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LIST DO REDAKCJI / LETTER TO THE EDITOR

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C.S. Lewis Philosopher — Who Changed My Life. Notes on the Margins of **The Magician's Twin**

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C.S. Lewis changed my life. I first read his book, **Miracles**, [1] nearly 40 years ago, as a young teenager growing up in a small town in Arkansas. Through a combination of books by Lewis and the influence of Mr. Merrifield, my high school chemistry teacher, I graduated high school deciding that I wanted to get my Ph. D. in chemistry, which I eventually did. Reading C.S. Lewis opened my eyes to a whole new world of classical literature that I had never even imagined existed. Importantly, I learned to read full-length books with **The Chronicles of Narnia** [2] and **The Lord of the Rings** [3] — building up abilities that would be important in college and for the rest of my life. Reading C.S. Lewis also taught me that it was possible to be a Christian and also a scientist, without having to choose between the two.

When I saw an advertisement for **The Magician's Twin**, [4] I thought this would be a great book to read. And indeed, I enjoyed many of the chapters in the book, although some I struggled with (more on that later). Each chapter is written by a different author, but of course the theme is well centered on C.S. Lewis, and in

[1] C.S. Lewis, **Miracles: A Preliminary Study**, Geoffrey Bles, London 1947.

[2] C.S. Lewis and Pauline Baynes, **The Chronicles of Narnia**, HarperCollins Publishers, New York 2004.

[3] J.R.R. Tolkien, **The Lord of the Rings**, HarperCollins, London 1991.

[4] John G. West (ed.), **The Magician's Twin: C.S. Lewis on Science, Scientism, and Society**, Discovery Institute Press, Seattle 2012.

particular his books **The Abolition of Man** [5] and **That Hideous Strength**. [6] After reading the first five chapters, I was feeling pretty good about the book — I was happy to see that John Collins noted that many scientists have been inspired by C.S. Lewis, including Francis Collins, who is director of the U.S. National Institutes of Health (NIH). In 2017, I published a book chapter on this ("Science in The Abolition of Man: »Can Science Rescue Itself?«"[7]).

I read **That Hideous Strength** when I was 14 years old (back in the 1970s). Many years later, in 2012, I re-read **That Hideous Strength**. I did remember the plot, but this time around it had developed new meaning — a lot has happened since I first read it in 1974. Although some of my friends at William Jewell College were part of an exchange program with Oxford University, for me this was something that only "rich smart people" could even think about. Several years later, I found myself doing post-doctoral research at Oxford. My wife and I lived in Headington, which is the same town on the edge of Oxford where C.S. Lewis lived, and we even attended (twice) the same church that Lewis worshipped in — although to be honest it seemed quite cold — both thermally (in December, 1992) and from my perspective, spiritually as well. I discovered the bench at the Eagle and Child pub in Oxford, where the Inklings met. I realized that C.S. Lewis was a beer-drinking, pipe-smoking Anglican — not the non-smoking conservative Southern Baptist teetotaler, I imagined as a 14-year old when I first read his books! As with most people, a lot has happened in my life during the last forty years! I have spent half of that time — 20 years — living in Europe (4 years in Oxford, 1 year in Norway, and then 15 years in Denmark).

A few years ago, I gave a talk in Los Alamos, New Mexico. On the drive up there, the mountains in January were majestic — it had snowed the night before, and with still chilly temperatures, the view was awe-inspiring. I thought of story of Coleridge and the waterfall, mentioned in the first chapter of **The Abolition of**

[5] C.S. Lewis, **The Abolition of Man: Reflections on Education with Special Reference to the Teaching of English in the Upper Forms of Schools**, Geoffrey Bles, London 1946.

[6] C.S. Lewis, **That Hideous Strength: A Modern Fairy-Tale for Grown-Ups**, "Space Trilogy", The Bodley Head, London 1945.

[7] David Ussery, "Science in The Abolition of Man: »Can Science Rescue Itself?«", in: Tim Mosteller and Gayne John Anacker (eds.), **Contemporary Perspectives on C.S. Lewis's "The Abolition of Man": History, Philosophy, Education, and Science**, Bloomsbury Academic, London 2017, pp. 111–134.

