Power, Religion and the Informational Nature of Reality

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Abstract
Technological advances are changing how we view reality. Scientific evidence, published articles and books suggest that we might exist in a Matrix-like simulation. Or that reality resides within the confines of a mathematics-created, informational universe - a quantum computer of some type. Through this lens, our understanding of our own reality changes in many ways. Although scientific explanations have demanded a "material cause" heretofore, the findings of quantum physics show that solid "material" may not really exist and thus needs reinterpretation in this light. Although science and religion have been on seemingly divergent pathways, this concept unifies them in unexpected ways. Religious concepts such as a creating God become more real in this context, but God as programmer? Religions have some entity or God(s) outside of our reality involved in its creation, but no one prior to the Age of Technology, would ever have referred to Him this way. The power issue enters because many authoritative figures use power to direct and enforce opinion about this and related issues. As individuals there is a need to be responsible for what we believe, and not just be swayed by powerful bullies. Because at the end of whatever this reality is, we will each face something or nothing. If it is nothing, then it really does not matter much what we believed. But if it is something, then what is the something? And, each will face it no matter what the power opinion makers opined. Although many viewpoints are all presented as truth, can we know the true nature of reality? This paper examines the emerging issues with an informational reality, faith and science.

Keywords: atheism, theism, information, programming, universe

Introduction

Technological advances are changing our view of reality. Scientific evidence, published articles, and books suggest that we might exist in a Matrix-like simulation. Or that reality resides within the confines of a mathematically created, informational universe - a quantum computer of some type. Through this lens, our understanding of our own reality changes in many ways. The big questions about how our world came to be, and why or what caused it in the first place have undergone several shifts in the last few hundred years. But this most recent change in perspective is calling many former ideas into question like never before. In many ways it is bringing the discussion full circle too.

One the one hand, ideas from faith(s) portray a created, highly multi-dimensional world, including other-dimensional places things and entities. At the end of this existence, there is some other reality that we face outside of this existence we know as life. Contrast that with theories of neo-Darwinian evolution, which propose a universe and world evolved from random nothingness, acted upon by solely material forces, small successive changes and natural selection. In this scenario there is no creating entity and nothing at the end of this existence.

There is a veritable power struggle over which opinion or beliefs will prevail. From religious to science leaders, all are using their authority and power to persuade the masses of the correctness of their perspective, when in fact all of us should be looking hard and with great zeal to answer the question: What is the real nature of our reality? Indeed, there may be no more important question to get right while in this reality.

In this paper, some historical perspective on how and why reality is increasingly seen as informational will be provided. Then the evidence and implications for the change will be examined.

Historical Background - Mathematics and changes in the perception of reality

The discovery that mathematics and scientific principles are embedded in everything in the "real" world began with the Age of Science. People like Sir Isaac Newton, Johanes Keppler, Nicholas Copernicus and Robert Boyle discovered things, which revolutionized people's understanding of our place in the universe, and the description or seeming government of things by mathematical equation. Prior to that, the earth was envisioned as being at the center of everything, and everything revolved around it. Math was not mentioned much except in the measurement of movement of the celestial bodies, sun and moon. The religious and other leaders of times past looked to the Bible, the Torah and the Q'uran and other religious texts (depending on locale) for how the world came to be. Within traditional western religious interpretation, the perception was that the world was created by God speaking. In strict Biblical accounts, God spoke 8 times over the course of six days, and the parts of the universe or world rolled into being including the heavens, the earth and all life on it. All religions have a creation account of some sort. Most involve other dimensional places, things, and entities.

As the first modern scientists began to discover details about how things worked, they were often perceived as being in conflict with religious principles or doctrine.

Nicholas Copernicus was trying to find a model that explained the movement of the planets better than the models of his day. The geocentric model of his time was sadly lacking in accuracy and predictive power. When he put forth the theory that everything revolved around the sun, and showed that this model was supported 100% by the mathematics, a revolution began, which ran contrary to religious belief. The way in which it was contrary was twofold, though. First, even though the order for what goes around what is unspecified in the Bible, this new theory ran contrary to the established viewpoint about it, and the opinion maintained by those in power. Second, it also placed the earth in a secondary position within the solar system, with the sun at the center, and the earth as just another planet. Not seeking to violate the religious authority of any thing, he was just trying to find a model that fit the observations. But since dictates about how things were, were supposed to come from the church, it violated the power structure no matter how right it was. Scientists today could be said to fit into that modus operandi too, as they look for models that predict and explain things correctly. Going against the grain of established doctrine though, will cause a backlash now, just as it did then.

