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“Shock-testing the Black Swan theory”

By Michael Lee

Adopting a satirical tone, self-confessed sceptic Nassim Nicholas Taleb’s bestseller *The Black Swan* ridicules the idea of predicting the future. Instead, he argues that the world is dominated by the impact of rare, unforeseen, random, highly improbable and yet influential events. These Black Swans, he says, happen abruptly, coming from outside the range of our vision. Examples would be the rise of Hitler, the sudden fall of communism in 1989, 9/11, the stock market crash of 1987, the global credit crisis of 2008, the emergence of Islamic fundamentalism on the global stage and the Lebanese civil war (1975-1990) which the author experienced firsthand at the age of 15 (and which I’m sure influenced his worldview). Such events, his argument goes, are characterized by low, or non-existent, predictability yet large impact: “It is easy to see,” he claims, “that life is the cumulative effect of a handful of significant shocks.”¹

It’s a pity that Taleb, while developing this idea, didn’t bother to consult the knowledge base of future studies and that he appears never to have encountered a single accurate, methodologically sound prediction. In addition, he doesn’t even mention the dynamics of time – and how phenomena behave over time - in *The Black Swan*.

¹ Taleb, N.N.2007. *The Black Swan – the impact of the highly improbable*. London: Penguin Books. xxiii.

When I realized this, I began to wonder just how robust the Black Swan theory really is. Would its central hypothesis, I asked myself, survive rigorous logical analysis?²

Let's get started with our shock-test. To begin with, take a copy of *The Black Swan*. Turn to the index. Look under 'T' for references to time, or under 'S' for entries on space-time. Nothing. For a book about prediction, it's strange that there's zero discussion of time in it. The future, by definition, is a phase of time. And predictions are propositions about the future. How can an author talk with authority about predictions, whose content is located in the future phase of time, without any reference to what time is and how it works according to contemporary physics and philosophy? This omission immediately raises a concern about the underlying philosophical soundness of the Black Swan theory which proposes that life is dominated by uncertainty.

Nor do the names of any recognized futurists appear in the book's index, such as Herman Kahn, Peter Schwartz, Wendell Bell, James Canton, Edward Cornish, Richard Slaughter, Sohail Inayatullah, Jamshid Gharajedaghi, Michio Kaku and even Bruce Bueno de Mesquita who uses game theory very effectively to predict contemporary political outcomes. And where are the names of modern historians, too, who interpret the underlying patterns driving history?

By the same token, Taleb's treatment of epistemology and of the current state of human knowledge shows no respect for the theory of knowledge or for over three centuries of priceless knowledge accumulated since the Enlightenment. Scientific knowledge, in particular, has played a major role in fuelling social progress and advancing technology. Without it, there would not have been a modern world.

² Shock tests are used to measure the fragility or robustness of products by checking how they respond when subjected to impacts/attacks.

Taleb, by contrast, seems gripped by an anti-epistemic fervour centred on the *idée fixe* (“my single idea”) that life is fundamentally unpredictable, subject to the overwhelming impacts of random events and behaviour. He believes that for centuries knowledge has been locked up in “two dimensions too simplistic to be of any use outside of classrooms.”³

The Black Swan, then, does not talk about the future or the physics and philosophy of time. Nor does the book draw on the knowledge base of futures studies or touch on the theory of history. In addition, the book fails to provide any discourse of substance on epistemology and the social contribution of science and knowledge. The book’s theoretical underpinnings for contextualizing and talking about predictions are surprisingly superficial.

The author’s writing style in *The Black Swan* is energetic, challenging and colorful and yet, on closer examination, is replete with non-sequiturs, unproven assumptions and exaggerated generalizations. In short, his language is rhetorical. Content is king, though, so let’s go ahead and test the substance behind the book’s strong language and forceful opinions as part of our shock-test.

Generalizations from the text include statements like: “A small number of Black Swans explain almost everything in our world, from the success of ideas and religions, to the dynamics of historical events, to elements of our own personal lives.”⁴ My response to this extreme opinion is: did you just say “a *small number* of Black Swans explain *almost everything* in our world” (my italics)? To quote John McEnroe: You can’t be serious!

³ Ibid, p.349.

⁴ Ibid, p.xxii.