Man. [8] I agree with Lewis that sometimes nature "deserves" our admiration. My talk was about bacterial genomics and evolution, a subject that in its own way I think can be awe-inspiring. There is a lot that we do not know. I had recently read **Ignorance: How it Drives Science**, by Stuart Firestein. [9] I think this is a wonderful book for helping to train young scientists: "Being a scientist requires having faith in uncertainty, finding pleasure in mystery, and learning to cultivate doubt. There is no surer way to screw up an experiment than to be certain of its outcome". [10]

This leads me to the few sections of the book that I really struggled with. In particular, I had difficulties with the two chapters by John West in the "Origins" section of the book. I've never met the author, and I'm convinced that he is quite well intentioned and sincere in his quest for the truth. I am not making moral judgments here, as I know myself, I have been convinced something is right, only to discover later that my human reasoning was limited. However, it felt a bit awkward when early in the first chapter in this section, the claim is made that, although Francis Collins (and other scientists like myself) were inspired by C.S. Lewis, we got it all wrong. According to West, Lewis really did not support evolution as a science.

> Lewis's early skepticism of Darwinism makes it all the more astonishing that he has been honored as a veritable patron saint in recent years by some contemporary proponents of theistic evolution. In the best-selling book **The Language of God** (2006), for example, biologist Francis Collins highlighted the role Lewis's writings played in his own conversion to Christianity as well as invoking Lewis to defend the idea that Christians should accept animal ancestry of humans [...]. [11]

Francis Collins is a great scientist, one of my heroes, along with Jim Watson and Francis Crick. But Francis Collins is an evangelical Christian. First, I had to ask myself, did Francis Collins *really* say this? I can kind of see where West gets the idea that Collins advocates "that Christians should accept animal ancestry of humans", but having heard Francis Collins in person struggle with whether Adam

[8] Lewis, **The Abolition of Man...**, pp. 1–13.

[9] Stuart Firestein, **Ignorance: How It Drives Science**, Oxford University Press, New York 2012.

[10] Firestein, **Ignorance...**, p. 17.

[11] John G. West, "Darwin in the Dock", in: John G. West (ed.), **The Magician's Twin: C.S. Lewis on Science, Scientism, and Society**, Discovery Institute Press, Seattle 2012, p. 110 [109–152]. See also Francis S. Collins, **The Language of God: A Scientist Presents Evidence for Belief**, Simon & Schuster, New York 2006.

was a literal person, along with a group of pastors at a BioLogos meeting a few years ago, I know that the issue is complex. The scientific evidence for the evolution of humans is extremely clear, and I absolutely agree that we need to respect this. But still, is there room perhaps for God somehow choosing one "Adam" and one "Eve" from a population, which would become the spiritual progenitors of what we would call modern humans. The discussion on this issue will continue, to be sure. Even so, I am very certain that Francis Collins is *not* saying that humans are *merely* animals. Good grief, it strikes me as just crazy to even think this. From what Francis Collins does with his life (evangelizing others, praying, worshiping, and in general being a Christian witness as a well-respected scientist), I really do not believe that Collins is saying the same thing as many atheists who claim that we are *merely* human. Francis Collins gets a lot of flak from atheists for his belief in God. I have had professors from Harvard Medical School tell me that Francis Collins believes in talking snakes. Where did they get this? Well, they think, Collins believes in the Bible, and anyone who is a Christian must take the Bible literally. And it seems to me that in the U.S. in particular, there is a belief in popular thought that one must choose between believing in God, or believing in Science — these are the only two possibilities. Francis Collins is trying hard to bring the two sides together — it is possible to be a good scientist and also believe in God, but he is certainly getting a lot of criticism from the materialists for this. Having said that, I find it kind of odd that folks from the Discovery Institute would attack Francis Collins from the other side. Wormwood would be proud — but I'm scratching my head — shouldn't this be a *good thing* to have such a prestigious scientist who is so clearly making a stand as a Christian in science?

