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The Sunset of the Alchemy of Uncertainty

By Michael Lee

“Thus the centre of the system of the world is immovable.”
Isaac Newton *Principia Mathematica* (Book 111) (1687)

Gradually, the medieval practices of the alchemists gave way to the modern discipline of chemistry, bringing priceless benefits to medicine and to industry, through the increasing application of strict scientific principles advocated by pioneering thinkers like Galileo, Kepler, Bacon and Descartes.

Today, we're on the brink of another sea-change in thinking whereby the popular intellectual alchemy of uncertainty, based on a misconception that life is fundamentally random, is destined to fade away and be replaced by a new modernism adopting a scientific approach to the future of society.

While there have always been advocates in the field of philosophy and epistemology arguing for the inherent uncertainty of knowledge and of life, from the skeptics of Ancient Greece through to David Hume and then the angst-ridden twentieth-century existentialists, it was the post-modernists who finally turned uncertainty into a mainstream art-form and dominant ideology in academia. Their anti-scientific deconstructionism gained moral and intellectual traction in the wake of an underlying pessimism about progress resulting from twentieth century catastrophes of two world wars, the Great Depression, the Cold War and numerous genocides.

In addition, the new concepts in physics of relativity and quantum uncertainty were applied out of context in the fields of philosophy and art, providing the ill-gotten licence for cultural relativism.

Einstein had originally wanted to call his new theory of the universe the Invariant Theory because it was based on the absolute, unwavering cosmic speed limit of light. Meanwhile, quantum physics was talking about the tiniest, weakest of particles which have totally different dynamics from the physics of macroscopic and planetary bodies. In the universe as a whole, both time scales and space scales are unimaginably huge, in comparison to which quantum uncertainty looks like a sub-atomic storm in a microscope. In addition, applying the uncertainty principle, willy-nilly, to philosophy, fallaciously transfers knowledge from one domain to another without proper contextualization.

In short, physics never intended to hand society and culture a licence for radical uncertainty or universal relativism. Einstein had come to dethrone Newton, not to bury him.

Society today, faced with global scale problems like climate change, environmental degradation, depletion of natural resources, Peak Oil and the new slave trade of human trafficking, can ill-afford much more of this deconstructionist post-modernism. The world was so thoroughly deconstructed in the twentieth century - ethically, socially, philosophically and politically - that it's just about ready to collapse altogether.

Fortunately, now is the time for the sunset of the post-modernist alchemy of uncertainty. The deconstruction of deconstructionism is overdue. It is science, not ideology, reason, not scepticism, which is most likely to provide solutions for our current global ills.

While the scientific method and the application of scientific knowledge in fields like engineering, medicine and business have produced technological, industrial and social progress, ideology, by contrast, has always led to war. Think of the religious wars in pre-modern Europe. Think of the destruction caused by the conflicts between the competing ideologies of communism, fascism and capitalism throughout the previous century. Think of today's asymmetric war between the West and radical Islam. Ideology is a force keeping civilization in a mind-set of inflated philosophical pretensions. Unless kept in check, ideology is inherently conflictual and should perhaps be consigned to the private sphere of life where it can be practised safely. Furthermore, it creates bias and blind-spots in thinking when we view social problems.

Ideology is a great pastime for individuals but history has proven it to be a lethal social virus at the state level. Can we please finally get it that there is freedom of belief in this world and that to try to systematically impose beliefs on others at the national or international level is chasing an impossible dream?

We live on an extraordinary earth but its future is being seriously endangered by this misguided and mischievous machismo politics of medieval-style ideology-mongering. The thought-police of political correctness should also take a very long holiday. What we need is the clarity, truth and common-sense of a scientific approach to our future. The beauty of science lies in its pure commitment to truth, the proven laws of our wondrous world. The power of science lies in its freedom from ideology in dealing with problems and in looking for solutions.

In all societies people will always believe differently. But they all need the same food and water to live, the same education to help them to think well and to become wiser. And they all face common problems related to the environment and to the economy. Hence the need for an ideology-neutral approach to public matters. Science, in my view, is the only framework we have for adopting a common approach to social and environmental problems, for producing efficient results with efficient processes, for applying effective methods to live effectively.

