices leading eventually to enriched understanding, enlightenment and universal consciousness. The Earth did not even exist five billion years ago, but we are here now, and the far future will certainly witness much improvement in intelligence and degrees of consciousness. To such an extent that we must admit humanity is only a small, imperfect, intermediate and ephemeral link in a long evolutionary chain leading to whatever wonderful we dare to imagine.

In the meantime, everyone can consciously choose to either live actively in harmony with the rest of the universe or else join a selfish and desperate losing battle. Our personal contribution may be minuscule in the grand scheme of things, but our collective impact is meaningful as it reaches out to the Infinite and allows us to be part of the most amazing story that will ever be.