In the section "An Historic Fall" (Chapter 6), John West explains that in "Christian theology, God created human beings morally innocent. The first humans then freely rejected God's will for them, resulting in a Fall from innocence and harmony into the sinful condition of human race as we currently find it [...]. Thus the Fall provides the »back story« for Jesus Christ and his death on the cross". [12] Before I go any further, I want to explain a background assumption here, that is not stated, but obvious in the context of the chapter, because from here West proceeds to discuss theistic evolution, and whether there was a literal Adam. The implication is that there was a literal, historical Adam, created supernaturally by God about 10,000 years ago. I think this is a great summary of a very popular view within modern Chri-

[12] West, "Darwin in the Dock...", in: West (ed.), **The Magician's Twin...**, p. 115.

stianity, from the past couple of hundred years. (It is not that the Christians during the 1500 years before the "Age of Reason" did not believe in "real" persons named Adam and Eve, and in the fall — of course they did, but the exact details were just accepted as a mystery, without the literal, scientific view of complete understanding that comes naturally to us today.) The idea of a literal scientific interpretation of an individual Adam and Eve, created on the 23rd of October, 4004 B.C., comes from Bishop James Ussher, first published in 1650. Several years ago, I read a wonderful book, called **The Death of Adam**, by John C. Greene, [13] which gives an historical analysis of how slowly, over time this idea of a "scientific", literal Adam and Eve became less and less plausible, as more scientific evidence became available. But this started almost as soon as Ussher tried to nail down a specific date of creation in the 17th century.

By the time that Darwin was writing **On The Origin of Species**, about 200 years later, many scientists were not so sure of a literal Adam being created in the past ten thousand years. During the more than 150 years since Darwin, there has been an explosion of information, including the human genome project, which Francis Collins was the leader. West (along with many others) want to continue to believe in this 17th century, rational, modern, "scientific" view, and argue that "real science" can give us knowledge of how humans were specially created; they confidently assert that God could not have used evolution from animals to create humans. Because, well, this doesn't appeal to their human reason, and they just know that God *would never* do it that way…

In Chapter 6, West seems to say that when Lewis states "we must sharply distinguish between Evolution as a biological theorem and popular Evolutionism […] which is certainly a Myth", he does not really mean "sharply". [14] Apparently, what

[13] John C. Greene, **The Death of Adam: Evolution and Its Impact on Western Thought**, The Iowa State University Press, New York 1961.

[14] West, "Darwin in the Dock…", in: West (ed.), **The Magician's Twin...**, p. 74.

Here is the full C.S. Lewis quote on biological evolution vs. Evolutionism: "The central idea of the Myth is what its believers would call »Evolution« or »Development« or »Emergence«, just as the central idea in the myth of Adonis is Death and Rebirth. I do not mean that the doctrine of Evolution as held by practicing biologists is a Myth. It may be shown, by later biologists, to be a less satisfactory hypothesis than was hoped for fifty years ago. But that does not amount to being a Myth. It is a genuine scientific hypothesis. But we must sharply distinguish between Evolution as a biological theorem and popular Evolutionism or Developmentialism which is certainly a Myth. Before proceeding to describe it and (which is my chief business) to pronounce its eulogy, I had better make clear its mythical character".

Lewis *really* means here is that there is a kind of fuzzy small division — that "Evolution as a biological theorem" is also not true, because many modern scientists, like Richard Dawkins for example, use the Myth of Evolutionism to push their atheism on other people. Thus sadly Francis Collins is wrong (and many other scientists, including myself, who took Lewis at his word). Actually, according to West, C.S. Lewis, if he were alive today, would be a strong supporter of Intelligent Design, and this is where I really had struggles.

I think there are many difficulties with this idea that C.S. Lewis could be enlisted as a supporter of intelligent design. But before I even address this — there is the problem of appeal to authority. West wants to test the validity of the claim by many that Lewis accepted conventional evolutionary biology, but only had problems with those who use "Evolutionism" to support their materialistic worldview. Imagine the headline — "Professor of Renaissance and Medieval Literature from Oxford in the 1940's is a Proponent of Intelligent Design". Probably many people would not be impressed (or surprised). However, I am not so sure that C.S. Lewis would be a strong supporter of ID.

