### They severly messed up – their only out for their 2ar was presumption negates BUT SIKE THEY CONCEDED EVALUATE THE DEBATE AFTER THE 1NC – THAT’S BAKER

Okamms razor means that you determine the easiest path out of two choices, the neg or the aff – the aff has repsonses on it after the 1nc and the negative doesn’t so whatever clash is hard so you vote neg now JUDGE HOLD THE LINE IT WAS COMPLETELY CONCEDED – VOTE NOW

#### 7] Vote neg because it’s simple – evaluating responses to this is complicated so don’t – so evaluate the debate after the 1NC

Baker 04’ [Baker, Alan, 10-29-2004, "Simplicity (Stanford Encyclopedia of Philosophy)," <https://plato.stanford.edu/entries/simplicity/>]

With respect to question (ii), there is an important distinction to be made between two sorts of simplicity principle. Occam's Razor may be formulated as an epistemic principle: if theory T is simpler than theory T\*, then it is rational (other things being equal) to believe T rather than T\*. Or it may be formulated as a methodological principle: if T is simpler than T\* then it is rational to adopt T as one's working theory for scientific purposes. These two conceptions of Occam's Razor require different sorts of justification in answer to question (iii). In analyzing simplicity, it can be difficult to keep its two facets—elegance and parsimony—apart. Principles such as Occam's Razor are frequently stated in a way which is ambiguous between the two notions, for example, “Don't multiply postulations beyond necessity.” Here it is unclear whether ‘postulation’ refers to the entities being postulated, or the hypotheses which are doing the postulating, or both. The first reading corresponds to parsimony, the second to elegance. Examples of both sorts of simplicity principle can be found in the quotations given earlier in this section.

### The 1nc doesn’t say that its abusive – we say you should lose on presumption! So it’s not a T shell – that shit was infinitely regressive you cant just beat back any layer and say we should lose bc of RVIs – don’t buy RVIs on non T stuff

On the negative definitions they concede all of them – again their only out is

### 1

#### Their plan text references the “US” – that’s the university school!

Farlex 12. Farlex; Flagship reference products, innovative learning tools; “University School”; The Free Dictionary

University School, commonly referred to as US, is an all-boys K - 12 school with two campus locations in the Greater Cleveland, Ohio, United States area. The Shaker Heights Campus is kindergarten through grade 8, and the Hunting Valley campus is grades 9 through 12. University School is a founding member of the International Boys' Schools Coalition and a member of the Center for the Study of Boys' and Girls' Lives and Cleveland Council of Independent Schools.

Music. The school's most famous performing staple is its Glee Club. The US Glee Club sings multiple times throughout the year in assemblies, concerts, graduation, and also throughout the city of Cleveland, collaborating with ensembles such as Choral Arts: Cleveland, the Cleveland Orchestra Chorus and other surrounding schools. In the past, the choir has toured throughout North America and Europe, performing in various concert halls and churches throughout the world. The US Glee Club sings a variety of music, including traditional men's chorus pieces, and arrangements by contemporary composers.

#### Oh wait…they might actually be referring to the “United States” but that’s a meaningless term anyway.

FGF 09. Family Guardian Fellowship; nonprofit religious ministry to protect people from extortion, persecution, and exploitation; “An Investigation Into the Meaning of the Term ‘United States’”; http://famguardian.org/subjects/Taxes/ChallJurisdiction/Definitions/freemaninvestigation.htm

Note that the Canal Zone is not a federal State, Territory, or possession of the U.S., but is still being classified as a State! But, then, you must always look at the title, chapter, section, subsection, or, sometimes even sentence, to determine the specific intent. Again, there is no ONE statutory United States. This is incontestable from the dozens and dozens of definitions of the United States in the statutes and codes. And yet one is usually thought weird to contest the underlying theme of the whole IRC namely, that there is only one United States the whole nation. This is fatuous, of course, when you really think about it which almost no one does. Not just because of the Hooven case, above, but because of the numbing [the] number of variations on the definition of the United States in the IRC. Some say [are] over 200, which is perhaps too many, but certainly more than one. In this title (12), Banks and Banking, they always seem to use the universally recognized restrictive word means, rather than the IRC s term of choice, includes, that has beguiled, deceived, deluded, hoodwinked, misdirected, and, most of all victimized, basically, the whole country. Such as in 215b(2) Definitions:

#### This is a reason to vote neg—plan vagueness ensures bad policy—bad for education—it’s a voter—precludes role of the ballot because there’s no way to know the effect that the plan would have in the real world. 90% of policymaking is deciding on implementation.

Elmore 80. Prof. Public Affairs at University of Washington; 1980 PolySci Quarterly 79-80; Pg. 605

The emergence of implementation as a subject for policy analysis coincides closely with the discovery by policy analysts that decisions are not self-executing. Analysis of policy choices matter very little if the mechanism for implementing those choices is poorly understood in answering the question, "What percentage of the work of achieving a desired governmental action is done when the preferred analytic alternative has been identified?" Allison estimated that in the normal case, it was about 10 percent, leaving the remaining 90 percent in the realm of implementation.

#### Vote negative – it’s impossible to debate an aff that does nothing and it’s not in your jurisdiction to vote for a policy that can never actually exist—hurts education and real-world applicability.

At worst, the University School can’t ban private appropriation

### 2

#### I am Eric, an Evil Demon from the Nether, and I have one goal: This ballot. I will wreak havoc and stop at nothing until l get this dub, then I will go back to Nether. I have taken over Eric’s Body, Fear me and my threat. No rules will constrain me as the application of rules, even when justified, are not inherent.

#### Langseth[[1]](#footnote-1),This section shows that rules themselves do not determine how they are to be followed. There is nothing, for example, inherent in an arrow that shows us which way it is pointing or directing us to go.2 Similarly, as the above quote shows, there is no means by which it can be known with com- plete certainty that, in following the arithmetical sequence 0, n, 2n, 3n, 4n... in line with the order “+1,” a person is following the intended rule, for he or she may be following an alternative rule that is compatible with the intended rule *up to a certain point.* There must be something in addition to the rule that directs us in a particular manner and indicates to us that we proceed accordingly. The argument Wittgenstein is making in Section 185 is dependent upon the fact that a rule, in order to be a rule, must be able to be broken. There must be correct and incorrect applications of a rule. The question that arises here is: What determines correct and incorrect application of a rule? Or, what justifies following a rule correctly? If a rule in itself does not show us how we are to follow it, then our interpretation of a rule must also not determine correct use. If interpretation was what determined correct use, there would be no incorrect application of a rule. This is the case because any interpretation can be seen to be in accordance with a rule.

#### Avik is now under my control, I have hypnotized them during prep time and they are now my Puppet.

#### To demonstrate this, I will make them do a couple of things.

#### In their 1ar, they will make arguments about why you should vote me down and why you should vote them up. (I will also make them say they aren’t hypnotized) But know this: through telepathy, I have learned that their true intention was to lose this round; They planned to forfeit in the 1ar. It appears I didn’t need to hypnotize them in the first place. No amount of evidence can ever prove objective knowledge. Searle,[[2]](#footnote-2)

#### **You could have the best possible evidence about other people’s behavior and still be mistaken about their mental states.** You could have the best possible evidence about the past and still be mistaken about the future. You could have the best possible evidence about your own perceptual experiences and still be mistaken about the external world. This is so because **you could be** dreaming,having hallucinations, be a brain in a vat, or be **deceieved** systematically **by an evil demon**. Strange situations, yes, but **it is impossible to disprove the potentiality** **for** any of **the**se**scenarios.”**

