

Quantum Lack

A curatorial statement for the exhibition “Five Centimeters Short.”

“Five Centimeters Short,” curated by Erik Bakke, is at the rupert goldsworthy gallery in Berlin from 14 January to 10 February, 2010--featured are the artists Desirée Holman / David Huffman / Tracey Emin / Bruce Conner / Erik Bakke

In 1964 Joseph Beuys famously wrote that “Beuys recommends that the Berlin Wall be elevated by 5 cm (better proportions!)”

For Beuys, the Berlin Wall lacked. Voltaire might have appreciated that idea. Leibniz perhaps not.

How does one measure the damage created or negated by something that never was? Can it be determined if there was a moment that the alternative could have existed?

When Voltaire took Gottfried Wilhelm von Leibniz to task in *Candide* it certainly wasn't for his contributions to calculus; it was for his *Theodicy*. Specifically, Voltaire's tale--of a young protagonist beset and thwarted by one natural and manmade horror after another--skewed Leibniz's conclusion that we must live in “the best of all possible worlds” (to simplify Leibniz, “the best” because this is the world god made).¹

More recently similar discussions on the other side of the fence have surrounded the “anthropic principle” or the “anthropic coincidences.” The universe must be the way it is because it is the universe we live in. The physicist Brandon Carter first proposed this argument in 1973 at symposia commemorating Copernicus's 500th birthday. He offered a “weak” version and a “strong” version of the argument.

*We must be prepared to take into account the fact that our location in the universe is necessarily privileged to the extent of being compatible with our existence as observers.*² (weak anthropic principle, WAP)

The Universe (and hence the fundamental parameters on which it depends) must be such as to admit the creation of observers within it at some stage. (strong anthropic principle, SAP)

Astronomer Victor J. Stenger has written a number of popular books discussing the implications of the anthropic principle. Stenger comes to the conclusion that understanding the anthropic principle must lead to atheism.

¹ <http://plato.stanford.edu/entries/leibniz-evil/>

² Stenger, Victor J., *The Anthropic Principle*, p.3, <http://www.colorado.edu/philosophy/vstenger/>

*The universe looks just as it would be expected to look if it were not created by God. From this we can conclude, beyond a reasonable doubt, that such a God does not exist.*³

Stenger, himself, has pointed out that the anthropic principle can be critically viewed as a tautology. In a similar fashion critics have attacked Leibniz as having in the end only come to the conclusion that “a = a.”

The discussion here will not follow the implications of the anthropic principle to their end nor look closely at the subtleties of argument Leibniz actually presents in his *Theodicy*⁴ but more will consider, on a quotidian level, if we could have lived in a world with less horror and then, thus, if we have a chance to mitigate future horror. Specifically, are there moments when things really could go one way or another? And, for our purposes here, can artists be materially involved in making decisions that ultimately affect the nature of future events? Beuys’ rhetoric about the height of the Berlin Wall had a different function than actually imagining what could have been had the Wall been higher. But perhaps if at the moment the decision were made regarding the height of the Wall it had been determined that each stretch of Wall would be five centimeters higher than it was and perhaps if Beuys were right and the Wall was, as a result, a more satisfying aesthetic object, then, perhaps, the history of that Wall, of Berlin, would have been completely different. Speculations on what could have been could themselves fill pages for it may be true that from the moment of the cosmos’ Big Bang the average height of the Wall was fixed at 360 centimeters or that the Wall could have been five centimeters higher or shorter and history would have been more or less the same. In the end, we will focus on Beuys’ ultimate argument--an argument not directed at the Wall--for the power of the creative, thoughtful mind to change the path of the future.

The “anthropic principle” comes into clearer view when considering it as deriving from the “anthropic coincidences.” “Anthropic” we understand as “of or relating to human beings or the period of their existence on earth.”⁵ The “anthropic coincidences” refer to physical realities which must be in order for humans to exist.

Theoretical physicist John Barrow and mathematical physicist and cosmologist Frank Tipler wrote perhaps the most influential book on the subject of anthropic coincidences. Barrow and Tipler have their own version of the weak anthropic principle.