Sir Isaac Newton, Boyle, and Kepler were all committed Christians who were also looking for appropriate explanations that fit observed phenomena. But they believed that by studying the physical world and how it functioned, one could find out something about how God thinks. So although they and others at that time were also in the process of uncovering the mathematics and principles of how things work, they and others like them actually had a religious purpose as the basis for their work. At that time, there was no conflict with being a Christian and doing science.

What all these early scientists discovered is that many if not most things in our physical world are describable by mathematical equations. Newton is credited not only with being the father of modern Physics, but also of Calculus. He found equations that accurately predicted and described the workings of the physical world. Boyle worked more on the descriptive mathematics related to Chemistry, including the discovery of the mathematical equations that relate pressure, temperature and volume of gases, known as Boyle's Law. Kepler worked out the mathematics of the motion of the planets, invented a better telescope, and wrote extensively. These and others found that mathematical equations and principles seem to undergird all physical things. Continued work in many fields has proceeded apace for the last four hundred years and more, and included millions of researchers. From classical Physics to Chemistry to Astronomy to Genetics, physical things in the known universe have been found to swim like fish into the net of mathematical description.

Many things in the biological world are also describable by mathematical equation. For instance, the growth of trees, snail shells, leaves, parts of flowers and also animals utilize Fibonacci equations. Fractal math is found in the way many leaves grow serrated edges. Former Berkeley graduate student, Alistair Boettiger discovered that by adjusting nine parameters of a single equation in a computer program, he could generate the patterns on the shell of a "Conus Gloriarus." (Boettiger) Marine animals, such as sharks or whales seem to follow a fractal pattern known as a "Levy Walk", when they search for food in the ocean. (Witze) As a researcher at the Federal University of Alagoas in Brazil, Gandimohan Viswanathan noted, "Living organisms, when allowed to make free willed decisions, seem to end up obeying some kind of mathematical law." (Viswanathan) A common example of mathematics in nature,

familiar to any math student is the formula for the growth of bacteria, which conforms to a simple exponential equation. The metabolic rate for organisms large and small has an exponential equation which projects roughly the same "amount of life" for all organisms, lived either faster or slower depending on the size of the animal. (Speakman) For instance, that old cliché about one human year being equivalent to seven dog years is not too far off the mark, math-wise.

There are many things in Nature for which mathematical equations have not yet been found, probably due to the sheer complexity of their structure. For instance if one were to try and find an equation for the construction of proteins, one might be advised not to hold one's breath. But this is where programming enters in, because all aspects of the construction and regulation of all of life are encoded for in DNA. Although the conventional wisdom about DNA is based on an evolutionary model, it is still regarded as, "highly accurate digital code" or so says biologist Richard Dawkins. (Dawkins) Others also use similar terms to describe the programming found in DNA. As time has progressed, this informational aspect of DNA has taken a more prominent place in the discussion, rather than the mathematics aspect, which is said of physical things.

Quantum physics and changes in the perception of the nature of reality

At the beginning of the Twentieth Century, early quantum scientists made discoveries that called into question that ours was a world made of solid particles of matter. As scientists such as Einstein, Bohr, Heisenberg, De Broglie, Rutherford and many others delved into the structure of the subatomic world, they discovered really odd things. Niels Bohr characterized this in his now famous statement, "Anyone who in not dizzy after his first acquaintance with quantum of action has not understood a word." (Blaidel) Today, this might be rephrased in a more current way, "Anyone who has studied quantum physics and is not completely blown away by it, has not understood what it means." This is because at the quantum level, things always understood to be real or even solid, are not. Things that are physically impossible are necessary for the universe to work right, too.