As stated earlier, **The Magician's Twin** focuses on two books by C.S. Lewis — **That Hideous Strength**, and **The Abolition of Man**. Lewis says that the he is using the former as a "fairy tale" to describe points made in the latter — sometimes telling a story can bring home an important point, as the parables that Jesus told. But just as Merlin the magician in Lewis's fiction book is not referring to a "real" person, so some of the stories in the Bible are meant to bring home a point, and not describe scientific facts. I bring this up here because it is actually easy to confuse a story with reality — I see this often with new Ph.D. students who are learning to speak the language of science and to grapple with scientific models. It seems to me that some of the fellows at the Discovery Institute who are working on Intelligent Design confuse scientific models with literal truth (more on this later). But I think in this chapter, West seems to argue from the point of view of scripture as being literal scientific text (that is, there was a "real" Adam created by God around 4004 B.C.), rather than a combination of poetry and stories and lots of different ways of telling an important (and very "real") message. But I am confident that Lewis would find great pleasure in the different types of literature in the Bible, and would be less likely to confuse stories with scientific descriptions. Fur-

C. S. Lewis, **Christian Reflections**, William B. Eerdmans Publishing Company, Grand Rapids, Michigan 1967, p. 93.

ther, I am not sure that the reasoning of the intelligent design community is internally consistent with the "Tao", as Lewis calls it. When I read West's description of intelligent design as a grass-roots movement in protest to the dogma of evolution, I was reminded of the biblical story of Aaron's laughable response to the golden calf — "I just threw the gold in a furnace, and out comes this golden calf" [Exodus 32:24]. Yet if one just looks at what is on the Discovery Institute's web pages, it is obvious this is not some sort of spontaneous grass-roots movement, but instead a carefully choreographed, planned strategy in order to push their agenda — which is an attack on the credibility of biological evolution. They really *really* do not like evolutionary biology, and seem to have big problems with randomness. Jay Richards states: "According to the Darwinian story, the adaptations of living things to their environment are not the results of purposeful design by God or an intelligent agent, but are the result of a blind process of natural selection on random variations within a population". [15] Note the contrast — *either* "purposeful design by God" or "random variations".

I want to end this discussion with some thoughts about randomness. A few years ago, I read a wonderful book, **God, Chance, and Purpose: Can God Have it Both Ways?**, by David Bartholomew. [16] As I have pointed out before (in my "Purpose-Driven iPod" article [17]), many people have problems with randomness — they tend to associate good things and purpose with predictability, and bad things (and no God) with random events. But surely God could use "randomness". I loved reading **AntiFragile: Things that Gain from Disorder**, by Nassim Nicholas Taleb. [18] He talks about how many biological systems can gain strength from struggles/difficulties. Could this idea be consistent with classical morality, what Lewis calls the "Tao"? Taleb writes: "I will repeat again until I get hoarse: ancients evolved hidden and sophisticated ways and tricks to exploit randomness". [19] It seems to me that the

[15] Jay W. Richards, "Mastering the Vernacular", in: John G. West (ed.), **The Magician's Twin: C.S. Lewis on Science, Scientism, and Society**, Discovery Institute Press, Seattle 2012, p. 186 [179–198].

[16] David Bartholomew, **God, Chance, and Purpose: Can God Have it Both Ways?**, Cambridge University Press, Cambridge 2008.

[17] David Ussery, "The Purpose-Driven iPod", *Christian Century* 2008, September 23, pp. 11–12.

[18] Nassim Nicholas Taleb, **Antifragile: Things That Gain From Disorder**, Random House, New York 2012.

[19] Taleb, **Antifragile...**, p. 105.

idea of being able to use seemingly random situations as a source of strength, rather than weakness, is entirely consistent with the "Tao". I woke up this morning thinking of scriptures, where it says "Consider it pure joy my brothers whenever you experience trials and tribulations, because you know the testing of your faith will produce endurance". [James 1:2,3]. Sometimes randomness can be a good thing, but of course randomness is not so good for fragile, non-biological objects like dishes or computers or iPhones.