*The observed values of all physical and cosmological quantities are not equally probable but take on values restricted by the requirement that there exist sites where carbon-based life can evolve and by the requirement that the Universe be old enough for it to have already done so.*⁶

³ Ibid, p. 15

⁴ <http://plato.stanford.edu/entries/leibniz-evil/>

⁵ <http://m-w.com/dictionary/anthropic>

⁶ Barrow, John D., and Frank J. Tipler, *The Anthropic Cosmological Principle*. Oxford: Oxford University Press, 1986), p. 21.

To clarify this point we can quote at some length from the introduction of Barrow and Tipler's *The Anthropic Cosmological Principle*.

Most biochemists believe that carbon, on which our own organic chemistry is founded, is the only possible basis for the spontaneous generation of life--carbon, nitrogen, oxygen and phosphorus--the simple elements of hydrogen and helium which were synthesized in the primordial inferno of the Big Bang must be cooked at a more moderate temperature and for a much longer time than is available in the early universe. The furnaces that are available are the interiors of stars. There, hydrogen and helium are burnt into the heavier life-supporting elements by exothermic nuclear reactions. When stars die, the resulting explosions which we see as supernovae, can disperse these elements through space and they become incorporated into planets and, ultimately, into ourselves. This stellar alchemy takes over ten billion years to complete. Hence, for there to be enough time to construct the constituents of living beings, the Universe must be at least ten billion years old and therefore, as a consequence of its expansion, at least ten billion light years in extent. We should not be surprised to observe that the Universe is so large. No astronomer could exist in one that was significantly smaller. The Universe needs to be as big as it is in order to evolve just a single carbon-based life-form.⁷

This argument is fairly easy to follow for the the lay person. Other anthropic coincidences are less overtly evident and also have to do with the necessity of certain conditions being present for life to exist; these include the electromagnetic force being 39 orders of magnitude stronger than the gravitational force; the electron's mass being less than the difference in the masses of the neutron and proton; the carbon nucleus having an excited energy level at around 7.65 million electron-volts (MeV).⁸

Physicist Milan M. Ćirković in his numerous discussions of the anthropic principle and quantum theory brings to the table the important consideration that we need to be careful how we speak about topics such as quantum theory. His concerns are of particular interest to any non-scientific community that uses rudimentary understandings of complex theories to construct metaphors to create quasi-scientific prisms with which to comprehend the logic of the world. Ćirković makes the point that casual interpretations can be specious in word and in the mathematical equivalents they unwittingly suggest.⁹ Justification for pursuing lines of thinking influenced by theory seemingly outside of the realms of understanding or relevance to artists, and this author, is that it is exactly the scale of these realms that match the scale of artists' reach. Additionally, if we are moving towards a greater scientific understanding of our universe and our position as observers in that universe then

⁷ Barrow, John D., and Frank J. Tipler, *The Anthropic Cosmological Principle*. Oxford: Oxford University Press, 1986), p. 4.

⁸ Stenger, Victor J., *The Anthropic Principle*, p.2, <http://www.colorado.edu/philosophy/vstenger/>

⁹ Ćirkovic, Milan M., *Physics versus Semantics: A Puzzling Case of the Missing Quantum Theory*, Foundations of Physics, Springer, Netherlands, 2004

that understanding will include a greater comprehension of the role of all observers and actors, including artists.

In trying to determine what is necessary in the universe, in human life, scientists are left facing the problem that though many things are known--about atoms and space for example--they don't know how everything fits together. Still they cannot make live in one room theories of the micro (atomic and subatomic) and the macro (the cosmos, time and space): quantum mechanics and general relativity. All this to say that the jury is still out as to what happens at the beginning and the end, or not, of time and space and, certainly, whether it is possible to have had a Berlin Wall five centimeters higher in this universe. Stephen Hawking has commented on the anthropic principle and M-theory as a means to a unifying theory that would reconcile quantum mechanics and general relativity. In his lecture *Quantum cosmology, M-theory and the Anthropic Principle* given in 1999, Hawking laid out the need for both a broad consideration of the quantum and the anthropic principle.

I will describe what I see as the framework for quantum cosmology, on the basis of M-theory. I shall adopt the no boundary proposal, and shall argue that the Anthropic Principle is essential, if one is to pick out a solution to represent our universe, from the whole zoo of solutions allowed by M-theory. Cosmology used to be regarded as a pseudo science, an area where wild speculation was unconstrained by any reliable observations. We now have lots and lots of observational data, and a generally agreed picture of how the universe is evolving. But cosmology is still not a proper science, in the sense that as usually practiced, it has no predictive power. ... we need a theory of quantum cosmology, if we are to predict the present state of the universe.¹⁰

Hawking reminds that inevitable on the horizon are fundamental and radical changes in the way the cosmos are understood. In discussing the powerful tools physicists are generating to produce further theory, he gives place to the anthropic principle for the reason that it must be the case that all the math adds up to a reality where humans can live and breath.