In Rutherford's 1909 gold foil experiment, he discovered that the nucleus is incredibly small, dense and positively charged. The same experiment also revealed that it is surrounded by vast quantities of empty space. Later experiments by he and others confirmed that and quantified that the empty space makes up 99.99% of an atom, leaving only 0.01% as solid. The clouds of electrons, which orbit the nucleus and comprise its outer surface were found to be very distant in deed. If one were an atomic nucleus, one's electrons would be orbiting at a radius of about 5 Km. It is one thing to say, well that empty space idea is just for stuff at the quantum level. But of course we are made of those things. Think of a human body or a chair or a rock as being 99.99% empty space. Too strange to comprehend? Perhaps so, but there is more that is even more strange, which also began to lead scientists to this concept that ours is an informational world, and not a material world at all.

Electrons, and eventually all subatomic particles were discovered to have the properties of both waves and solid particles, something which is impossible in a "real world" but which works perfectly well in the context of a computer simulation. Albert Einstein put it like this, "It seems as though we must use sometimes the one theory

and sometimes the other, while at times we may use either. We are faced with a new kind of difficulty. We have two contradictory pictures of reality; separately neither of them fully explains the phenomena of light, but together they do." (Harrison, D) This comment pre-dates the Age of Computers, in which such a thing would have been understood as possible through programming.

Thomas Young showed that if an electron came up to a grid where it had to pass through on either the left side or the right side, it would pass through on both sides, simultaneously. (Heavens et al) Impossible but not, apparently. Other experiments revealed that electrons are found only at discrete "quanta" or levels (from which the term quantum physics derives). They can change levels, but are never observed moving between levels. How do they travel or get to another level? Apparently they do not; they just show up at a different one, having not traveled there at all. Again, impossible. But not if done in the context of a programmed environment using discrete math and equations. Electrons likewise change their spin from up to down or down to up, but are never observed in the process of changing. Like the level, they just show up with a new spin. A reality created through programming could make this possible, but in "real" reality it cannot be so.

Much later on, scientists began to smash atoms into one another through the use of ultra-high speed accelerators. Instead of just the existence of only three subatomic particles – protons, neutrons and electrons, they discovered a whole zoo of other sub-subatomic particles, most of which have no mass whatsoever. Since things at our macro level have mass, how can it be that we are made of things which have no mass? Peter Higgs theorized that there must be some particle, which confers mass. Much later it was discovered that indeed, the Higgs boson does exist. (O'Luanaigh et al) Work on the mathematics of how all the particles work together is providing quite stable employment for researchers around the globe to this day. By no means are all the details worked out.

But there was more, which continued to cast an odd, fantastic hue upon the solid particles of reality. Theorized to be at the base of all matter are tiny strings or perhaps membranes of vibrating energy. This is known as "String Theory." In this model, the solid particles of matter of which our world including all of us, are ultimately made of energy, and so are not even solid. The most famous of all equations, $E = mc^2$, showed that matter and energy were related, and was put forth by Einstein long before String Theory. But these grasp the concept that energy and matter are interchangeable.

There were other "spooky" phenomena, which began to suggest that the underpinnings of material had to be mathematical or rely on some sort of programming, for lack of a better term. It is well known that if two photons are emitted from the same source travelling in opposite directions, if one is subjected to a force, which deflects it, the other one not subjected to that force, will also be deflected. It is as if these two photons have some invisible link. Since they are presumably discrete particles, then how can this be? Einstein coined the term to describe this as, "spooky action at a distance." (Walker) This is not so scary if one considers that a mathematical equation could generate them both. Any change to the equation would result in a change in both. So this angle of interpretation has more explanatory power than assuming they are discrete.

What is most salient about some of these findings from quantum physics is that they show that reality is made of solid particles of "real" stuff. And possibly that it is not really real in the first place, or that reality is very different in its make-up from established ideas about it. As Bruce Rosenbaum and Fred Kuttner describe in their book, "Quantum Enigma, Physics Encounters Consciousness," "…if quantum theory denies the straightforward physical existence of atoms, then it would also seem to deny the straightforward physical existence of chairs, made of atoms. Is nature trying to tell us something?" (Rosenbaum et al) And what might that be?

