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Dan Brown and Science

 Dan Brown once again has blessed us with a new novel, *Origin*. It is the fifth book in the Robert Langdon series following *The Da Vinci Code*, *Angels and Demons*, *The Lost Symbol*, and *Inferno*. Unlike the past novels, this one is set in the future and features a stunning AI robot along with the answers to the questions, “Where did we come from?” and “Where are we going?”.

 Dan Brown’s new novel follows the consistent character of Robert Langdon through yet another murder mystery and a battle against government authority and religious leaders to reveal truth. In *Origin*, Robert Langdon is joined by Ambra Vidal, the intelligent museum director and future queen of Spain, along with Winston, a futuristic AI computer, to reveal the secrets that were the cause of Edmond Kirsch’s murder. Through the deciphering of many codes and close encounters with the law, Langdon and Ambra are finally able to broadcast to the world the true meaning of life.

The main use of science in this novel is Edmond Kirsch’s AI Winston. The most notable characteristics of Winston are that he is able to communicate effectively and almost seamlessly with whomever he interacts with, and he is so advanced he is mistaken for a human being by Harvard professor Robert Langdon, and not just some human, an articulate and well-read one. Here is where fact and fiction are separated: all current AI systems have obvious robotic voices, take the first humanoid robot to obtain citizenship, Sophia, for example. It does not have a realistic sounding voice and all of her responses are programmed in advance and are more of a catchall response rather than an individual response that actually makes sense. As explained in the video (<https://www.youtube.com/watch?v=1rrBBfVBx2Q>), Dr. Ben Goertzel explains how AI is still not nearly as advanced as humans because humans can adapt to change without reprogramming their entire “cortex”, as with AI there is still work to be done in the manner of coordinating through different conversations and situations.

There is a lot of work advancing the amount of nodes connected to the neural processor of AI robots so they can have access to more information to then form more complete conversations. In terms of business, there is a strong focus on making the AI industry decentralized so that there is not a problem with those at the higher end of hierarchy in a company having all the control and insuring that lower-level employees, usually be the engineers and scientists, have as much ability to submit their input as their managers. This also helps to put all AI on a single network for use in any service by whomever accesses the network. This provides the cheapest access to AI and the highest quality. There is also much focus on decentralization in order to grant access to the general public and make sure that governments don’t control AI and also that AI is not only available to the rich.

In *Origin*, Winston is only exposed to the most rich and intelligent people of the time, and it is mostly kept private by Edmond Kirsch, presumably to keep his investment safe and profitable. This is different from reality for it shows a more centralized use of AI, which is much more advanced than our current AI systems. The company Singularity Net that created Sophia plans on having the server up and running by around November 2018, and this will allow multiple AI systems access to different nodes of information for their individual robots. This, however, is much different from Winston in the sense that he is highly intelligent, and modern-day robots can hardly hold a conversation that makes sense given their vague responses to questions or comments.

Other than AI, *Origin* introduces the use of the new Tesla cars and focuses on their ability to self-park, and especially, its ability to navigate through a driveway with nobody in the driver’s seat. Tesla was introduced by Martin Eberhard and Marc Tarpenning back in 2003 and was later acquired by Elon Musk (who shares much in common with the character Edmond Kirsch) to create luxury and cutting-edge, electric vehicles. As shown in the video linked below, Tesla cars do have the ability to park by themselves, and even drive onto roads with streetlights and other cars, so this is one description of technology that Dan Brown does not even care to exaggerate. Perhaps this part of the novel was written a couple years ago, and in the intervening years Tesla has caught up with it.

Another example of science is the phone that Edmond Kirsch uses to remain totally off-the-grid and not be able to be tracked by others. This is definitely a possibility, along with the data-blocking system in place when Edmond Kirsch is giving his presentation in order to make sure nobody is on their phone during his big reveal.

The big question in the novel, “Where do we come from?”, is answered by the results of the Miller-Urey experiment. The novel describes it as a re-creation of the beginning of the earth, where the elements were duplicated to show just how the conditions at the dawn of time were. Their goals were to heat up the basic elements from this time, hydrogen, water, methane, and ammonia, to spark life, or, “To stimulate creation” [Brown, 383]. The novel states that, unfortunately, they did not succeed, and were only able to form a few amino acids from the elements, which, although are the building blocks of proteins, are not enough for Kirsch’s bold statement. It is then described how Miller’s students found his test tubes in 2007, over 50 years after the initial experiment was conducted, and they began to analyze these amino acids more closely, and found the building blocks of RNA which eventually would lead to DNA. Since this timeline of 50 years of growth is so short comparatively to the rise of man-kind after the first living organism, it is concluded that the Miller- Urey experiments were actually successful and they prove that humans could have been created through these basic elements being heated up along with billions of years of evolution. Edmond Kirsch then goes on to explain how, although this isn’t evidence enough to disprove all creationists, having a time machine to put the vials would be. So he creates a computer simulation to speed-up processes given their mass, velocity, and friction, and he compares that to a modern-day time machine as it allows one to look a bit into the future given existing data about a situation. Entropy is described as the goal for the universe, and it even creates some order to further this goal and spread more entropy through the destruction of this order. Thus, it is concluded that life was created in order to dissipate more energy back into the universe as heat. As Kirsch runs the model again, this time adding entropy, it leads to the creation of DNA, the basis of all life.