About 40 years ago, when I was a Ph.D. student at the University of Cincinnati College of Medicine, I entered a competition from the library, with an essay about a collection of books. I had written to them and suggested my collection of C.S. Lewis books, or a collection of books on creationism/evolution. They recommended I use the latter, and for my essay I won a prize of $100 at a used bookstore in town, which of course allowed me to add even more books to my collection, which started when I was about 12 years old, with **Evolution: the Fossils Say No**, by Duane T. Gish. [20] I was (temporarily) convinced that he was right, and from that point on began reading and collecting books about creationism and evolution. Within a few years (by the time I was 14) I had serious doubts about the credibility of many of the creationist claims, but I continued to collect books on the subject. Now, more than 40 years later, I have in my office three full bookshelves, each about 2 meters wide, from floor to ceiling, with more than a thousand books on creationism / evolution / science-faith issues. There is (literally!) a ton of material on this — lots and lots of books. Some (a few) are quite good. Many are repetitive. But this is obviously an extremely popular topic, generating a lot of ink. One book that I think is worth mentioning in all of this is **Coming to Peace with Science: Bridging the Worlds Between Faith and Biology**, by Darrel Falk. [21] Falk describes how C.S. Lewis influenced him. The audience of Falk's book is evangelical Christians (mainly in the U.S.) who have been struggling with how to accept the biological sciences. The book has a forward by Francis Collins, and the two of them formed the BioLogos foundation, which seeks to have a conversation between faith and biology.

In a way, I do think that some of the Intelligent Design books can be useful in

[20] Duane T. Gish, **Evolution: the Fossils Say No**, Institute for Creation Research, El Cajon 1995.

[21] See Darrel Falk, **Coming to Peace with Science: Bridging the Worlds Between Faith and Biology**, InterVarsity Press, Downers Grove 2004.

teaching. In the first chapter of my textbook ("Sequences as Biological Information: Cells Obey the Laws of Chemistry and Physics"), I state that "Despite the protests of the Intelligent Design community, more than 40 years after the first publication of Watson's **Molecular Biology of the Gene**, it is still clear that cells obey the laws of chemistry and physics". [22] When I give lectures on this chapter, I like to include a discussion of recent books such as **Signature in the Cell**, [23] where Stephen Meyer confuses models with reality. He seems to think that the analogy of "DNA being like a computer program" is the literal truth — that DNA actually "really" is a computer program. As I point out in my review ("An Inordinate Fondness for Bacteria" [24]) he fails to understand that the information in DNA is not just text, but the order of the bases is what determines the shape, and it is the shape of the DNA that determines its function, just as it is the sequence of amino acids that determines the shape, which in turn determines the function of proteins. A good discussion about the role of information can be found in **Information and the Nature of Reality: From Physics to Metaphysics** by Paul Davies and Niels Henrik Gregersen, [25] which is based on a conference held here in Copenhagen, a few years ago.

Similarly, Mike Behe seems to confuse models with reality. He takes the analogy of large protein complexes being like a machine, and implies that they are literally machines, divinely inspired or made by an "intelligent designer". In this context, I can happily recommend **Life's Rachet: How Molecular Machines Extract Order from Chaos**, by Peter Hoffmann. [26] In the introduction, the author states

[22] David W. Ussery, Trudy M. Wassenaar, and Stefano Borini, "Sequences as Biological Information: Cells Obey the Laws of Chemistry and Physics", in: David W. Ussery, Trudy M. Wassenaar, and Stefano Borini (eds.), **Computing for Comparative Microbial Genomics**, *Computational Biology*, Vol. 8, Springer, London 2009, p. 6 [3–17], https://doi.org/10.1007/978-1-84800-255-5_1.

[23] Stephen C. Meyer, **Signature in the Cell: DNA and the Evidence for Intelligent Design**, HarperOne, New York 2009.

[24] David W. Ussery, "An Inordinate Fondness for Bacteria" [review of **Signature in the Cell: DNA and the Evidence for Intelligent Design**], *Reports* 2010, Vol. 30, No. 5, p. 39.

[25] See Paul Davies and Niels Henrik Gregersen, **Information and the Nature of Reality: From Physics to Metaphysics**, Cambridge University Press, Cambridge 2010.