The problem with uncertainty, and with post-modernist deconstructionism as a whole, is the capacity they possess for incubating fear and ignorance of the future. In the long-run, it could be argued that these two off-shoots of uncertainty gradually undermine our evolutionary social progress towards both freedom and security for the world. Fear and ignorance can, and do, lead to brainwashing and state-dependence of populations.

Science, by contrast, promotes freedom through independent thinking and security through its search for certainty and practical solutions to common problems (which tend to work because they are based on knowledge of the laws of reality).

By contrast, what are the fruits of uncertainty for society?

In my view, the scale of uncertainty in our world has been misconceived. It's important to pin down exactly how much of existence is really beyond the powers of our current knowledge, including what we can know about the future. This approach would effectively challenge many of the assumptions of popular merchants of uncertainty who have exaggerated its role in human life and in nature.

The great formulae developed by science over the centuries to explain the laws of nature, motion and energy, such as $F = ma$, $E = mc^2$ and Einstein's equations describing how gravitation occurs as a result of space-time being curved by matter and energy, provide such overwhelming evidence of the world's hidden universal order that it seems logical to call this knowledge certainty. The principle of natural selection in the animal kingdom is universally true and qualifies as certain knowledge.

A brain surgeon friend of mine pointed out how his profession relies on standard human anatomy. As he explained to me, beneath the superficial cosmetic differences, human anatomy is pretty predictable with only relatively minor variations. He added that surgery would be virtually impossible if this anatomical predictability did not exist.

It's not only laws of nature, often expressed in precise mathematical relations which convey a requisite level of certainty. Universal factual knowledge is also certain. There's a double helix structure to DNA. The sun is the center of the solar system and all bodies in it gravitate towards it, with the force of gravity being measurable according to the distance from the body's center. The regularities in the operations of the solar system can be illustrated by the observation that Halley's comet appears in intervals of 575 years. That's pretty regular cosmic behavior.

The Standard Model of particle physics¹ is an edifice of certainty, a mathematical description of the twelve fundamental particles and three forces (omitting gravity) governing the operations of the building blocks of matter. However hard science has tried to disprove the Standard Model, no experimental evidence has yet been found to contradict it. So it's been called a theory of "almost everything". As the best and most experimentally validated model of the subatomic world, it shows there's an order underlying the uncertainty of behavior at this most microscopic level of existence.

So please if you will have a very close look at this coffee mug in Figure 1.

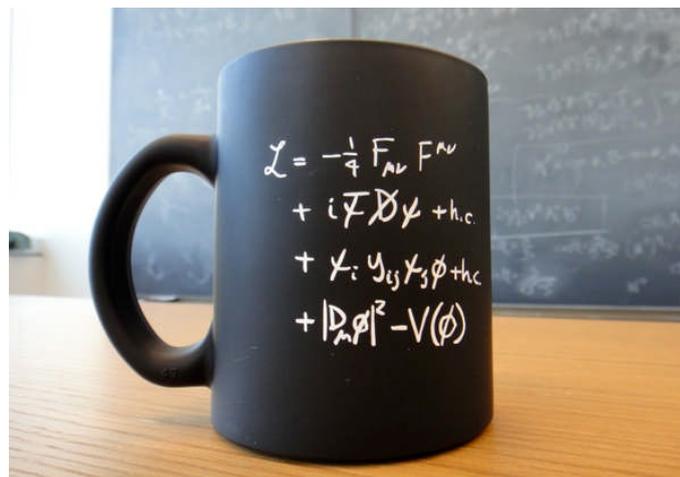


Figure 1: The Standard Model Lagrangian on a coffee mug
(Source: Quantum Diaries www.quantumdiaries.org)

¹ It's a theory about electromagnetic, weak, and strong nuclear interactions, which impact the dynamics of subatomic particles. The Standard Model explains how the basic units of matter interact, governed by these forces. It's a result of the work and discoveries of thousands of physicists across the world since the 1930s. Developed in the early part of the 1970s, it has been vindicated by countless experimental results, becoming a thoroughly tested physics theory. See <http://home.web.cern.ch/about/physics/standard-model>

This cool looking coffee mug marks the end for me of the reign of uncertainty in post-modern human thought.