Let's take the rise of Hitler to power, for example. Anyone reading *Mein Kampf*, published in 1925-6, would not have been surprised by *any* of Hitler's policies. He plotted his ascent to power and what he would do when he got it for well over a decade in full public view. As a monomaniac, he never deviated from the principles, ideas and plans openly explained in *Mein Kampf* back in the 1920s. In the end, his planned Thousand Year Reich, despite the almost superhuman will he imposed on events, lasted all of eleven years, a whopping 989 years short of the time-span of his crazy dream. Historians know there are bigger, underlying forces at work determining history's course, including economic conditions, international relations and competition for resources. Hitler's rise and fall did not occur in a socio-historical vacuum. To say that a handful of Black Swans explains almost everything in our world is always going to be shown up as an oversimplification.

Speaking of war, Taleb asserts with his customary zeal: "wars are fundamentally unpredictable".⁵ Really? Listen to the words of Winston Churchill when he addressed the British parliament in April 1933: "...as surely as Germany acquires full military equality with her neighbours while her own grievances are still unaddressed and while she is in the temper which we have unhappily seen, so surely shall we see ourselves within a measurable distance of the renewal of general European war." Six years later, on 1 September 1939, Germany invaded Poland. It is thought some 60 million people died in the war that followed. As a student of history, Churchill correctly read the signs of coming war and made this accurate prediction in parliament.⁶ Tragically, his warning fell on deaf ears.

This example shows that it is untrue, as Taleb alleges, that wars cannot be predicted. Sometimes wars are planned for months, if not for years. There is a war currently building up in the Persian Gulf, for example. Another one is brewing in the Middle East.

⁵ Ibid, p.xxiv.

⁶ Just as Churchill's prescience resulted in part from his insights as a fine historian, so one of the world's greatest investors, Warren Buffett, is considered a student of financial history.

The way in which Churchill used historical insights to help him reach his correct conclusion in 1933 that a Second World War was imminent shows that history is one of the most important guides for understanding the future. I disagree with Taleb that we cannot derive general knowledge from history.⁷ Although I do agree that there is an “asymmetry between past and future”⁸ in the sense that the two phases of time are by no means identical, I don’t think there can be any radical, or complete, separation or discontinuity between history and the future. Time, after all, is essentially a linear, evolutionary medium as shown by the arrow of time in physics and by the character of cosmological time. There is both literal continuity between the past, present and future in one continuous physical time as well as continuity of evolutionary patterns over time. So it does not make sense to postulate the kind of radical asymmetry between history and the future we see in the Black Swan ideology.

On the basis of his unproven and untenable idea of an absolute asymmetry between past and future, Taleb goes on to generalize about our mental block about the future, comparing what he calls our inability to comprehend uncertainty to autism.⁹ He says we have future-blindness. Yet we have seen that the author has made no effort in *The Black Swan* to understand the history, theory, methods and principles of futures studies. Nor does he show any understanding of the properties of time illustrated by physics. He shows scant regard for history.

⁷ Ibid, p.199.

⁸ Ibid, p.193.

⁹ Ibid, p.194.

Taleb also posits that technological innovation, like war, is “fundamentally unpredictable”.¹⁰ Although it’s true that some discoveries and inventions have resulted from serendipity or good luck,¹¹ such as Fleming’s discovery of penicillin, there are sufficient examples of accurate technological forecasts to disprove Taleb’s assertion. In 1901, H.G. Wells, for example, the science fiction writer and world’s first real futurist, wrote *Anticipations*, the earliest attempt at a scientific study of the long-range social future. In it, he correctly predicted the motorization and suburbanization of twentieth century society, a few years before Ford’s Model T began to be mass produced in 1908 and long before the development of the suburbs made possible by new road systems. In the book Wells also predicted the advent of aircraft and suggested that telephony would revolutionize communication and eventually lead to the invention of telephone shopping. Both Jules Verne and Wells speculated that mankind would reach the moon using rocket power several decades before the dream became reality in 1969 with the Apollo 11 manned moon landing.

In 1967, Herman Kahn and Anthony Wiener published a book entitled *The Year 2000* with the descriptive sub-title *A Framework for Speculation on the Next Thirty-Three Years*. (Incidentally, Herman Kahn was the futurist from the Rand Corporation who was caricatured in Stanley Kubrick’s 1964 black comedy *Dr. Strangelove or: How I Learned to Stop Worrying and Love the Bomb*. The character representing Kahn was played by Peter Sellers.) Its authors correctly predicted “extensive and worldwide use of high altitude cameras for mapping, prospecting, census, land use and geological investigations” (think Google Earth) and “automated, universal (real time) credit, audit and banking systems” (think of the worldwide network of 2,3 million ATMs, the first of which was installed in London in the year the book was published).