The new paradigm shift in the perception of the nature of reality

Looking at all these findings taken together, some have concluded that instead of mathematical equations merely describing reality, they generate it. For instance, if the mathematics for the quantum world predicts some odd result, its real life manifestation will always obey the math, no matter how strange or counterintuitive the predicted behavior is. Describe or generate, that is the question. The consensus in the scientific community is increasingly going towards the latter.

This suggests a larger context, which is something to compute all that math. After all, an equation on a paper is just so much ink unless a computation happens. To compute the math for physical reality, suggests a computer of some kind whether a brain or a machine. In the discussion used here, it would be the universe as computer. Books, journal articles and popular science magazines alike have increasingly featured themes relating to this. Max Tegmark, of MIT is the author of, Our Mathematical Universe – My Quest for the Ulimate Nature of Reality."(Tegmark) Or how about, "Programming the Universe – A Quantum Scientist Take on the Cosmos," by Seth Lloyd, also of MIT. (Lloyd) Another one is, "Decoding the Universe," Charles Seife. (Seife) As one can see, topics like this represent a dramatic shift in our concept of reality, if they were to be accepted. Instead of solid little particles of matter, randomly interacting and forming things of great complexity, like ourselves eventually, we would be programmed for "self aware substructures" in a larger, programmed for structure, to paraphrase Dr. Tegmark. That is a very different model of reality than the popular, current answer to where everything came from and how it came into being, known as neo-Darwinian evolution.

A famous article by Nick Bostrom of Oxford asked the question in so many words, "Are you living in a computer simulation?" (Bostrom) According to this paper, if modern technology advances as it has done, then say, in a couple of hundred years or so, could we be created characters in an "ancestor simulation?" This controversial idea is actually not so far fetched when compared to today's computer games, which are very realistic and interactional. If one were to add full immersion of the senses, then how would we be able to distinguish between that reality and a "real" one? In a college philosophy class final exam in Australia, the professor gave students a choice of a few prompts on which they could write an essay. One of them was, "Prove you are not living in the Matrix." Interestingly, no one chose that theme to write about.

What is more interesting than a mere philosophical shift is the appearance of evidence in support of a math driven, informational, programmed for existence. One researcher at the University of Maryland, Dr. James Gates discovered what appear to be "error correcting codes" embedded in the mathematics of the supersymmetry of fundamental

particles. (Spivak) High profile scientist and author Dr. Brian Greene, has written about evidence for a computer-like, informational existence, "If the continuum laws that physics had developed over many millennia were input into a powerful digital computer, and used to generate a simulated universe, the errors built up from inherent approximations would be the very sort being observed [in our universe]." (Greene) The "inherent approximations" he referred to would be those resulting from things like rounding off of numbers. For instance, when doing calculations for round or circular objects, they always involve the number "pi." One has no choice but to truncate the decimal, since it apparently goes on forever: 3.1415…. But in doing this, there is a wee bit of inaccuracy introduced into the calculation. Tears or rips in the fabric of space and ripples in gravity, would be two such examples of things which ought not to be, but are. Why are they there? Inaccuracies in calculations could cause such things. In any case, such things provide more corroboration that ours is a mathematics and programming generated world.

Power, opinion and the nature of reality

The neo-Darwinian model is accepted virtually everywhere in the mainstream science community, and even those authors writing about a programmed universe or computer simulation of the world, will tip their hat to it. But can it be both – a random mish-mash of solid particles, with mutations, acted upon by natural selection over long periods of time and also a programmed for reality? These are actually very different concepts. People who do programming for a living or even those who have taken a programming class know that programming is highly structured and organized, the product of deliberate intent. That one might toss some instructions together randomly and expect they will produce the graphics on your tablet computer, or for that matter anything, is ludicrous. Only those who have no idea how those graphics are produced through perhaps millions of lines of code might expect such a result. So, a programmed for reality suggests (a) programmer(s), rather than a lucky smash-up of random things. Who would that be?