Our contemporary situation amidst the conundrums of theoretical physics brings us back to Voltaire's *Candide*. We can imagine evolutionary paths for the world and humankind and think further of *Candide's* narrative, and history's narrative, and as to whether deadly earthquakes are necessary and whether murderers and rapists are necessary. We may not be able to determine at the moment if the multiple dimensions of M-theory will lead to big unifying answers or if there are such things as parallel universes but the artists' work in "Five Centimeters Short" stands ready to address the question as to the necessity of atomic holocaust, human bondage, and, even, last night's vicious murders. In the artists' universe it certainly would have been possible for the Berlin Wall to have been five centimeters higher, for things to have been different in the past, and in these creative thinkers' universe it is also possible to influence which of any number of possible futures is the actual future. As we go forward it is helpful to keep in mind that this discussion is not about the "butterfly effect" where the president's having had a bagel instead of a doughnut on a certain morn-

¹⁰ Hawking, S. W., Pritzker Symposium, Chicago, 29 January 1999

ing prevents a third world war. Here we want to discuss the importance of creative thought, of the creative mind intervening in history.

And to return again to the quantum, it is important for this argument to think of Hawking's sometimes collaborator Roger Penrose and his 1989 book *The Emperor's New Mind: Concerning Computers, Minds and The Laws of Physics* where he posits that within the creative mind there is a kind of quantum effect that leads to discovery (i.e. a process not mimic-able by A.I. (artificial intelligence)). The implication is that if as in quantum measurements the result is not determined until the measurement is made (the more you know about momentum the less you know about position, and vice versa) and if the measurement of the same circumstance can be different each time the measurement is made then there is still room for mystery in the world--there is still room for things to go one way or another. There is still the possibility that choices are independent of determinism and that not only is each choice not pre-determined but that each choice could result in a different history. Recently the A.I. crowd would seem to have the upper hand as Penrose's critics¹¹ have become entrenched and computers and programs have become exponentially more powerful and sophisticated, but in the end Penrose and even Leibniz may have the last laugh. Leibniz himself invented an early, and influential, calculating machine. Along with his pragmatism Leibniz was decidedly anti-materialist.

One is obliged to admit that perception and what depends upon it is inexplicable on mechanical principles, that is, by figures and motions. In imagining that there is a machine whose construction would enable it to think, to sense, and to have perception, one could conceive it enlarged while retaining the same proportions, so that one could enter into it, just like into a windmill. Supposing this, one should, when visiting within it, find only parts pushing one another, and never anything by which to explain a perception. Thus it is in the simple substance, and not in the composite or in the machine, that one must look for perception. (...)

Furthermore, by means of the soul or form, there is a true unity which corresponds to what is called the I in us; such a thing could not occur in artificial machines, nor in the simple mass of matter, however organized it may be.¹²

This argument looks similar to John Searle's famous "Chinese Room" thought experiment where he explains that even if a computer could follow a program that would allow it to respond in conversation in Chinese with a Chinese person in a convincing enough way that the person would think the computer another person the computer can still not be said to understand Chinese because a non-Chinese-speaking person could be given the same program and by following the program could generate the same convincing answers but in this case it is clear that the non-Chinese-speaking person will still not understand Chinese, as the computer does not understand Chinese.¹³

¹¹ Tegmark, M. (2000), "Importance of quantum decoherence in brain processes", Phys. Rev. E 61: 4194–4206, doi:10.1103/PhysRevE.61.4194