¹⁰ Ibid, p.171.

¹¹ Many inventions are the result of blood, sweat and tears, not luck.

These examples of successful technological predictions show that Taleb's statement that technological innovation is unpredictable is untrue. We still live in the motorized, suburbanized world predicted by H.G. Wells in 1901. Besides, the long wave theory of economic development, propounded by Nikolai Kondratieff and Joseph Schumpeter, for example, places innovation within economic cycles of "boom and bust" which average 50-60 years in duration.

Schumpeter's highly credible and time-tested theory of creative destruction places a high premium on innovation as a driving force of capitalistic economies. There is a theoretical background of long-term regularities in economic behaviour which provides a framework for understanding the patterns of innovation and for making technological predictions. In addition, there's a wealth of historical data and theoretical principles about technology itself which have improved our ability to predict technological developments. When Taleb states "almost everything of the moment is the product of serendipity"¹² he is, once again, exaggerating.

Although Alexander Fleming stumbled accidentally upon the magical properties of penicillin in 1928, he possessed the collective scientific knowledge of the day to exploit the opportunity serendipity had presented to him. This unplanned discovery was then thoroughly and systematically exploited by science. The "exception" (finding something out by accident) was validated by the "rule" (scientific methods). The same principle applies to the so-called "accidental" discovery of cosmic background radiation.

¹² P.166.

For the above reasons, I question the logic of the view in *The Black Swan* that it's impossible to predict technological and scientific innovations: "Prediction requires knowing about technologies that will be discovered in the future. But that very knowledge would almost automatically allow us to start developing those technologies right away. Ergo, we do not know what we will know."¹³ H.G Wells forecast the motorization of society, the advent of airplanes and the landing on the moon but he did not have the will, the money, the expertise nor the inclination to develop those technologies himself. The theoretical knowledge required to make a technological prediction does not necessarily and automatically lead in practice to its immediate invention or development. So the conclusion in the above argument does not follow from the premise. It's a non-sequitur.

Taleb has a penchant for indulging in unsubstantiated and misleading generalizations: "*Almost everything in social life* is produced by rare but consequential shocks and jumps"¹⁴ (my italics) and "our world is *dominated* by the extreme, the unknown, and the very improbable"¹⁵ (my italics). But unexpected Black Swan events are rare *because* they are the exception. That is why there will always be many more typical events than extreme ones. The ordinary daily lives of billions of people on earth in over two hundred countries go on just as they have done for generations and societies continue to develop and evolve even as they absorb the impacts, often tragic, of shock events. This is because underlying conditions that really determine the course of history persist as extreme events get absorbed into the big evolutionary picture of nature and society. The statement "almost everything in social life" above is therefore an example of hyperbole.

¹³ Ibid, p. 173.

¹⁴ Ibid, p.xxix.

¹⁵ Ibid, p. xxxii.

Nor is the world “dominated” by the unknown as suggested by Taleb. It would be closer to the truth to say the world is “challenged” from time to time by the unknown. His assertion that the world is dominated by the unknown underestimates the power of the body of knowledge humanity has built up about the behavior of both nature and society.

The book contains several non-sequiturs in addition to its generalizations. For example, he states “if you believe in free will you can’t truly believe in social science and economic projection. You cannot predict how people will act.”¹⁶ There is no logical bridge between the premise – belief in free will – and the conclusion – social science and economic projection can’t work. Free will does not exclude the fact that some of human life is predetermined. We can only decide to play the cards we have been dealt. Nor does free will necessarily eliminate predictability in human behavior. And individual free will does not preclude the fact that on a social level, many conditions and trends are beyond the control of the individual. We’re actors in a play we didn’t write. And game theory has been successfully used to make predictions of how human beings behave in group contexts, since they tend to act strategically in their self-interest.

Another example of a non-sequitur is Taleb’s argument “The inability to predict outliers implies the inability to predict the course of history, given the share of these events in the dynamics of events”.¹⁷ The conclusion – that history is unpredictable – does not follow from the premise - that we cannot predict “outliers” (things outside of our current range of vision and understanding).

¹⁶ Ibid, p.184.

¹⁷ Ibid, p. xxiv.