#### I have programmed them to think that they are not hypnotized, that they want to win the round, and that they think what I am saying is very silly. But no matter our empirical observations, their intentions are indeterminate. Kant Immanuel, The Critique of Pure Reason. Translated by J.M.D. Meiklejohn. 1781. Under heading “Exposition of the Cosmological Idea of Freedom in Harmony with the Universal Law of Natural Necessity.” available online: <http://www.gutenberg.org/dirs/etext03/cprrn10.txt> SJCP//JG The **real morality of actions’--**their **merit** or demerit**, and** even that of **our own conduct, is completely unknown to us.** Our **estimates can relate only to** their **empirical character**. **How much is the result of** the action of **free will**, how much is to be **ascribed to nature** and to **blameless error**, **or to** a happy **constitution of temperament** (merito fortunae), **no one can discover, nor,** for this reason, **determine with perfect justice.**

#### Of course, I have no intention of keeping them as my puppet, (I have too many). When they say

#### “I am forfeiting this round, yes this is serious, and this comes before all other arguments. To clarify- I am kicking every single argument I made and asking you to vote for Eric” and then stop speaking, then they will wake up and you will know they are no longer under my command. Until then, I am the puppet-master.:

### 3

#### Earth is flat – tons of warrants.

Anti-Vaccine Scientific Support Arsenal 16 [Anti-Vaccine Scientific Support Arsenal, 2-8-2016, "Top Ten Undeniable Proofs the Earth is Flat," FLAT EARTH SCIENCE AND THE BIBLE, https://flatearthscienceandbible.com/2016/02/08/top-ten-undeniable-flat-earth-proofs/] JS

1) The horizon always appears completely flat 360 degrees to the observer, regardless of how high you go up. Any curvature you think you see is from curved airplane windows or Go Pro cameras and fisheye lenses (which NASA loves to use). The reality is that the horizon never curves because we are on an endless plane. On a globe with 25,000 miles in circumference you would see a noticeable disappearance of objects the further they are as they would be leaning away from you and dropping below the constantly curving horizon! 2) The horizon always rises to meet your eye level never no matter how high in altitude you go. Even at 20 miles up the horizon rises to meet the observer/camera. This is only physically possible if the earth is a huge "endless" flat plane. 3) The natural physics of water is to find and maintain its level. If Earth were a giant spinning sphere tilting and hurling through space then truly flat, consistently level surfaces would not exist here. There would be a massive bulge of water in the oceans because of the curvature of the earth. If earth was curved and spinning the oceans of water would be flowing down to level and covering land. Some rivers would be impossibly flowing uphill. There would massive water chaos and flooding! What we would see and experience would be vastly different! But since Earth is in fact an extended flat plane, this fundamental physical property of fluids finding and remaining level is consistent with experience and common sense. The water remains flat because the earth is flat! 4) If Earth were a ball 25,000 miles in circumference as NASA and modern astronomy claim, spherical trigonometry dictates the surface of all standing water must curve downward an easily measurable 8 inches per mile multiplied by the square of the distance. This means along a 6 mile channel of standing water, the Earth would dip 6 feet on either end from the central peak. Every time such experiments have been conducted, however, standing water has proven to be perfectly level. 5) The sun is much closer than we have been told. It is, in fact, in our atmosphere. You can clearly see that it is not 93 million miles away. Many times you can see the sun's rays shooting out of a cloud forming a triangle. If you follow the rays to their source it will always lead to a place above the clouds. If the sun was truly millions of miles away, all the rays would come in at a straight angle. Also the sun can be seen directly above clouds in some balloon photos, creating a hot spot on the clouds below it and in other photos you can clearly see the clouds dispersing directly underneath the close small sun. 6) If we were living on a spinning globe airplane's would constantly have to dip their noses down every few minutes to compensate for the curvature of the earth (with a circumference of 25,000 miles the earth would be constantly curving at the speed of an airplane). In reality however, they never do this! They learn how to fly based on a level flat plane. Also if the earth was spinning the airplane's going west would get to their destination much faster since the earth is spinning in the opposite direction. If the atmosphere is spinning with the earth then airplanes flying west would have to fly faster than the earth's spin to reach its destination. In reality, the earth is flat and airplanes just fly level and reach their destination easily because the earth is not moving. 7) The experiment known as “Airy’s Failure” proved that the stars move relative to a stationary Earth and not the other way around. By first filling a telescope with water to slow down the speed of light inside, then calculating the tilt necessary to get the starlight directly down the tube, Airy failed to prove the heliocentric theory since the starlight was already coming in the correct angle with no change necessary, and instead proved the geocentric model correct. 8) The Michelson-Morley and Sagnac experiments attempted to measure the change in speed of light due to Earth’s assumed motion through space. After measuring in every possible different direction in various locations they failed to detect any significant change whatsoever, again proving the stationary geocentric model. 9) If “gravity” is really a force strong enough to hold the world’s oceans, buildings, people and atmosphere stuck to the surface of a spinning ball, then it is impossible for “gravity” to also simultaneously be weak enough to allow little birds, bugs, and planes to take-off and travel freely unabated in any direction. If “gravity” is strong enough to curve the massive expanse of oceans around a globular Earth, it would be impossible for fish and other creatures to swim through such forcefully held water. 10) Ship captains in navigating great distances at sea never need to factor the supposed curvature of the Earth into their calculations. Both Plane Sailing and Great Circle Sailing, the most popular navigation methods, use plane, not spherical trigonometry, making all mathematical calculations on the assumption that the Earth is perfectly flat. If the Earth were in fact a sphere, such an errant assumption would lead to constant glaring inaccuracies. Plane Sailing has worked perfectly fine in both theory and practice for thousands of years, however, and plane trigonometry has time and again proven more accurate than spherical trigonometry in determining distances across the oceans. If the Earth were truly a globe, then every line of latitude south of the equator would have to measure a gradually smaller and smaller circumference the farther South travelled. If, however, the Earth is an extended plane, then every line of latitude south of the equator should measure a gradually larger and larger circumference the farther South travelled. The fact that many captains navigating south of the equator assuming the globular theory have found themselves drastically out of reckoning, more so the farther South travelled, testifies to the fact that the Earth is not a ball.

#### Flat earth flips existing all conceptions of science & society at large – this means you go neg on presumption because their presumptions are presumptive

DirtyOldAussie 17 [DirtyOldAussie, 4-1-2017, "What are the true implications of a Flat Earth vs Spherical Earth? How else would our thinking change if it really was flat? • r/AskReddit," reddit, \*this post was marked serious so it’s legit, https://www.reddit.com/r/AskReddit/comments/670rf6/what\_are\_the\_true\_implications\_of\_a\_flat\_earth\_vs/] JS

You'd have throw away the theory of gravity, special relativity, Newtonian mechanics, conventional astronomy, celestial mechanics, cosmology and a bunch of other fairly well established structures. Then you'd also have to deal with several worldwide conspiracies involving government, airline pilots, space agencies, astronomers, ships captains and others.

### 4

#### The role of the ballot is to determine whether the resolution is a true or false statement – anything else moots 7 minutes of the nc – their framing collapses since you must say it is true that a world is better than another before you adopt it.

#### They justify substantive skews since there will always be a more correct side of the issue but we compensate for flaws in the lit.

#### Scalar methods like comparison increases intervention – the persuasion of certain DA or advantages sway decisions – T/F binary is descriptive and technical.

#### Negate because either the aff is true meaning its bad for us to clash w/ it because it turns us into Fake News people OR it’s not meaning it’s a lie that you can’t vote on for ethics

#### The ballot says vote aff or neg based on a topic – five dictionaries[[3]](#footnote-3) define to negate as to deny the truth of and affirm[[4]](#footnote-4) as to prove true so it's constitutive and jurisdictional. I denied the truth of the resolution by disagreeing with the aff which means I've met my burden.