This begins to sound like a religious concept - a creating entity, commonly known as God. The Bible says that "In the beginning was the Word and the Word was with God and the Word was God." (John 1:8) Does this Word contain the information to start things up, as in programming? If one thinks about it, other concepts than merely the programmer / programming could assert themselves in a religious vernacular. For instance, compared to our own technology, one would expect a programmed for world would have memory. Every thought, action and deed of each individual character could be recorded, archived in a file. The Judeo-Christian Bible very specifically mentions accountability for one's actions and words. (Matthew 12:36, Romans 14:12)

But there is more. This computer of the universe simulation-like reality makes it sound like we are characters in a game. Dr. Tegmark and others openly envision such a thing. So, most games have a scenario being played out. When some combination of events occurs it advances the programming up to a new level, where other things can happen. This has its parallel in real life and faith as Christians and Jews look to the prophetic passages of their respective texts and find similarities in historical events. They use those passages to predict what will happen in the future too. Christians in particular look to the "End Time Prophecies" of the Bible as a sort of checklist of

things that have already happened versus what is yet to come, as verification that they are on track with what they believe.

A preprogrammed simulation-like world with a scenario working its way out is a starkly different way of seeing reality than the neo-Darwinian model. But which is it? Or is there any way to tell which it is? If it is the former then there could be many versions of what the scenario is and the rules for characters within the simulation, just as there are many different religions. But if it is one of these, then the predictions made by that religion ought to be found playing out in this world we live in. If reality were to be the latter, a purposeless, randomly kluged together existence, that predicts very different things. One of them would be the lack of any larger scenario working its way out.

The neo-Darwinian model suggests that we luckily happen to exist in a universe, which happens to have just so Laws of Physics, which just happen to provide conditions that result in life. In this model, there are possible other universes that could have other laws, in which life would be impossible. Indeed, in the "multiple universe" or multiverse scenario, also known as M-theory, there could be all manner of other universes, some with other versions of ourselves, working out different choices we have made. Since these universes are purported to be the product of strictly material processes, they would have no memory, consequences, plan or care for any of the characters in them. At the end of the lifespan of any character in such a universe, there would be nothing. Certainly there would be no accountability. That is an affectively safe universe for anyone who wanted to be free of rules for living. But such a stance guarantees nothing for its holders.

Some might say that the nature of reality cannot be ascertained. They might assert that everyone is entitled to their own beliefs about this topic. The problem exists in the concept that there may well be a way in which it is.

For most of human history, no one had any clue how things worked. But we are living in times unlike any ever, in which the opaque cloaking of the details of how our world does work are falling away with unimaginable rapidity. What they reveal is that ours is a world that seems to be generated by programming and mathematics. Although there are many theories and beliefs that people maintain, it seems incumbent upon all of us to diligently search for the right answer to the question of where did our reality come from? There may be no other question to get right while in this reality. Consequences or not? Something after this life or not? While everyone holds their own opinions dearly, reality may or may not coincide completely with how we think it is.

If it is so important to answer this question correctly then why is humanity not doing it with eyes wide open? Everyone seems to want to look through their own (or that of their particular group's) lens of opinion and belief on this issue. And, structures exist to force adherents to certain philosophies into submission, too. People who question in whichever subset group will often be bullied into obedience, shunned, expelled or worse. This is not just the case for members of religious groups, but for those in the science communities, too. But why? Is it out of fear? Do people not want to think for themselves? The question itself is too hard? Or is it that human beings like to have a

comfortable “reality box” with familiar easy walls that coincide with how they want to live their lives? Human nature?

Part of the power issue could simply derive from the structure of groups. Groups have rules for behavior for members, with consequences that reward good and punish bad. There are always leaders and followers. Since people follow their leaders, the responsibility for having the right answer falls most heavily on them. Leaders profit in many ways as a result of their leadership, though. These could include respect, financial gain and just the ability to have and use power for themselves. Any change to the power equation would be particularly unwelcome if it results in the group leaders losing any of these benefits. So they would be predisposed to block any changes that might result in that.

Proponents of certain traditional theories in science and religions have used power to cut short discussions of findings contrary to established beliefs. For instance, years ago the tobacco industry used doctors to speak against the concept that their products caused cancer. Of course those products do cause harm and the lid could not be kept on the truth forever. Later, the medical community assumed that excess stomach acid caused ulcers. Then some Australian scientists, Barry Marshall and Robin Warren put forth the idea that the bacteria, H. pylori caused stomach ulcers. And, they had evidence to back up their claim. British scientist Stewart Goodwin confirmed this. From the discussion that ensued, one would never know that science was supposed to “go where the data leads,” because there was a vicious backlash. Eventually, it did become accepted practice to treat stomach ulcers by addressing the H. pylori infection, because the truth comes out. But in the meantime, proponents of the old theory did loose some respect and power, as their now incorrect theory was supplanted by a new one. Pharmaceutical manufacturers also lost out on profits as their antacid treatments became less prescribed. Eventually the truth must surface, no matter how it is kept under wraps, even if the power establishment balks.