Taleb has not demonstrated what share outliers actually play in determining historical events. There is a hidden assumption that outliers determine history. But he never measures the influence of underlying socio-economic and historical conditions compared to the impact of apparently random and isolated events in the short, medium and long terms. Ergo, I don't think he has earned the logical right to draw the conclusion that the course of history is unpredictable. Even the assumption that outliers are impossible to predict under all circumstances, is itself questionable and has not been validated in the text.

But Taleb goes further and states, as the tone of his book deteriorates, that those who don't agree with him that the course of history is unpredictable suffer from a "pathology of thinking"¹⁸.

Despite failing to provide an adequate theoretical and philosophical foundation for the Black Swan ideology, the author continues to claim that those who do not share his view of history and the future are deluded: "...we are just a great machine for looking backward...humans are great at self-delusion."¹⁹ We are "self-deceit machines".²⁰ He says "I felt in my spine the weight of the epistemic arrogance of the human race."²¹ He laments "our crippling shallowness".²²

Although he never conducted proper discourse on epistemology and the social role of our human knowledge, Taleb speaks in sweeping terms of the "epistemic arrogance of the human race...we are demonstrably arrogant about what we think we know."²³ Bizarrely, he even calls for a society governed on the basis of ignorance, not knowledge.²⁴ In my view, this is a counsel of despair, the recipe for dystopias.

¹⁸ Ibid, p. 9.

¹⁹ Ibid, p.12.

²⁰ Ibid, p.173.

²¹ Ibid, p.17.

²² Ibid, p.81.

²³ Ibid, p.136.

²⁴ Ibid, p.192.

Such Olympian generalizations about humanity and our collective body of knowledge are not useful. On the contrary, they sound hollow and patronizing. His sustained attack on knowledge in the book is biased and heavily sceptical: “Black Swan logic makes *what you don’t know* far more relevant than what you do know.”²⁵ He speaks of the “scandal of prediction” and of our “unknowledge of the future”²⁶. Although it’s true that we do tend to underestimate uncertainty, by reducing the “space of the unknown”²⁷, we would not have been able to accelerate social and technological progress in the modern era without a significant and effective body of validated, scientific knowledge at our disposal. Just as the “typical” seems to predominate over the “a-typical” in both nature and society, so the body of our knowledge is much, much more relevant and effective than what we do not yet know or our “unknowledge”.

It is not surprising that the author attacks scientists, especially social scientists, given that science has a demonstrable and sustainable body of knowledge of laws of nature and social evolution, based on decades, and even centuries, of observation and evidence pointing to an underlying (but not absolute) regularity in the behaviour of the universe and in history which flatly and overwhelmingly contradicts the “findings” of the Black Swan theory about the dominance of unpredictability (the “oversize role of extreme events in many domains of life”²⁸).

²⁵ Ibid, p.xxiii.

²⁶ P.135-6.

²⁷ P.140.

²⁸ Ibid, p.xxi.

Taleb calls economic forecasters and predictors in social science “mere entertainers”²⁹ and refers to the “need to downgrade ‘soft’ areas such as history and social science to a level slightly above aesthetics and entertainment, like butterfly or coin collecting.”³⁰ The economics establishment, he says “is still ignorant of the presence of complexity, which degrades unpredictability.”³¹ He calls scenarios, one of the most influential tools of futurists, “suckers’ methods”³². He describes the bell curve as a “a great intellectual fraud”³³ despite the fact that M.King Hubbert successfully used it to predict both the peak of US oil production and global Peak Oil in two of the greatest predictions of the twentieth century.

It is regularity in behaviour in both nature and society and the evolutionary continuity of time which are the concepts most likely to kill off the Black Swan hypothesis in our shock-test.

Knowledge of the world accumulated by science is based on the premise that there is sufficient regularity in nature to permit it to be modelled in theoretical terms. Recently, Professor Stephen Hawking stated categorically: “The universe is comprehensible because it is governed by scientific laws; that is to say, its behaviour can be modelled.”³⁴

What this means is that the physical world is subject to proven laws: “...we appear to need only a handful of laws to explain pretty much all of physics....We currently have a theory that is demonstrably proven, after a vast and painstaking effort by thousands of scientists around the world, to work across a very wide range of phenomena.”³⁵ The lawfulness of nature, in other words, allows science to develop models explaining reality.

²⁹ Ibid, p.203.

³⁰ Ibid, p.171.

³¹ Ibid, p. 359.

³² Ibid, p.372.

³³ P. xxxiii.