#### The resolution is incoherent-

#### 1] Appropriation means the act of getting or saving money, but outer space can’t own or save money since it’s an abstract concept

Merriam Webster https://www.merriam-webster.com/dictionary/appropriation

the act of getting or saving money for a specific use or purpose

#### 2] Unjust is defined as unfaithful or dishonest but appropriation can’t lie or be faithful to something because it’s the noun form of a verb

Merriam Webster https://www.dictionary.com/browse/unjust

unfaithful or dishonest

#### 3] The is defined as things that occur in nature but appropriation doesn’t occur naturally

Merriam Webster https://www.merriam-webster.com/dictionary/the

used to refer to things that occur in nature

#### 4] Entities are defined as objects in Minecraft which have heath points but they can’t appropriate space lol

Minecraft Wiki https://minecraft-archive.fandom.com/wiki/Entity#:~:text=Entities%20are%20objects%20in%20Minecraft,be%20reduced%20and%20can%20move.

Entities are objects in Minecraft which often have health points that can be reduced and can move.

#### 5] Neg definition and framework choice-anything else moots 7 mins of the 1NC since I premised my engagement on your lack of a definition, they had a chance to define the resolution in the 1AC but didn’t.

#### 6] Good Samaritan Paradox: In order to solve X problem one must want X problem to exist since it’s existence is a precondition for it becoming non-existent, which makes any attempt to be moral inherently immoral, turns the aff

#### 7] Vote neg because it’s simple – evaluating responses to this is complicated so don’t – so evaluate the debate after the 1NC

Baker 04’ [Baker, Alan, 10-29-2004, "Simplicity (Stanford Encyclopedia of Philosophy)," <https://plato.stanford.edu/entries/simplicity/>]

With respect to question (ii), there is an important distinction to be made between two sorts of simplicity principle. Occam's Razor may be formulated as an epistemic principle: if theory T is simpler than theory T\*, then it is rational (other things being equal) to believe T rather than T\*. Or it may be formulated as a methodological principle: if T is simpler than T\* then it is rational to adopt T as one's working theory for scientific purposes. These two conceptions of Occam's Razor require different sorts of justification in answer to question (iii). In analyzing simplicity, it can be difficult to keep its two facets—elegance and parsimony—apart. Principles such as Occam's Razor are frequently stated in a way which is ambiguous between the two notions, for example, “Don't multiply postulations beyond necessity.” Here it is unclear whether ‘postulation’ refers to the entities being postulated, or the hypotheses which are doing the postulating, or both. The first reading corresponds to parsimony, the second to elegance. Examples of both sorts of simplicity principle can be found in the quotations given earlier in this section.

### Case

#### Extinction is inevitable from future technology — nanotech, our simulation gets shut down, AI, biotech, particle accelerators, and black swans

Bruce Sterling 18, 6-1-20**18**, "When Nick Bostrom says “Bang”," WIRED, <https://www.wired.com/beyond-the-beyond/2018/06/nick-bostrom-says-bang/>

\*We do not endorse the author’s language\*

4.1 Deliberate misuse of nanotechnology In a mature form, molecular nanotechnology will enable the construction of bacterium-scale self-replicating mechanical robots that can feed on dirt or other organic matter [22-25]. Such replicators could eat up the biosphere or destroy it by other means such as by poisoning it, burning it, or blocking out sunlight. A person of malicious intent in possession of this technology might cause the extinction of intelligent life on Earth by releasing such nanobots into the environment.[9] The technology to produce a destructive nanobot seems considerably easier to develop than the technology to create an effective defense against such an attack (a global nanotech immune system, an “active shield” [23]). It is therefore likely that there will be a period of vulnerability during which this technology must be prevented from coming into the wrong hands. Yet the technology could prove hard to regulate, since it doesn’t require rare radioactive isotopes or large, easily identifiable manufacturing plants, as does production of nuclear weapons [23]. Even if effective defenses against a limited nanotech attack are developed before dangerous replicators are designed and acquired by suicidal regimes or terrorists, there will still be the danger of an arms race between states possessing nanotechnology. It has been argued [26] that molecular manufacturing would lead to both arms race instability and crisis instability, to a higher degree than was the case with nuclear weapons. Arms race instability means that there would be dominant incentives for each competitor to escalate its armaments, leading to a runaway arms race. Crisis instability means that there would be dominant incentives for striking first. Two roughly balanced rivals acquiring nanotechnology would, on this view, begin a massive buildup of armaments and weapons development programs that would continue until a crisis occurs and war breaks out, potentially causing global terminal destruction. That the arms race could have been predicted is no guarantee that an international security system will be created ahead of time to prevent this disaster from happening. The nuclear arms race between the US and the USSR was predicted but occurred nevertheless. 4.2 Nuclear holocaust[winter] The US and Russia still have huge stockpiles of nuclear weapons. But would an all-out nuclear war really exterminate humankind? Note that: (i) For there to be an existential risk it suffices that we can’t be sure that it wouldn’t. (ii) The climatic effects of a large nuclear war are not well known (there is the possibility of a nuclear winter). (iii) Future arms races between other nations cannot be ruled out and these could lead to even greater arsenals than those present at the height of the Cold War. The world’s supply of plutonium has been increasing steadily to about two thousand tons, some ten times as much as remains tied up in warheads ([9], p. 26). (iv) Even if some humans survive the short-term effects of a nuclear war, it could lead to the collapse of civilization. A human race living under stone-age conditions may or may not be more resilient to extinction than other animal species. 4.3 We’re living in a simulation and it gets shut down A case can be made that the hypothesis that we are living in a computer simulation should be given a significant probability [27]. The basic idea behind this so-called “Simulation argument” is that vast amounts of computing power may become available in the future (see e.g. [28,29]), and that it could be used, among other things, to run large numbers of fine-grained simulations of past human civilizations. Under some not-too-implausible assumptions, the result can be that almost all minds like ours are simulated minds, and that we should therefore assign a significant probability to being such computer-emulated minds rather than the (subjectively indistinguishable) minds of originally evolved creatures. And if we are, we suffer the risk that the simulation may be shut down at any time. A decision to terminate our simulation may be prompted by our actions or by exogenous factors. While to some it may seem frivolous to list such a radical or “philosophical” hypothesis next the concrete threat of nuclear holocaust, we must seek to base these evaluations on reasons rather than untutored intuition. Until a refutation appears of the argument presented in [27], it would intellectually dishonest to neglect to mention simulation-shutdown as a potential extinction mode. 4.4 Badly programmed superintelligence When we create the first superintelligent entity [28-34], we might make a mistake and give it goals that lead it to annihilate humankind, assuming its enormous intellectual advantage gives it the power to do so. For example, we could mistakenly elevate a subgoal to the status of a supergoal. We tell it to solve a mathematical problem, and it complies by turning all the matter in the solar system into a giant calculating device, in the process killing the person who asked the question. (For further analysis of this, see [35].) 4.5 Genetically engineered biological agent With the fabulous advances in genetic technology currently taking place, it may become possible for a tyrant, terrorist, or ~~lunatic~~ to create a doomsday virus, an organism that combines long latency with high virulence and mortality [36]. Dangerous viruses can even be spawned unintentionally

#### The military is developing isomer bombs—even just testing will destroy the Universe

Bekkum 4 – Gary S. Bekkum, Founder of Spacetime Threat Assessment Report Research, Founder of STARstream Research, Futurist, "American Military is Pursuing New Types of Exotic Weapons", Pravda, 8-30, http://www.starstreamresearch.com/dark\_matters.htm