[26] See Peter M. Hoffmann, **Life's Rachet: How Molecular Machines Extract Order from Chaos**, Basic Books, New York 2012, p. 64. From the introduction: "This book is a vindication for randomness, a much maligned force. Without randomness, there would be no universe, no life, no humans, and no thought" (Hoffmann, **Life's Rachet...**, p. 7).

"Astoundingly, the force that drives life at the smallest scale is not a mysterious, supernatural force, but a surprising one nonetheless. The force that drives life is chaos". [27] Don't take me wrong — I'm certainly not saying that God is not involved, just that (1.) randomness can be "good", and (2.) that I really do not know for sure *how* God did it, and I think it is extremely dangerous (and arrogant) to claim to have scientific proof for God (I have heard some say that Behe has at last found God's fingerprints), or even to say that God *must* have done it this way, or that God cannot do it another way. I can already hear people at the Discovery Institute saying "but Behe never mentions God at all, this is »merely« a scientific discussion". Yet when I go to the Discovery Institute web pages, I see lots of news about talks in churches and God, and certainly this book about C.S. Lewis published by the Discovery Institute discusses his theology as well. This point goes beyond the discussion of this short article — the interested reader can have a look at my review of Behe's book, "A Biochemist's Response to »The Biochemical Challenge to Evolution«". [28]

Along the same lines, in **The Myth of Junk DNA**, Jonathan Wells (in addition to one attack after another on Francis Collins) argues that ID was right when it said that most of the human DNA was not junk, but serves a "purpose". In a sense he is right here; I am not a materialist, and I disagree with those who would argue that somehow "junk DNA" proves that there is no God. However, from my perspective, having worked with sequenced bacterial genomes now for more than 30 years, the coding potential for the human genome is quite low — that is, only about 1% or so of the DNA encodes proteins, compared to the more optimized bacterial genomes, where about 90% of the genome is protein coding. There are reasons for this, but nonetheless, about two-thirds of the human genome is repeats of various sorts, and much of it is "filler" material. It seems that the concentration of DNA is constant in cells, so larger cells have more DNA. The reason the human genome contains around 3 billion bp of haploid DNA is because of the size of the cells-larger cells means more DNA, smaller cells less DNA. The concentration of DNA in nearly the same in all living cells studied so far is quite high — enough to make a kind of gel. Some think that in this sense DNA is playing a simple structural role (in addition of course to its potential for coding proteins). If one

[27] Hoffmann, **Life's Rachet...**, p. 5.

[28] See David W. Ussery, "A Biochemist's Response to **The Biochemical Challenge to Evolution**" (review of Michael Behe's **Darwin's Black Box: The Biochemical Challenge to Evolution**), *Bios* 1999, Vol. 70, pp. 40–45, https://tiny.pl/qwg5bnw7 [28.02.2025].

looks at lots of different plants and animals, the amount of DNA in humans is about in the middle. Some organisms (with larger cells) have a thousand times as much DNA as humans, some (with much smaller cells, like bacteria) have a thousand times less DNA. Much of this extra DNA that comes and goes with size is simple repeats, like CGCGCGCG repeated millions of times. Yes one can argue for a "function" as a spacer DNA, but the truth remains, only a tiny fraction of the human genome encodes proteins, and there is much variability within the genome, including transposable elements, which move around and can cause structural changes in proteins, resulting on average in about one insertion into a structurally important protein for every twenty human births [29] — and this is just one insertion sequence, out of many. Each of us has about a hundred "loss of function" mutations, and on average an individual is completely missing about 20 genes. [30] It is a good thing that our genome is "anti-fragile" and can survive (and even positively use) messy randomness. "Tinkering outperforms design", writes Taleb. [31]

I thought the last section of the book, on "Society" was interesting. I think that Lewis is right when he says that in the future, people will try and use "science" as the basis for their claim to political power, just as they have used religion in the past. One thing that has struck me recently is the real mess we've gotten ourselves into as a large society by giving power to a few "elite" (such as the bankers that caused the economic meltdown in 2008 — for a history on this, see Jeff Madrick's book, **Age of Gree** [32]). People have always been greedy, but now it is possible for an individual to "bet" on a country, and actually cause serious economic

[29] See Jinchuan Xing, Yuhua Zhang, Kyudong Han, Abdel Halim Salem, Shurjo K. Sen, Chad D. Huff, Qiong Zhou, Ewen F. Kirkness, Samuel Levy, Mark A. Batzer, and Lynn B. Jorde, "Mobile Elements Create Structural Variation: Analysis of a Complete Human Genome", *Genome Research* 2009, Vol. 19, No. 19, pp. 1516–1526, https://doi.org/10.1101/gr.091827.109.