As for the question, “Where are we going?” Kirsch runs the computer simulation and concludes that in 50 years we will have been absorbed by another species, which is in an entirely new kingdom composed of nonliving species, described by Kevin Kelly. This species is a combination of both humans and technology.

I believe that the answers to both of these questions are, not only thought-provoking, but accurate, which is rare as in the other novels where Brown doesn’t care much to even accurately describe simple devices. In *Origin* he references real people, their research, and even past research. Although the possibility of a computer simulation exactly replicating the creation of living beings is questionable, it is probably the closest we can get in our life-times as life did take billions of years to form. It can also be safely assumed that human beings will increasingly interact with technology. As in just the past 25 years it has started to take up most of our days and replace even basic jobs, and is now part of many human bodies. In just 50 more years, the possibilities are endless.

Dan Brown’s novel, *The Da Vinci Code[[1]](#footnote-1)*, does a wonderful job of blurring the lines between fact and fiction, and in doing so, he leads the reader to believe the scientific inaccuracies that come along with it. Everything from the big revelation of Mary Magdalene’s bloodline leading to Sophie Neveu to the papyrus paper dissolving in vinegar is completely impossible. Although the novel makes people question their beliefs and society’s norms, it is a work of fiction and should be treated as such.

 The book starts off with a confrontation between Jacques Sauneire and Silas where the curator is shot in the stomach. Dan Brown describes how his stomach acids would soon seep into his chest cavity, poisoning him from within, which is completely false because a shot to the stomach would do nothing more than lead to blood loss. Additionally, in the time it would’ve taken the security to get there (around fifteen minutes), Sauneire wouldn’t have died from blood loss yet, as it would take much longer to bleed out from a shot to the stomach than say from a shot to the hip or chest.

In the movie, a part that seemed completely odd was the flashback of Sophie Neveu and her family during the car accident. They appeared to be in a small car with Sophie and her brother in the back seat and were then suddenly in a head-on collision with a big truck or eighteen-wheeler. It is explained that Sophie’s parents and her brother all die, yet, young Sophie Neveu who was sitting in the middle of the back row of seats in the car, is carried out from the scene of the accident.

 A major fixture in the book was the cryptex, which turned out to be neither an original creation of Da Vinci’s nor scientifically accurate. Papyrus paper is made from the papyrus plant, and thus, as it is cellulose, won’t dissolve in vinegar. It seems odd that Dan Brown would specify this certain type of paper, as there are indeed other papers that would dissolve in vinegar, but regardless, this concept is false.

 Lastly, and what seems to be the most outstanding falsity in the novel is the connection that Dan Brown attempts to connect Jesus and Sophie Neveu. Throughout the novel, Robert Langdon, Leigh Teabing, and Sophie Neveu are chasing the Holy Grail, which they know as the sarcophagus of Mary Magdalene. The discovery of her body would be crippling to the Christian church because of the apparent relationship between Jesus Christ and Mary Magdalene. But what Dan Brown fails to connect is how finding a DNA connection between Mary Magdalene and Sophie Neveu would prove that Jesus had a child with Mary since there is no DNA of Jesus to compare Sophie’s to as well.

*Inferno* is the first Dan Brown novel which presents a problem existent in the real word; the staggering potential of exponential population growth. The creation of a plague virus, the use of the faraday pointer, and the description of how projected population growth will detrimentally influence the human race all have scientific connections. Although the scientific inaccuracies which are presented do move the reader back into reality, this novel does effectively explain a pressing issue and then leaves the reader without a solution as a sort of catalyst to prompt a revolution, change, or at least gets people to contemplate solutions for this problem

This issue of population growth is first presented in the novel by Dr. Zobrist, the morbid and rich scientist, who crudely explains to the head of the World Health Organization that due to the growth of the human population, in around 40 years, the world will most likely be like Botticelli’s depiction of Dante’s Inferno. The UN states that, as shown in the novel [Brown, 103], projected population growth for the year 2050 is at around 10 billion, which is actually more than shown in the graph presented by Zobrist. And just as in the novel, there is no clear solution presented by global health organizations, just methods of birth control, which seem to be a scapegoat used to not wonder too deeply in the moral grey area that is population control.

The faraday pointer in the novel is somewhat scientifically inaccurate. It is described as a device with has a metal ball inside which is moved across paddles to power a generator [Brown, 61]. On the other hand, a real faraday system is composed of a battery, coils, and a magnet, which is rocked through a tube against the coils to give energy to the battery. This inaccuracy doesn’t take much away from the plot and the purpose of the pointer but once again reiterates that this novel is fiction.