On it is the Standard Model Lagrangian, the equation explaining mathematically the dynamics of the model's complex system of interactions of particles within the major physical forces of the universe. Along with many other advances in the understanding of the physical world, from the Copernican revolution to the discovery of the Higgs Boson, the Standard Model of Particle Physics symbolizes for me that the tipping point has been reached when science has finally silenced the cultural relativists who hated it by providing a body of hard-fought formulae and natural laws that literally explain "nearly everything".

Oh, yes, and if that weren't enough, the human genome happens to have been decoded as well. That's another marvelous scientific milestone. This immense collaborative project was completed a decade ago in April 2003.

I'm bedazzled by the scope and depth of the accumulated knowledge of science in laying bare how reality works, from our cosmic origins to the intricate creative work of DNA in replicating and producing life forms from its beginnings in tiny single cells. It's simply nonsensical, perhaps even self-indulgent, to wallow in uncertainty when we have built this library of proven human knowledge, when we have established scientific and logical methods at our disposal to effectively spearhead further social, industrial and technological progress.

In addition to this wealth of certain scientific knowledge, principles of thought such as the *cogito ergo sum*, and of logic, such as the laws of probability, have attained a level of universality that deserves to be seen as certain.

I would define certain knowledge of this kind as information or principles which are clear, comprehensive, convincing and confirmed.

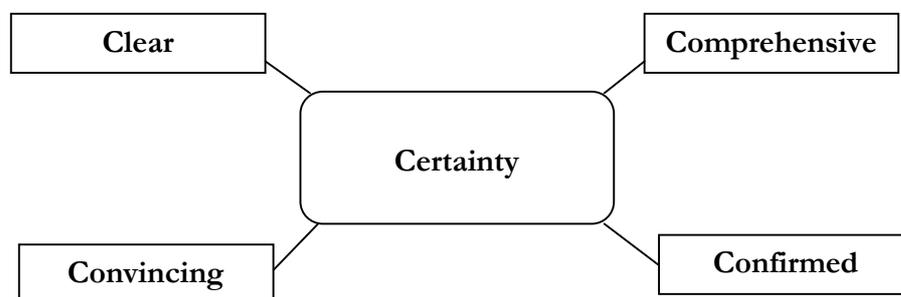


Figure 2: Four criteria for certain knowledge (© Institute of Futurology)

Knowledge is clear if it has been logically defined using scientifically understandable terms. It is comprehensive if it makes sense according to a body of existing knowledge about the world. It is convincing if counterarguments consistently fail to undermine the truth claims made about it. And it is confirmed if substantial evidence supports it. Certain knowledge of this kind will stand the test of time.

Whereas certainty breeds confidence and independence, and encourages investment in the future, uncertainty breeds doubt and fear. Doubt and fear generate a thought climate conducive to both radicalism and, at the opposite extreme, excessive government control and propaganda. Gripped by fear and uncertainty, people can turn to extreme so-called solutions for seemingly desperate situations. Or they can fall into despair and paralysis.

Two recent best-selling books have flown the flag of uncertainty in our time in mainstream culture. *The Drunkard's Walk: How Randomness Rules our Lives* (2008) by physicist Leonard Mlodinow was a New York Times notable book of the year and was named "one of the 10 best science books of 2008" on Amazon.com.² *The Black Swan: The Impact of the Highly Improbable* (2007) by the epistemologist Nassim Nicholas Taleb spent 36 weeks on the New York Times best-seller list.³ Since I wrote a critique last November of Taleb's book on Black Swan events, entitled "Shock-testing the Black Swan Theory" (see <http://www.wfs.org/blogs/michael-lee/shock-testing-black-swan-theory>), I'll illustrate some of my rebuttals of uncertainty by referring more in this article to Mlodinow's book.

Uncertainty is certainly popular. Its effects are widespread. But just because something is popular and prevalent doesn't make it right or even accurate.