Recently the British science news journal "New Scientist" revealed that the American military is pursuing new types of exotic bombs - including a new class of isomeric gamma ray weapons. Unlike conventional atomic and hydrogen bombs, the new weapons would trigger the release of energy by absorbing radiation, and respond by re-emitting a far more powerful radiation. In this new category of gamma-ray weapons, a nuclear isomer absorbs x-rays and re-emits higher frequency gamma rays. The emitted gamma radiation has been reported to release 60 times the energy of the x-rays that trigger the effect. The discovery of this isomer triggering is fairly recent, and was first reported in a 1999 paper by an international group of scientists. Although this controversial development has remained fairly obscure, it has not been hidden from the public. Beyond the visible part of defense research is an immense underground of secret projects considered so sensitive that their very existence is denied. These so-called "black budget programs" are deliberately kept from the public eye and from most political leaders. CNN recently reported that in the United States the black budget projects for 2004 are being funded at a level of more than 20 billion dollars per year. In the summer of 2000 I contacted Nick Cook, the former aviation editor and aerospace consultant to Jane's Defence Weekly, the international military affairs journal. Cook had been investigating black budget super-secret research into exotic physics for advanced propulsion technologies. I had been monitoring electronic discussions between various American and Russian scientists theorizing about rectifying the quantum vacuum for advanced space drive. Several groups of scientists, partitioned into various research organizations, were exploring what NASA calls "Breakthrough Propulsion Physics" - exotic technologies for advanced space travel to traverse the vast distances between stars. Partly inspired by the pulp science fiction stories of their youth, and partly by recent reports of multiple radar tracking tapes of unidentified objects performing impossible maneuvers in the sky, these scientists were on a quest to uncover the most likely new physics for star travel. The NASA program was run by Marc Millis, financed under the Advanced Space Transportation Program Office (ASTP). Joe Firmage, then the 28-year-old Silicon Valley CEO of the three billion dollar Internet firm US Web, began to fund research in parallel with NASA. Firmage hired a NASA Ames nano-technology scientist, Creon Levit, to run the "International Space Sciences Organization", a move which apparently alarmed the management at NASA. The San Francisco based Hearst Examiner reported that NASA's Office of Inspector General assigned Special Agent Keith Tate to investigate whether any proprietary NASA technology might have been leaking into the private sector. Cook was intrigued when I pointed out the apparent connections between various private investors, defense contractors, NASA, INSCOM (American military intelligence), and the CIA. While researching exotic propulsion technologies Cook had heard rumors of a new kind of weapon, a "sub-quantum atomic bomb", being whispered about in what he called ⌠the dark halls of defense research. Sub-quantum physics is a controversial re-interpretation of quantum theory, based on so-called pilot wave theories, where an information field controls quantum particles. The late Professor David Bohm showed that the predictions of ordinary quantum mechanics could be recast into a pilot wave information theory. Recently Anthony Valentini of the Perimeter Institute has suggested that ordinary quantum theory may be a special case of pilot wave theories, leaving open the possibility of new and exotic non-quantum technologies. Some French, Serbian and Ukrainian physicists have been working on new theories of extended electrons and solitons, so perhaps a sub-quantum bomb is not entirely out of the question. Even if the rumors of a sub-quantum bomb are pure fantasy, there is no question that mainstream physicists seriously contemplate a phase transition in the quantum vacuum as a real possibility. The quantum vacuum defies common sense, because empty space in quantum field theory is actually filled with virtual particles. These virtual particles appear and disappear far too quickly to be detected directly, but their existence has been confirmed by experiments that demonstrate their influence on ordinary matter. "Such research should be forbidden!" In the early 1970's Soviet physicists were concerned that the vacuum of our universe was only one possible state of empty space. The fundamental state of empty space is called the "true vacuum". Our universe was thought to reside in a "false vacuum", protected from the true vacuum by "the wall of our world". A change from one vacuum state to another is known as a phase transition. This is analogous to the transition between frozen and liquid water. Lev Okun, a Russian physicist and historian recalls Andrei Sakharov, the father of the Soviet hydrogen bomb, expressing his concern about research into the phase transitions of the vacuum. If the wall between vacuum states was to be breached, calculations showed that an unstoppable expanding bubble would continue to grow until it destroyed our entire universe! Sakharov declared that "Such research should be forbidden!" According to Okun, Sakharov feared that an experiment might accidentally trigger a vacuum phase transition.

#### Nuclear war can’t cause extinction – We’ve nuked ourselves 2000 times – guess what happened nothing

Eken 17 (Mattias Eken - PhD student in Modern History at the University of St Andrews whose thesis focuses on “The Enola Gay Controversy and the American Encounter with Nuclear Weapons”. <MKIM> “The understandable fear of nuclear weapons doesn’t match reality”. 3/14/17. DOA: 7/17/19. https://theconversation.com/the-understandable-fear-of-nuclear-weapons-doesnt-match-reality-73563)

Nuclear weapons are unambiguously the most destructive weapons on the planet. Pound for pound, they are the most lethal weapons ever created, capable of killing millions. Millions live in fear that these weapons will be used again, with all the potential consequences. However, the destructive power of these weapons **has been vastly exaggerated**, albeit for good reasons. Public fear of nuclear weapons being used in anger, whether by terrorists or nuclear-armed nations, has risen once again in recent years. **This is** in no small part **thanks to the current political climate** between states such as the US and Russia and the various nuclear tests conducted by North Korea. But whenever we talk about nuclear weapons, it’s easy to get carried away with doomsday scenarios and apocalyptic language. As the historian Spencer Weart once argued: “**You say ‘nuclear bomb’ and everybody immediately thinks of the end of the world.**” Yet the means necessary to produce a nuclear bomb, let alone set one off, remain incredibly complex – and while the damage that would be done if someone did in fact detonate one might be very serious indeed, **the chances that it would mean “the end of the world” are vanishingly small**. In his 2013 book Command and Control, the author Eric Schlosser tried to scare us into perpetual fear of nuclear weapons by recounting stories of near misses and accidents involving nuclear weapons. One such event, the 1980 Damascus incident, saw a Titan II intercontinental ballistic missile explode at its remote Arkansas launch facility after a maintenance crew accidentally ruptured its fuel tank. Although the warhead involved in the incident didn’t detonate, Schlosser claims that “if it had, much of Arkansas would be gone”. But that’s not quite the case. The nine-megaton thermonuclear warhead on the **Titan II** missile had a blast radius of 10km, or an area of about 315km². The state of Arkansas spreads over 133,733km², meaning the weapon **would have caused destruction across 0.2% of the state.** That would naturally have been a terrible outcome, but certainly not the catastrophe that Schlosser evokes. Claims exaggerating the effects of nuclear weapons have become commonplace, especially after the September 11 terrorist attacks in 2001. In the early War on Terror years, Richard Lugar, a former US senator and chair of the Senate Foreign Relations Committee, argued that terrorists armed with nuclear weapons pose an existential threat to the Western way of life. What he failed to explain is how. It is by no means certain that a single nuclear detonation **(or even several)** would do away with our current way of life. Indeed, we’re still here despite having nuked our own planet more than 2,000 times – a tally expressed beautifully in this video by Japanese artist Isao Hashimoto). While the 1963 Limited Test Ban Treaty forced nuclear tests underground, around 500 of all the nuclear weapons detonated were unleashed in the Earth’s atmosphere. This includes the world’s largest ever nuclear detonation, the 57-megaton bomb known as **Tsar Bomba**, detonated by the Soviet Union on October 30 1961. Tsar Bomba was more than 3,000 times more powerful than the bomb dropped on Hiroshima. That is immense destructive power – but as one physicist explained, **it’s only “one-thousandth the force of an earthquake, one-thousandth the force of a hurricane”.** The Damascus incident proved how incredibly hard it is to set off a nuclear bomb and the limited effect that would have come from just one warhead detonating. Despite this, some scientists have controversially argued that an even limited all-out nuclear war might lead to a so-called nuclear winter, since the smoke and debris created by very large bombs could block out the sun’s rays for a considerable amount of time. To inflict such ecological societal annihilation with weapons alone, we would have to detonate hundreds if not thousands of thermonuclear devices in a short time. Even in such extreme conditions, the area actually devastated by the bombs would be limited: for example, **2,000 one-megaton explosions with a destructive radius of five miles each would directly destroy less than 5% of the territory of the US**. Of course, if the effects of nuclear weapons have been greatly exaggerated, there is a very good reason: since these weapons are indeed extremely dangerous, any posturing and exaggerating which intensifies our fear of them makes us less likely to use them. But it’s important, however, to understand why people have come to fear these weapons the way we do. After all, nuclear weapons are here to stay; they can’t be “un-invented”. If we want to live with them and mitigate the very real risks they pose, we must be honest about what those risks really are. Overegging them to frighten ourselves more than we need to keeps nobody safe.