Finally, the plague virus is described in the novel as able to invade human gametes rendering them infertile. This is completely and utterly false due to the impossibility of an air-borne virus spreading up and into one’s genitals. Germline manipulation[[2]](#footnote-2) is much more difficult than depicted to be in the novel; it involves the microinjection of DNA into several human eggs, and even then the chances of successfully modifying a single egg is slim.

 *Inferno* is the most relatable of Dan Brown’s novels in that, instead of presenting a made-up ancient society or future technology, it raises the problem the human race is currently experiencing. Although some of the science behind it, factually, may be inaccurate, this novel effectively expresses the pressing issue at hand.

The plot of Dan Brown’s novel, *Angels and Demons[[3]](#footnote-3)*, is formulated around the theory of using antimatter as a source of energy. Created by Vittoria’s father and then stolen by Hassassin to get revenge against the Catholic Church, antimatter is described as a highly reactive and powerful energy source, which must remain suspended in a vacuum, otherwise it will come into contact with matter and annihilate into photons. *Angels and Demons* contains accurate scientific depictions of antimatter as well as inaccurate depictions of antimatter.

 In the first place, antimatter was originally presented by Dirac in his Nobel Prize winning equation, which predicted the possibility of antiparticles due to the equation having two solutions; positive and negative. This particle is linked to the Higgs Boson[[4]](#footnote-4) or the “God Particle” due to the relation of creating and destroying mass. The Higgs Boson is said to be the particle, which gives mass to otherwise massless particles and this theory helps explain why the universe is mostly matter-dominated while antimatter is almost nonexistent; antimatter never went through the Higgs field to have mass. Regardless, the “God Particle” is still a theory and so are the applications of antimatter, which are described in *Angels and Demons*.

Furthermore, in regards to scientific research at CERN[[5]](#footnote-5), antimatter has only been studied for its characteristics, and studies for its applications to the real world haven’t been done yet. So although there is a possibility that antimatter could be used in the future for energy, it is only a theory that is depicted in *Angels and Demons*, not proven scientific fact. Most of what is described in the novel seems to make sense in theory, such as the description of the suspension of antimatter by Vittoria as “the reverse polarity vacuum to pull the antimatter positrons out of the accelerator before they could decay” [Brown, 73] to describe how antimatter, when created, would be sustained long enough to be used as an energy source, but even in this case, such a vacuum would not be portable.

 Additionally, antimatter is used by Hassassin to show the most powerful defeat of the Vatican; by science, and by the “God Particle” itself. In the Big Bang theory, particles of matter were formed of pure energy and each particle of matter had its antimatter counterpart. Their contact is what is believed to have created the universe. Hassassin tries to uncover the impossibility of Genesis by the exposing of this new knowledge.

 Although it might be possible to eventually use antimatter as an energy source, there is no current research that has been done to prove so. *Angels and Demons* shines light on an interesting theory yet fails to withstand deeper scrutiny.

 It can safely be concluded that although Dan Brown strongly integrates science in his novels to contrasts human beliefs regarding religion, he does so in a manner that stretches the truth in order to create an interesting plot, which keeps the reader engaged throughout the duration of the novel. Although many of his descriptions of technology in *Origin* are a bit far-fetched, they aren’t impossible and could very well be the future of AI as advances through the industry just this year show. Some blatant scientific inaccuracies as implemented in the novel *The Da Vinci Code* are in place, I believe, in order to exhibit Dan Brown’s command in blurring the lines of fact and fiction and, in this novel, he does so almost seamlessly, especially to those who don’t know much about Christian history. Dan Brown’s writing style throughout these five novels remains fairly consistent and I’m positive that in a few years he will release a new book, once again allowing his readers to question the very basis of life and its meanings.

<https://techcrunch.com/gallery/a-brief-history-of-tesla/>

<https://www.youtube.com/watch?v=ivTeW4xWQv0>

<http://www.encyclopedia.com/science-and-technology/biology-and-genetics/cell-biology/miller-urey-experiment>

<https://www.edge.org/conversation/kevin_kelly-the-technium-and-the-7th-kingdom-of-life>

1. Dan Brown, *The Da Vinci Code.* (Doubleday: 2003). [↑](#footnote-ref-1)
2. Council for Responsible Genetics, February 23rd, 2001, http://www.councilforresponsiblegenetics.org/ViewPage.aspx?pageId=101 [↑](#footnote-ref-2)
3. Dan Brown, *Angels and Demons*. (Pocket Books: 2000). [↑](#footnote-ref-3)
4. Conseil Européen pour la Recherche Nucléaire, September 20, 2017, The Higgs Boson | CERN https://home.cern/topics/higgs-boson [↑](#footnote-ref-4)
5. Conseil Européen pour la Recherche Nucléaire, https://home.cern/topics/antimatter, September 20, 2017, Antimatter | CERN [↑](#footnote-ref-5)