In my view, post-modern Western culture today is shot through with deconstructionist, anti-scientific thinking which is conducive to cognitive acceptance of this reign of randomness I'm challenging. The roots of uncertainty, as I've indicated, go back a long way, as Bacon explained in his ground-breaking work *The Advancement of Learning*: "It was not, therefore, without cause, that many of the ancient philosophers, and some of them eminent in their way, became academics and sceptics, who denied all certainty of human knowledge, and held that understanding went no further than appearance and probability."⁴ Bacon outlined a comprehensive methodology for reforming the pursuit of modern knowledge, laying the groundwork for the emergence of scientific empiricism and its evidence-based truths which, in turn, have helped create the modern world.

² http://en.wikipedia.org/wiki/Leonard_Mlodinow

³ [http://en.wikipedia.org/wiki/The_Black_Swan_\(Taleb_book\)](http://en.wikipedia.org/wiki/The_Black_Swan_(Taleb_book))

⁴ p.187

Mlodinow's *The Drunkard's Walk: How Randomness Rules our Lives* is a very good read but Keynes himself did a much better job of describing the theory of probability in his classic 1920 work *A Treatise on Probability*. Make no mistake, many truths are currently probabilistic, as Mlodinow argues. However, he presses his analogy too far in saying "randomness rules our lives". From the solar system to the functioning of the body, from the evolution of stars to the evolution of societies in history, it's regularity that rules, with random events being the exception that proves this rule. It's illusory to believe that randomness rules humanity and nature. Randomness, rather, seems to indicate behaviour we don't yet understand. The march of science turns today's mysteries into tomorrow's certainties with the cumulative advance of knowledge.

It's interesting that Mlodinow has to employ extreme examples to illustrate his hypothesis about randomness ruling human life, from the role serendipity played in the careers of Bill Gates and Bruce Willis to the chaos of the Holocaust. His examples do show the role of luck and coincidence but they are unusual cases he has chosen which indicate that serendipity is the exception, not the rule. He won't find many examples of randomness ruling daily life because that is unequivocally governed by regularity, not randomness. Nevertheless, it's true that we always need to take into account the surprise factors that seem to emerge from nowhere and cause substantial ripples in our lives.

Mlodinow's book is light on theory and strong on anecdote. That's because one cannot turn the theory of probability into a view of the world. Probability is an aspect of logic and epistemology but it does not enjoy priority over the laws of nature. Would America have achieved a successful pinpoint landing on the moon in 1969 at first attempt if randomness ruled rather than regularity? Would there be robot explorers on Mars now? Could we even enjoy a daily life at all if there were no regularity in the universe? Unfortunately for Mlodinow's arguments, science has successfully modelled the universe only because it has a hidden order. It is categorically not overwhelmed by randomness.

We have developed sufficient knowledge of how things work to use prediction in a scientific way. I'm sure in time we'll reduce uncertainty on an industrial scale. Our aim in advancing knowledge is to obliterate the random. What, after all, is uncertainty? Something is happening for which there is no reason, or meaning, and which cannot find a place within our current knowledge of the world? That point of view simply won't wash in a world that can decode the human genome, formulate laws of energy, motion and light and map out the master equation of physics.

Conclusion

Regularity rules, not randomness, as evidenced by the hidden order of the universe extensively modelled by science. Uncertainty has been exaggerated in our culture for several important historical and philosophical reasons but has now overshot its sell-by date as a doctrine. For physics never handed society a licence for universal relativism and pervasive theoretical uncertainty.

In my view, the reign of uncertainty ended with the establishment of the Standard Model for particle physics and the decoding of the human genome whereby a tipping point has been reached in favour of the power of the scientific method for comprehensively understanding the world. The twentieth century, fuelled by heady yet fuzzy competing ideologies, deconstructed the world on a vast scale. The sad, post-modernist legacy is a planet and world teetering on the brink of collapse.

Therefore, an ideology-neutral scientific approach to the future is an idea whose time has surely come.

It's the new rational approach to hope.

Acknowledgments & websites

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