¹² <http://plato.stanford.edu/entries/leibniz-mind/>

¹³ <http://www.iep.utm.edu/chineser/>

This detour into a discussion of A.I. is not to discount the possibility of the future Raymond Kurzweil¹⁴ sees with super intelligent machines, in need of their own civil rights, but to say that if at some point the evolution of the human race is to collectively lead in a direction decidedly away from horror then we can see hope in the idea that in the intelligence of the human mind, or perhaps also of the machine, there is a chance that a collective beneficent spark is going to flash. Penrose believes that “the hallmark of consciousness is a non-algorithmic forming of judgments.” Here we get to the heart of the functioning of the creative mind whether in the service of art or science. Penrose includes a number of examples of these moments of realization where a complex problem is solved in a sudden realization (referring to his own discoveries, Henri Poincaré’s and other notables’)--he uses these example of the experience of famous scientists to support his argument that these moments where complex, multi-faceted, long considered problems are solved instantly, often while the scientist is doing something mundane with thoughts elsewhere (crossing a street, boarding a bus), are related more to a kind of quantum effect than the resolution of a computer program’s algorithm.
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The full title of Voltaire’s work is *Candide, ou l’Optimisme*. False optimism about the perfection of a violent, harsh world is to be ridiculed and action seems to be the one tool Candide has in overcoming trial after trial he encounters. In *Candide* this action evolves from first the reactionary fight for one’s life to then the more considered cultivating of a planned garden. Before we start comparing artists to gardeners we can let Beuys have another word. He addresses--in speaking again on the subject of the Berlin Wall--the subject of what Voltaire saw was missing and what has always been missing.

*Quintessence: The Wall as such is totally unimportant. Don’t talk so much about the Wall! Establish through self-education a better morale in mankind and all walls will disappear. There are so many small walls between you and me.*¹⁶

With the Wall now long gone and the importance of celebrations of its absence uncertain, this consideration of Beuys’ fundamental relocation of the importance of discussing walls is doubly welcome. Further, it is fundamental to our discussion as to what it is possible for the mind to change. The question returns to the problem of determinism. First, is the kind of quantum thought Penrose discusses possible, and if so is it optional? Are important creative advances, again in any science, art or field, inevitable? And if they are not inevitable can a creative moment, can you, change the course of future history? Can we manifest “a better morale in mankind?” Of course, we cannot

¹⁴ <http://www.kurzweiltech.com/aboutray.html>

¹⁵ Penrose, Roger, Martin Gardner. *The Emperor’s New Mind: Concerning Computers, Minds, and the Laws of Physics*, Oxford University Press, 1999. PP. 533, 541.

¹⁶ Adriani, Götz, Winfried Konnertz, and Karin Thomas. *Joseph Beuys: Life and Works*. Translated into English by Patricia Lech. Woodbury, New York: Barron’s Educational Series, Inc., 1979.

check. We cannot control time, cannot compare multiple timelines forking from a common point. We cannot know if something beneficent could have happened or, conversely, did happen. But we can surmise, or hope.

In Robert Penn Warren's great American novel *All the King's Men* the narrator reassesses his determinist inclinations after listening to the deathbed words of an assassinated politician-- importantly, a politician of dubious moral character.

The eyes turned toward me again, very slowly, and I almost thought that I could hear the tiny painful creak of the balls in their sockets. But the light flickered up again. He said, "It might have been all different, Jack."

I nodded again.

He roused himself more. He even seemed to be straining to lift his head from the pillow. "You got to believe that," he said hoarsely.¹⁷

The narrator is left considering that it might actually have been possible that things might have been different. In this case, given the corruptness of the politician, that this insight came to him via a man of decidedly worse morale made it an ambivalent indicator of hope. In Warren's narrative "different" may not have lead to a "better morale," but it at least allows for the possibility. If creative thinkers' thoughts are capable of manifesting the "different," we end with the thought that artists are harbingers of the kind of thinking that could lead to a collective realization of a "better morale."

This analysis brings us just to the point of starting to look at the works of the artists of "Five Centimeters Short." Each artist presents worlds where "lack" is largely present. One cannot but imagine that if circumstances were indeed different in the world these artists would offer up different narratives, different works. Likewise, one sees through the works a past that could have been different and a future that can be different. It would be a bleak imagination, even in accepting an anthropic viewpoint where so much "must be," that reduced the production of art to an act of role play, where the artist is a recurring actor in an infinitely predetermined role. Voltaire, Penrose (with his relationship between the quantum and the inventive), and even Leibniz might ultimately side with Warren; artists' imaginations don't live in the world of the necessary, of the predetermined. Artists don't make work to tell you what happened; they don't make work to explain their time; they don't make work to discuss what might have been. Artists seek to realize quantum flashes of imagination as transformative communications.

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California, 2010

¹⁷ Warren, Robert Penn, *All the King's Men*, 1946