[30] See Daniel G. MacArthur, Suganthi Balasubramanian, Adam Frankish, Ni Huang, James Morris, Klaudia Walter, Luke Jostins, Lukas Habegger, Joseph K. Pickrell, Stephen B. Montgomery, Cornelis A. Albers, Zhengdong D. Zhang, Donald F. Conrad, Gerton Lunter, Hancheng Zheng, Qasim Ayub, Mark A. DePristo, Eric Banks, Min Hu, Robert E. Handsaker, Jeffrey A. Rosenfeld, Menachem Fromer, Mike Jin, Xinmeng Jasmine Mu, Ekta Khurana, Kai Ye, Mike Kay, Gary Ian Saunders, Marie-Marthe Suner, Toby Hunt, If H.A. Barnes, Clara Amid, Denise R. Carvalho-Silva, Alexandra H. Bignell, Catherine Snow, Bryndis Yngvadottir, Suzannah Bumpstead, David N. Cooper, Yali Xue, Irene Gallego Romero; 1000 Genomes Project Consortium; Jun Wang, Yingrui Li, Richard A. Gibbs, Steven A. McCarroll, Emmanouil T. Dermitzakis, Jonathan K. Pritchard, Jeffrey C. Barrett, Jennifer Harrow, Matthew E. Hurles, Mark B. Gerstein, and Chris Tyler-Smith, "A Systematic Survey of Loss-of-function Variants in Human Protein-coding Genes", *Science* 2012, Vol. 335, No. 6070, pp. 823–828, https://doi.org/10.1126/science.1215040.

[31] Taleb, **Antifragile...**, p. 181.

damage, hurting millions of people. I think that Lewis is very insightful here when he says that what science gives us is the power for a few individuals to rule over everyone else. Although this can happen with some very powerful people in places like the US, it doesn't have to be this way. In terms of society, a federation of small groups of people (like Switzerland, and perhaps Scandinavian countries) is better than one centralized "top-down" country. As Taleb says,

> [...] Further, biology plays a role in a municipal environment, not in a larger system [...] Eye contact with one's peers changes one's behavior. But for the desk-grounded office leech, a number is just a number. Someone you see in church Sunday morning would feel uncomfortable for his mistakes — and more responsible for them. On the small, local scale, his body and biological response would direct him to avoid causing harm to others. [33]

Successful societies need trust, and this works best in small communities, that can hold individuals accountable, as detailed in Schneier's **Liars & Outliers**. [34] How we live is important — certainly there is a need for respecting the "Tao" in this sense of morality being good for society.

Finally, I have realized in reading this book is that there is a large group of people in the U.S. who have dedicated themselves to becoming "C.S. Lewis scholars" — going through everything he's written, and spending their whole lives studying his work. I guess in a way this is no different than historians spending their careers studying Abraham Lincoln. Although I would not consider myself in the same category as these people who have dedicated much of their life to studying his work, as I said at the beginning of this review, C.S. Lewis changed my life, for the better, by giving a solid pointing towards classic thought, literature, and values.

David Ussery

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[32] See Jeff Madrick, **Age of Greed: The Triumph of Finance and the Decline of America, 1970 to Present**, Alfred A. Knopf, New York 2011.

[33] Taleb, **Antifragile...**, pp. 88–89.

[34] See Bruce Schneier, **Liars & Outliers: Enabling the Trust that Society Needs to Thrive**, John Wiley & Sons, Inc., Indianapolis 2012.

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5. Firestein Stuart, **Ignorance: How It Drives Science**, Oxford University Press, New York 2012.
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