#### Rigorous climate simulations prove that hydrophilic black carbon would cause to atmospheric precipitation – results in a rainout effect that quickly reverses nuclear cooling

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\*BC = Black Carbon

The no-rubble simulation produces a significantly more intense fire, with more fire spread, and consequently a significantly stronger plume with larger amounts of BC reaching into the upper atmosphere than the simulation with rubble, illustrated in Figure 5. While the no-rubble simulation **represents the worst-case scenario** involving vigorous fire activity, **only a relatively small amount of carbon makes its way into the stratosphere** during the course of the simulation. But while small compared to the surface BC mass, stratospheric BC amounts from the current simulations are significantly higher than what would be expected from burning vegetation such as trees (Heilman et al., 2014), e.g., the higher energy density of the building fuels and the initial fluence from the weapon produce an intense response within HIGRAD with initial updrafts of order 100 m/s in the lower troposphere. Or, in comparison to a mass fire, wildfires will burn only a small amount of fuel in the corresponding time period (roughly 10 minutes) that a nuclear weapon fluence can effectively ignite a large area of fuel producing an impressive atmospheric response. Figure 6 shows vertical profiles of BC multiplied by 100 (number of cities involved in the exchange) from the two simulations. The total amount of BC produced is in line with previous estimates (about 3.69 Tg from no-rubble simulation); however, the majority of BC resides **below the stratosphere** (3.46 Tg below 12 km) and can be **readily impacted by scavenging from precipitation** either via pyro-cumulonimbus produced by the fire itself (not modeled) or other synoptic weather systems. While the impact on climate of these more realistic profiles will be explored in the next section, it should be mentioned that **these estimates are** still **at the high end**, considering the inherent simplifications in the combustion model that lead to **overestimating BC production**. 3.3 Climate Results Long-term climatic effects critically depend on the initial injection height of the soot, with larger quantities reaching the upper troposphere/lower stratosphere inducing a greater cooling impact because of longer residence times (Robock et al., 2007a). Absorption of solar radiation by the BC aerosol and its subsequent radiative cooling tends to heat the surrounding air, driving an initial upward diffusion of the soot plumes, an effect that depends on the initial aerosol concentrations. **Mixing and sedimentation** tend to **reduce this process**, and low altitude emissions are also significantly impacted by precipitation if aging of the BC aerosol occurs on sufficiently rapid timescales. But once at stratospheric altitudes, aerosol dilution via coagulation is hindered by low particulate concentrations (e.g., Robock et al., 2007a) and lofting to much higher altitudes is inhibited by gravitational settling in the low-density air (Stenke et al., 2013), resulting in more stable BC concentrations over long times. Of the initial BC mass released in the atmosphere, most of which is emitted below 9 km, **70% rains out within the first month** and 78%, or about 2.9 Tg, is removed within the first two months (Figure 7, solid line), with the remainder (about 0.8 Tg, dashed line) being transported above about 12 km (200 hPa) within the first week. This outcome differs from the findings of, e.g., Stenke et al. (2013, their high BC-load cases) and Mills et al. (2014), who found that most of the BC mass (between 60 and 70%) is lifted in the stratosphere within the first couple of weeks. This can also be seen in Figure 8 (red lines) and in Figure 9, which include results from our calculation with the initial BC distribution from Mills et al. (2014). In that case, only 30% of the initial BC mass rains out in the troposphere during the first two weeks after the exchange, with the remainder rising to the stratosphere. In the study of Mills et al. (2008) this percentage is somewhat smaller, about 20%, and smaller still in the experiments of Robock et al. (2007a) in which the soot is initially emitted in the upper troposphere or higher. In Figure 7, the e-folding timescale for the removal of tropospheric soot, here interpreted as the time required for an initial drop of a factor e, is about one week. This result compares favorably with the “LT” experiment of Robock et al. (2007a), considering 5 Tg of BC released in the lower troposphere, in which 50% of the aerosols are removed within two weeks. By contrast, the initial e-folding timescale for the removal of stratospheric soot in Figure 8 is about 4.2 years (blue solid line), compared to about 8.4 years for the calculation using Mills et al. (2014) initial BC emission (red solid line). The removal timescale from our forced ensemble simulations is close to those obtained by Mills et al. (2008) in their 1 Tg experiment, by Robock et al. (2007a) in their experiment “UT 1 Tg”, and © 2018 American Geophysical Union. All rights reserved. by Stenke et al. (2013) in their experiment “Exp1”, in all of which 1 Tg of soot was emitted in the atmosphere in the aftermath of the exchange. Notably, the e-folding timescale for the decline of the BC mass in Figure 8 (blue solid line) is also close to the value of about 4 years quoted by Pausata et al. (2016) for their long-term “intermediate” scenario. In that scenario, which is also based on 5 Tg of soot initially distributed as in Mills et al. (2014), the factor-of2 shorter residence time of the aerosols is caused by particle growth via coagulation of BC with organic carbon. Figure 9 shows the BC mass-mixing ratio, horizontally averaged over the globe, as a function of atmospheric pressure (height) and time. The BC distributions used in our simulations imply that the upward transport of particles is substantially less efficient compared to the case in which 5 Tg of BC is directly injected into the upper troposphere. The semiannual cycle of lofting and sinking of the aerosols is associated with atmospheric heating and cooling during the solstice in each hemisphere (Robock et al., 2007a). During the first year, the oscillation amplitude in our forced ensemble simulations is particularly large during the summer solstice, compared to that during the winter solstice (see bottom panel of Figure 9), because of the higher soot concentrations in the Northern Hemisphere, as can be seen in Figure 11 (see also left panel of Figure 12). Comparing the top and bottom panels of Figure 9, the BC reaches the highest altitudes during the first year in both cases, but the concentrations at 0.1 hPa in the top panel can be 200 times as large. Qualitatively, the difference can be understood in terms of the air temperature increase caused by BC radiation emission, which is several tens of kelvin degrees in the simulations of Robock et al. (2007a, see their Figure 4), Mills et al. (2008, see their Figure 5), Stenke et al. (2013, see high-load cases in their Figure 4), Mills et al. (2014, see their Figure 7), and Pausata et al. (2016, see one-day emission cases in their Figure 1), due to high BC concentrations, but it amounts to only about 10 K in our forced ensemble simulations, as illustrated in Figure 10. Results similar to those presented in Figure 10 were obtained from the experiment “Exp1” performed by Stenke et al. (2013, see their Figure 4). **In that scenario as well, somewhat less that 1 Tg of BC remained in the atmosphere after the initial rainout**. As mentioned before, the BC aerosol that remains in the atmosphere, lifted to stratospheric heights by the rising soot plumes, undergoes sedimentation over a timescale of several years (Figures 8 and 9). This mass represents the effective amount of BC that can force climatic changes over multi-year timescales. In the forced ensemble simulations, it is about 0.8 Tg after the initial rainout, whereas it is about 3.4 Tg in the simulation with an initial soot distribution as in Mills et al. (2014). Our more realistic source simulation involves the worstcase assumption of no-rubble (along with other assumptions) and hence serves as an upper bound for the impact on climate. As mentioned above and further discussed below, our scenario induces perturbations on the climate system similar to those found in previous studies in which the climatic response was driven by roughly 1 Tg of soot rising to stratospheric heights following the exchange. Figure 11 illustrates the vertically integrated mass-mixing ratio of BC over the globe, at various times after the exchange for the simulation using the initial BC distribution of Mills et al. (2014, upper panels) and as an average from the forced ensemble members (lower panels). All simulations predict enhanced concentrations at high latitudes during the first year after the exchange. In the cases shown in the top panels, however, these high concentrations persist for several years (see also Figure 1 of Mills et al., 2014), whereas the forced ensemble simulations indicate that the BC concentration starts to decline after the first year. In fact, in the simulation represented in the top panels, mass-mixing ratios larger than about 1 kg of BC © 2018 American Geophysical Union. All rights reserved. per Tg of air persist for well over 10 years after the exchange, whereas they only last for 3 years in our forced simulations (compare top and middle panels of Figure 9). After the first year, values drop below 3 kg BC/Tg air, whereas it takes about 8 years to reach these values in the simulation in the top panels (see also Robock et al., 2007a). Over crop-producing, midlatitude regions in the Northern Hemisphere, the BC loading is reduced from more than 0.8 kg BC/Tg air in the simulation in the top panels to 0.2-0.4 kg BC/Tg air in our forced simulations (see middle and right panels). The more rapid clearing of the atmosphere in the forced ensemble is also signaled by the soot optical depth in the visible radiation spectrum, which drops below values of 0.03 toward the second half of the first year at mid latitudes in the Northern Hemisphere, and everywhere on the globe after about 2.5 years (without never attaining this value in the Southern Hemisphere). In contrast, the soot optical depth in the calculation shown in the top panels of Figure 11 becomes smaller than 0.03 everywhere only after about 10 years. The two cases show a similar tendency, in that the BC optical depth is typically lower between latitudes 30º S-30º N than it is at other latitudes. This behavior is associated to the persistence of stratospheric soot toward high-latitudes and the Arctic/Antarctic regions, as illustrated by the zonally-averaged, column-integrated mass-mixing ratio of the BC in Figure 12 for both the forced ensemble simulations (left panel) and the simulation with an initial 5 Tg BC emission in the upper troposphere (right panel). The spread in the globally averaged (near) surface temperature of the atmosphere, from the control (left panel) and forced (right panel) ensembles, is displayed in Figure 13. For each month, the plots show the largest variations (i.e., maximum and minimum values), within each ensemble of values obtained for that month, relative to the mean value of that month. The plot also shows yearly-averaged data (thinner lines). The spread is comparable in the control and forced ensembles, with average values calculated over the 33-years run length of 0.4-0.5 K. This spread is also similar to the internal variability of the globally averaged surface temperature quoted for the NCAR Large Ensemble Community Project (Kay et al., 2015). These results imply that surface air temperature differences, between forced and control simulations, which lie within the spread may not be distinguished from effects due to internal variability of the two simulation ensembles. Figure 14 shows the difference in the globally averaged surface temperature of the atmosphere (top panel), net solar radiation flux at surface (middle panel), and precipitation rate (bottom panel), computed as the (forced minus control) difference in ensemble mean values. The sum of standard deviations from each ensemble is shaded. Differences are qualitatively significant over the first few years, when the anomalies lie near or outside the total standard deviation. Inside the shaded region, differences may not be distinguished from those arising from the internal variability of one or both ensembles. The surface solar flux (middle panel) is the quantity that appears most affected by the BC emission, with qualitatively significant differences persisting for about 5 years. The precipitation rate (bottom panel) is instead affected only at the very beginning of the simulations. The red lines in all panels show the results from the simulation applying the initial BC distribution of Mills et al. (2014), where the period of significant impact is much longer owing to the higher altitude of the initial soot distribution that results in longer residence times of the BC aerosol in the atmosphere. When yearly averages of the same quantities are performed over the IndiaPakistan region, the differences in ensemble mean values lie within the total standard deviations of the two ensembles. The results in Figure 14 can also be compared to the outcomes of other previous studies. In their experiment “UT 1 Tg”, Robock et al. (2007a) found that, when only 1 Tg of soot © 2018 American Geophysical Union. All rights reserved. remains in the atmosphere after the initial rainout, temperature and precipitation anomalies are about 20% of those obtained from their standard 5 Tg BC emission case. Therefore, the largest differences they observed, during the first few years after the exchange, were about - 0.3 K and -0.06 mm/day, respectively, comparable to the anomalies in the top and bottom panels of Figure 14. Their standard 5 Tg emission case resulted in a solar radiation flux anomaly at surface of -12 W/m2 after the second year (see their Figure 3), between 5 and 6 time as large as the corresponding anomalies from our ensembles shown in the middle panel. In their experiment “Exp1”, Stenke et al. (2013) reported global mean surface temperature anomalies not exceeding about 0.3 K in magnitude and precipitation anomalies hovering around -0.07 mm/day during the first few years, again consistent with the results of Figure 14. In a recent study, Pausata et al. (2016) considered the effects of an admixture of BC and organic carbon aerosols, both of which would be emitted in the atmosphere in the aftermath of a nuclear exchange. In particular, they concentrated on the effects of coagulation of these aerosol species and examined their climatic impacts. The initial BC distribution was as in Mills et al. (2014), although the soot burden was released in the atmosphere over time periods of various lengths. Most relevant to our and other previous work are their one-day emission scenarios. They found that, during the first year, the largest values of the atmospheric surface temperature anomalies ranged between about -0.5 and -1.3 K, those of the sea surface temperature anomalies ranged between -0.2 and -0.55 K, and those of the precipitation anomalies varied between -0.15 and -0.2 mm/day. All these ranges are compatible with our results shown in Figure 14 as red lines and with those of Mills et al. (2014, see their Figures 3 and 6). As already mentioned in Section 2.3, the net solar flux anomalies at surface are also consistent. This overall agreement suggests that the **inclusion of organic carbon aerosols, and** ensuing **coagulation** with BC, **should not dramatically alter the climatic effects** resulting from our forced ensemble simulations. Moreover, aerosol growth would likely **shorten the residence time of the BC particulate in the atmosphere** (Pausata et al., 2016), possibly **reducing the duration of these effects.**