³⁴ Hawking & Mlodinow The Grand Design (2010) 87.

³⁵ Cox & Forshaw, Why does E=mc²? (2009) 173.

More specifically, nature has been shown to operate through a few basic laws and forces: “These four forces [gravity, electromagnetism, the strong nuclear force and the weak nuclear force] act between just twelve fundamental particles to build everything in the world we can see.”³⁶ There is a ‘unified fabric of law’ as well as ‘an extremely rich and diversified structure’ in laws of nature.³⁷

The master equation of physics, called the Standard Model of Particle Physics, testifies to the degree to which physics has mapped out the underlying laws governing nature. This master equation’s function is “to specify the rules according to which every particle in the entire universe interacts with every other particle (except it does not account for gravity)... Figuring out the master equation is without doubt one of the great achievements in the history of physics.”³⁸ The models physics has developed and proven to explain nature are the basis for making predictions about future behaviour conforming to scientific laws.

Secondly, in addition to the concept of regularity and lawfulness of nature, we need to take account of what leading cosmologists and Big Historians say about the underlying patterns of evolution throughout cosmic and human history : “in my view pure chance does not exist in reality, because everything is influenced by everything else either directly or indirectly... From the viewpoint of big history, it may therefore be argued that the increase of complexity over time would have led to a corresponding decrease of pure chance events.”³⁹

³⁶ Cox & Forshaw, *Why does E=mc²?* (2009) 62.

³⁷ Bohm, *Causality and Chance in Modern Physics* (1957) 30.

³⁸ Cox & Forshaw, *Why does E=mc²?* (2009) 175.

³⁹ Fred Spier, *Big History and the Future of Humanity*. Chicester: Wiley-Blackwell. 2011.19.

Again, Big Historian Fred Spier, explains: “It has often been argued that the emergence of life would have been very unlikely had it been based solely on chance encounters of atoms and molecules. The process leading to life must, therefore, have been the result of several highly constrained, or channelled, processes...”⁴⁰ Spier talks of a spontaneous process of self-organization kicking in leading to the emergence of life.⁴¹ The evolution of life is dominated by steady orderly progress according to the laws of life, not by randomness.

While it would be wise to take note of Taleb’s central idea that asymmetric (i.e. a-typical and totally unexpected) outcomes need to be taken into account in trying to understand the future, this idea is nowhere near strong enough on its own to constitute a theory of knowledge. On the contrary, proven regularities of behaviour in nature and in society, expressed in scientific laws, form the basis of predictions. Taleb’s tautology “I will never get to know the unknown, since, by definition, it is unknown”⁴² is therefore trite. The whole enterprise of knowledge has been built on the idea of using what is known to find out what is unknown. Knowledge has advanced at an incredible rate in the modern era. The mental tool of inference is probably the greatest logical invention of the human race. We have to base society on what we know not on what we don’t know. There’s no such thing as a society or an organization without knowledge. Why base life on Taleb’s “unknowledge” when, as Hawking states, the world can be modelled by science? There are irregularities and asymmetries but there are also incredible regularities, as demonstrated by the Standard Model of Particle Physics.

⁴⁰ Ibid., p75.

⁴¹ P.79.

⁴² Ibid, p.210.

Conclusion

The Black Swan is entertaining, challenging and colorful but has not stood up well to this shock-test of logical analysis. The Black Swan is essentially pop philosophy and does not deserve to be categorized as a theory as such. Rather it is an ideology with no scientific or philosophical cohesion to it.

Science is in far greater control than Taleb gives it credit for and the future is much more knowable than this merchant of uncertainty believes. The subjective nature of the Black Swan ideology comes out in the highly personal, biased and rhetorical writing style of the book which majors in opinions and minors in facts.

Taleb's universe of perpetual uncertainty is a fantasy world without any empirical laws which takes us back to pre-Enlightenment levels of knowledge or "unknowledge". It descends into self-confessed paranoia: "Every morning the world appears to me more random than it did the day before, and humans seem to be even more fooled by it than they were the previous day. It is becoming unbearable. I find writing these lines painful; I find the world revolting."⁴³

This is a position of hyper-scepticism, one which would undermine the whole scientific enterprise and the ageless quest for human knowledge and, increasingly, foreknowledge. In my view, the Black Swan ideology tastes like a spicy, undercooked intellectual stew. It's likely to give futurists, social scientists and systems thinkers a touch of indigestion.

⁴³ Ibid, p.215.

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