Conclusion

As this new informational way of considering reality gains momentum, ways have been mentioned that have the potential to close the rift between science and areas of faith. Many in power positions would say differently in spite of new evidence to the contrary. Perhaps this insistence on only “material” explanations has itself rooted in tradition, comfort, and denial of other more scary options. But affective issues aside, the question still remains, how is it really? If the nature of our reality is informational and even computer-like, what does that make us? Are we just “self aware substructures”, artifacts of a computer algorithm that have no existence outside the greater program? Or, what if we are other-dimensional or spiritual entities, passing through a period of testing in a simulated reality existence? And at the end of this existence in this reality, we might either be held accountable for our actions, choices and words while in it, face nothing or who knows? Can we say this is not the case? No, because we cannot rule out anything at this point. Just because some may like a consequence-less, material existence, does not mean that that is how it is. We can only hope that because of the importance of the question, power will be directed into answering this most important of questions rather than traffic directing of opinions.

Using power to enforce opinion on a topic with such potentially serious consequences, could be considered inappropriate if not abusive. Ultimately, whatever it is that individuals face when they depart from this reality, they face it alone and not as a member of a group. Therefore the individual needs to be free to make choices, perhaps informed by but not forced by those in power.

References

Blaidel, Niels. (1988). Harmony and Unity: The Life of Niels Bohr. Madison: Science Tech

Boettiger, A., Ermentrout, B., Oster, G., (2009). "The neural origins of shell structure and pattern in aquatic mollusks," Proceedings of the National Academy of Science, vol. 106, no. 16, 6837–6842, doi:10.1073/pnas.0810311106.

Bostrom, N. (2003). Are you living in a computer simulation? Philosophical Quarterly, Vol. 53, No. 211, pp. 243-255

Dawkins, R. (November 12, 1196). Science and the X-files. prospectmagazine.co.uk

Greene, B. (2010). The Hidden Reality – Parallel Universes and the Deep Laws of the Cosmos. New York: Alfred A. Knopf

Harrison, D. (2002). Complementarity and the Copenhagen Interpretation of Quantum Mechanics. UPSCALE. Dept. of Physics, U. of Toronto

Heavens, O. S.; Ditchburn, R. W. (1991). Insight into Optics. New York: John Wiley & Sons.

Letter from Einstein to Max Born, 3 March 1947; The Born-Einstein Letters; Correspondence between Albert Einstein and Max and Hedwig Born from 1916 to 1955, (1988) Walker, New York. (cited in M. P. Hobson et al., Quantum Entanglement and Communication Complexity (1998), pp. 1/13

Lloyd, S., "Programming the Universe – A Quantum Scientist Takes on the Cosmos," 2006, A. Knopf

O'Luanaigh, C. (14 March 2013). "New results indicate that new particle is a Higgs boson". CERN.

Rosenbaum, B., Kuttner, F., (2006). "Quantum Enigma, Physics Encounters Consciousness," Oxford: Oxford University Press

Seife, C. "Decoding the Universe," 2006, Viking

Speakman, J.R. (February 25, 2005). Body size, energy metabolism and lifespan. The Journal of Experimental Biology, jeb.biologists.org

Spivak, N. (March 22, 2012). "Is the Universe a Computer? New Evidence Emerges." novaspivak.com

Tegmark, M. "Our Mathematical Universe – My Quest for the Ultimate Nature of Reality," 2014, Knopf Doubleday

Viswanathan, G.M.; Raposo, E.P.; da Luz, M.G.E. (September 2008). "Lévy flights and superdiffusion in the context of biological encounters and random searches". Physics of Life Reviews **5** (3): 133–150.

Witze, A. (July 3, 2010). “Sharks use math to hunt their prey.” Science News, Vol. 178, no. 1, page 15,

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