#### Industrial civilization wouldn’t recover.

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Imagine that the world as we know it ends tomorrow. There’s a global catastrophe: a pandemic virus, an asteroid strike, or perhaps a nuclear holocaust. The vast majority of the human race perishes. Our civilisation collapses. The post-apocalyptic survivors find themselves in a devastated world of decaying, deserted cities and roving gangs of bandits looting and taking by force. Bad as things sound, that’s not the end for humanity. We bounce back. Sooner or later, peace and order emerge again, just as they have time and again through history. Stable communities take shape. They begin the agonising process of rebuilding their technological base from scratch. But here’s the question: how far could such a society rebuild? Is there any chance, for instance, that a post-apocalyptic society could reboot a technological civilisation? Let’s make the basis of this thought experiment a little more specific. Today, we have already consumed the most easily drainable crude oil and, particularly in Britain, much of the shallowest, most readily mined deposits of coal. Fossil fuels are central to the organisation of modern industrial society, just as they were central to its development. Those, by the way, are distinct roles: even if we could somehow do without fossil fuels now (which we can’t, quite), it’s a different question whether we could have got to where we are without ever having had them. So, would a society starting over on a planet stripped of its fossil fuel deposits have the chance to progress through its own Industrial Revolution? Or to phrase it another way, what might have happened if, for whatever reason, the Earth had never acquired its extensive underground deposits of coal and oil in the first place? Would our progress necessarily have halted in the 18th century, in a pre-industrial state? It’s easy to underestimate our current dependence on fossil fuels. In everyday life, their most visible use is the petrol or diesel pumped into the vehicles that fill our roads, and the coal and natural gas which fire the power stations that electrify our modern lives. But we also rely on a range of different industrial materials, and in most cases, high temperatures are required to transform the stuff we dig out of the ground or harvest from the landscape into something useful. You can’t smelt metal, make glass, roast the ingredients of concrete, or synthesise artificial fertiliser without a lot of heat. It is fossil fuels – coal, gas and oil – that provide most of this thermal energy. In fact, the problem is even worse than that. Many of the chemicals required in bulk to run the modern world, from pesticides to plastics, derive from the diverse organic compounds in crude oil. Given the dwindling reserves of crude oil left in the world, it could be argued that the most wasteful use for this limited resource is to simply burn it. We should be carefully preserving what’s left for the vital repertoire of valuable organic compounds it offers. But my topic here is not what we should do now. Presumably everybody knows that we must transition to a low-carbon economy one way or another. No, I want to answer a question whose interest is (let’s hope) more theoretical. Is the emergence of a technologically advanced civilisation necessarily contingent on the easy availability of ancient energy? Is it possible to build an industrialised civilisation without fossil fuels? And the answer to that question is: maybe – but it would be extremely difficult. Let’s see how. We’ll start with a natural thought. Many of our alternative energy technologies are already highly developed. Solar panels, for example, represent a good option today, and are appearing more and more on the roofs of houses and businesses. It’s tempting to think that a rebooted society could simply pick up where we leave off. Why couldn’t our civilisation 2.0 just start with renewables? Well, it could, in a very limited way. If you find yourself among the survivors in a post-apocalyptic world, you could scavenge enough working solar panels to keep your lifestyle electrified for a good long while. Without moving parts, photovoltaic cells require little maintenance and are remarkably resilient. They do deteriorate over time, though, from moisture penetrating the casing and from sunlight itself degrading the high-purity silicon layers. The electricity generated by a solar panel declines by about 1 per cent every year so, after a few generations, all our hand-me-down solar panels will have degraded to the point of uselessness. Then what? New ones would be fiendishly difficult to create from scratch. Solar panels are made from thin slices of extremely pure silicon, and although the raw material is common sand, it must be processed and refined using complex and precise techniques – the same technological capabilities, more or less, that we need for modern semiconductor electronics components. These techniques took a long time to develop, and would presumably take a long time to recover. So photovoltaic solar power would not be within the capability of a society early in the industrialisation process. Perhaps, though, we were on the right track by starting with electrical power. Most of our renewable-energy technologies produce electricity. In our own historical development, it so happens that the core phenomena of electricity were discovered in the first half of the 1800s, well after the early development of steam engines. Heavy industry was already committed to combustion-based machinery, and electricity has largely assumed a subsidiary role in the organisation of our economies ever since. But could that sequence have run the other way? Is there some developmental requirement that thermal energy must come first? On the face of it, it’s not beyond the bounds of possibility that a progressing society could construct electrical generators and couple them to simple windmills and waterwheels, later progressing to wind turbines and hydroelectric dams. In a world without fossil fuels, one might envisage an electrified civilisation that largely bypasses combustion engines, building its transport infrastructure around electric trains and trams for long-distance and urban transport. I say ‘largely’. We couldn’t get round it all together. When it comes to generating the white heat demanded by modern industry, there are few good options but to burn stuff While the electric motor could perhaps replace the coal-burning steam engine for mechanical applications, society, as we’ve already seen, also relies upon thermal energy to drive the essential chemical and physical transformations it needs. How could an industrialising society produce crucial building materials such as iron and steel, brick, mortar, cement and glass without resorting to deposits of coal? You can of course create heat from electricity. We already use electric ovens and kilns. Modern arc furnaces are used for producing cast iron or recycling steel. The problem isn’t so much that electricity can’t be used to heat things, but that for meaningful industrial activity you’ve got to generate prodigious amounts of it, which is challenging using only renewable energy sources such as wind and water. An alternative is to generate high temperatures using solar power directly. Rather than relying on photovoltaic panels, concentrated solar thermal farms use giant mirrors to focus the sun’s rays onto a small spot. The heat concentrated in this way can be exploited to drive certain chemical or industrial processes, or else to raise steam and drive a generator. Even so, it is difficult (for example) to produce the very high temperatures inside an iron-smelting blast furnace using such a system. What’s more, it goes without saying that the effectiveness of concentrated solar power depends strongly on the local climate. No, when it comes to generating the white heat demanded by modern industry, there are few good options but to burn stuff. But that doesn’t mean the stuff we burn necessarily has to be fossil fuels. Let’s take a quick detour into the pre-history of modern industry. Long before the adoption of coal, charcoal was widely used for smelting metals. In many respects it is superior: charcoal burns hotter than coal and contains far fewer impurities. In fact, coal’s impurities were a major delaying factor on the Industrial Revolution. Released during combustion, they can taint the product being heated. During smelting, sulphur contaminants can soak into the molten iron, making the metal brittle and unsafe to use. It took a long time to work out how to treat coal to make it useful for many industrial applications. And, in the meantime, charcoal worked perfectly well. And then, well, we stopped using it. In retrospect, that’s a pity. When it comes from a sustainable source, charcoal burning is essentially carbon-neutral, because it doesn’t release any new carbon into the atmosphere – not that this would have been a consideration for the early industrialists. But charcoal-based industry didn’t die out altogether. In fact, it survived to flourish in Brazil. Because it has substantial iron deposits but few coalmines, Brazil is the largest charcoal producer in the world and the ninth biggest steel producer. We aren’t talking about a cottage industry here, and this makes Brazil a very encouraging example for our thought experiment. The trees used in Brazil’s charcoal industry are mainly fast-growing eucalyptus, cultivated specifically for the purpose. The traditional method for creating charcoal is to pile chopped staves of air-dried timber into a great dome-shaped mound and then cover it with turf or soil to restrict airflow as the wood smoulders. The Brazilian enterprise has scaled up this traditional craft to an industrial operation. Dried timber is stacked into squat, cylindrical kilns, built of brick or masonry and arranged in long lines so that they can be easily filled and unloaded in sequence. The largest sites can sport hundreds of such kilns. Once filled, their entrances are sealed and a fire is lit from the top. The skill in charcoal production is to allow just enough air into the interior of the kiln. There must be enough combustion heat to drive out moisture and volatiles and to pyrolyse the wood, but not so much that you are left with nothing but a pile of ashes. The kiln attendant monitors the state of the burn by carefully watching the smoke seeping out of the top, opening air holes or sealing with clay as necessary to regulate the process. Brazil shows how the raw materials of modern civilisation can be supplied without reliance on fossil fuels Good things come to those who wait, and this wood pyrolysis process can take up to a week of carefully controlled smouldering. The same basic method has been used for millennia. However, the ends to which the fuel is put are distinctly modern. Brazilian charcoal is trucked out of the forests to the country’s blast furnaces where it is used to transform ore into pig iron. This pig iron is the basic ingredient of modern mass-produced steel. The Brazilian product is exported to countries such as China and the US where it becomes cars and trucks, sinks, bathtubs, and kitchen appliances. Around two-thirds of Brazilian charcoal comes from sustainable plantations, and so this modern-day practice has been dubbed ‘green steel’. Sadly, the final third is supplied by the non-sustainable felling of primary forest. Even so, the Brazilian case does provide an example of how the raw materials of modern civilisation can be supplied without reliance on fossil fuels. Another, related option might be wood gasification. The use of wood to provide heat is as old as mankind, and yet simply burning timber only uses about a third of its energy. The rest is lost when gases and vapours released by the burning process blow away in the wind. Under the right conditions, even smoke is combustible. We don’t want to waste it. Better than simple burning, then, is to drive the thermal breakdown of the wood and collect the gases. You can see the basic principle at work for yourself just by lighting a match. The luminous flame isn’t actually touching the matchwood: it dances above, with a clear gap in between. The flame actually feeds on the hot gases given off as the wood breaks down in the heat, and the gases combust only once they mix with oxygen from the air. Matches are fascinating when you look at them closely. Wartime gasifier cars could achieve about 1.5 miles per kilogram. Today’s designs improve upon this To release these gases in a controlled way, bake some timber in a closed container. Oxygen is restricted so that the wood doesn’t simply catch fire. Its complex molecules decompose through a process known as pyrolysis, and then the hot carbonised lumps of charcoal at the bottom of the container react with the breakdown products to produce flammable gases such as hydrogen and carbon monoxide. The resultant ‘producer gas’ is a versatile fuel: it can be stored or piped for use in heating or street lights, and is also suitable for use in complex machinery such as the internal combustion engine. More than a million gasifier-powered cars across the world kept civilian transport running during the oil shortages of the Second World War. In occupied Denmark, 95 per cent of all tractors, trucks and fishing boats were powered by wood-gas generators. The energy content of about 3 kg of wood (depending on its dryness and density) is equivalent to a litre of petrol, and the fuel consumption of a gasifier-powered car is given in miles per kilogram of wood rather than miles per gallon. Wartime gasifier cars could achieve about 1.5 miles per kilogram. Today’s designs improve upon this. But you can do a lot more with wood gases than just keep your vehicle on the road. It turns out to be suitable for any of the manufacturing processes needing heat that we looked at before, such as kilns for lime, cement or bricks. Wood gas generator units could easily power agricultural or industrial equipment, or pumps. Sweden and Denmark are world leaders in their use of sustainable forests and agricultural waste for turning the steam turbines in power stations. And once the steam has been used in their ‘Combined Heat and Power’ (CHP) electricity plants, it is piped to the surrounding towns and industries to heat them, allowing such CHP stations to approach 90 per cent energy efficiency. Such plants suggest a marvellous vision of industry wholly weaned from its dependency on fossil fuel. Is that our solution, then? Could our rebooting society run on wood, supplemented with electricity from renewable sources? Maybe so, if the population was fairly small. But here’s the catch. These options all presuppose that our survivors are able to construct efficient steam turbines, CHP stations and internal combustion engines. We know how to do all that, of course – but in the event of a civilisational collapse, who is to say that the knowledge won’t be lost? And if it is, what are the chances that our descendants could reconstruct it? In our own history, the first successful application of steam engines was in pumping out coal mines. This was a setting in which fuel was already abundant, so it didn’t matter that the first, primitive designs were terribly inefficient. The increased output of coal from the mines was used to first smelt and then forge more iron. Iron components were used to construct further steam engines, which were in turn used to pump mines or drive the blast furnaces at iron foundries. And of course, steam engines were themselves employed at machine shops to construct yet more steam engines. It was only once steam engines were being built and operated that subsequent engineers were able to devise ways to increase their efficiency and shrink fuel demands. They found ways to reduce their size and weight, adapting them for applications in transport or factory machinery. In other words, there was a positive feedback loop at the very core of the industrial revolution: the production of coal, iron and steam engines were all mutually supportive. In a world without readily mined coal, would there ever be the opportunity to test profligate prototypes of steam engines, even if they could mature and become more efficient over time? How feasible is it that a society could attain a sufficient understanding of thermodynamics, metallurgy and mechanics to make the precisely interacting components of an internal combustion engine, without first cutting its teeth on much simpler external combustion engines – the separate boiler and cylinder-piston of steam engines? It took a lot of energy to develop our technologies to their present heights, and presumably it would take a lot of energy to do it again. Fossil fuels are out. That means our future society will need an awful lot of timber. An industrial revolution without coal would be, at a minimum, very difficult In a temperate climate such as the UK’s, an acre of broadleaf trees produces about four to five tonnes of biomass fuel every year. If you cultivated fast-growing kinds such as willow or miscanthus grass, you could quadruple that. The trick to maximising timber production is to employ coppicing – cultivating trees such as ash or willow that resprout from their own stump, becoming ready for harvest again in five to 15 years. This way you can ensure a sustained supply of timber and not face an energy crisis once you’ve deforested your surroundings. But here’s the thing: coppicing was already a well-developed technique in pre-industrial Britain. It couldn’t meet all of the energy requirements of the burgeoning society. The central problem is that woodland, even when it is well-managed, competes with other land uses, principally agriculture. The double-whammy of development is that, as a society’s population grows, it requires more farmland to provide enough food and also greater timber production for energy. The two needs compete for largely the same land areas. We know how this played out in our own past. From the mid-16th century, Britain responded to these factors by increasing the exploitation of its coal fields – essentially harvesting the energy of ancient forests beneath the ground without compromising its agricultural output. The same energy provided by one hectare of coppice for a year is provided by about five to 10 tonnes of coal, and it can be dug out of the ground an awful lot quicker than waiting for the woodland to regrow. It is this limitation in the supply of thermal energy that would pose the biggest problem to a society trying to industrialise without easy access to fossil fuels. This is true in our post-apocalyptic scenario, and it would be equally true in any counterfactual world that never developed fossil fuels for whatever reason. For a society to stand any chance of industrialising under such conditions, it would have to focus its efforts in certain, very favourable natural environments: not the coal-island of 18th-century Britain, but perhaps areas of Scandinavia or Canada that combine fast-flowing streams for hydroelectric power and large areas of forest that can be harvested sustainably for thermal energy. Even so, an industrial revolution without coal would be, at a minimum, very difficult. Today, use of fossil fuels is actually growing, which is worrying for a number of reasons too familiar to rehearse here. Steps towards a low-carbon economy are vital. But we should also recognise how pivotal those accumulated reservoirs of thermal energy were in getting us to where we are. Maybe we could have made it the hard way. A slow-burn progression through the stages of mechanisation, supported by a combination of renewable electricity and sustainably grown biomass, might be possible after all. Then again, it might not. We’d better hope we can secure the future of our own civilisation, because we might have scuppered the chances of any society to follow in our wake.

1AR theory is illegit—

A)it skews to aff—forces the 2NR to overcover theory— destroys collapsing and crystallization in the last speech, while the 2AR can sit on one layer, which also justifies 2NR RVIs – there’s no 2NR dump since you have 7 minutes from 1AR and 2AR. Also a reason I get 2NR RVIs

2) Time skew—they get 7 minutes to win the theory debate with the and I only have a 6 minute 2NR – outweighs bc its more structural, whereas both of us have 13 minutes and they get 2 speeches while I get 1. Neg theory comes first because any abusive positions were read as a reaction to the aff’s abusive position—the 1AC’s abuse controls the root cause. No infinite abuse – hard debate is not impossible and is good and that just gives you more leeway

1. Langesth, Jonathan. “Wittengenstein’s Account of Rule-Following and Its Implications”. Stance Vol 1, April 1, 2008. <http://www.bsu.edu/libraries/virtualpress/stance/2008_spring/12Wittgenstein.pdf> [↑](#footnote-ref-1)
2. Searle, John R. Mind, Language, and Society: Philosophy in the Real World. New York: Basic Books; 2000. (27). [↑](#footnote-ref-2)
3. <http://dictionary.reference.com/browse/negate>, <http://www.merriam-webster.com/dictionary/negate>, <http://www.thefreedictionary.com/negate>, <http://www.vocabulary.com/dictionary/negate>, <http://www.oxforddictionaries.com/definition/english/negate> [↑](#footnote-ref-3)
4. *Dictionary.com – maintain as true, Merriam Webster – to say that something is true, Vocabulary.com – to affirm something is to confirm that it is true, Oxford dictionaries – accept the validity of, Thefreedictionary – assert to be true* [↑](#footnote-ref-4)