## Off

### 1nc

#### Interpretation: The affirmative may not specify a just government.

#### “A” is an indefinite article that modifies “just government” in the res – means that you have to prove the resolution true in a vacuum, not a particular instance

CCC (“Articles, Determiners, and Quantifiers”, http://grammar.ccc.commnet.edu/grammar/determiners/determiners.htm#articles, Capital Community College Foundation, a nonprofit 501 c-3 organization that supports scholarships, faculty development, and curriculum innovation) LHSLA JC/SJ

The three articles — a, an, the — are a kind of adjective. The is called the definite article because it usually precedes a specific or previously mentioned noun; a and an are called indefinite articles because they are used to refer to something in a less specific manner (an unspecified count noun). These words are also listed among the noun markers or determiners because they are almost invariably followed by a noun (or something else acting as a noun). caution CAUTION! Even after you learn all the principles behind the use of these articles, you will find an abundance of situations where choosing the correct article or choosing whether to use one or not will prove chancy. Icy highways are dangerous. The icy highways are dangerous. And both are correct. The is used with specific nouns. The is required when the noun it refers to represents something that is one of a kind: The moon circles the earth. The is required when the noun it refers to represents something in the abstract: The United States has encouraged the use of the private automobile as opposed to the use of public transit. The is required when the noun it refers to represents something named earlier in the text. (See below..) If you would like help with the distinction between count and non-count nouns, please refer to Count and Non-Count Nouns. We use a before singular count-nouns that begin with consonants (a cow, a barn, a sheep); we use an before singular count-nouns that begin with vowels or vowel-like sounds (an apple, an urban blight, an open door). Words that begin with an h sound often require an a (as in a horse, a history book, a hotel), but if an h-word begins with an actual vowel sound, use an an (as in an hour, an honor). We would say a useful device and a union matter because the u of those words actually sounds like yoo (as opposed, say, to the u of an ugly incident). The same is true of a European and a Euro (because of that consonantal "Yoo" sound). We would say a once-in-a-lifetime experience or a one-time hero because the words once and one begin with a w sound (as if they were spelled wuntz and won). Merriam-Webster's Dictionary says that we can use an before an h- word that begins with an unstressed syllable. Thus, we might say an hisTORical moment, but we would say a HIStory book. Many writers would call that an affectation and prefer that we say a historical, but apparently, this choice is a matter of personal taste. For help on using articles with abbreviations and acronyms (a or an FBI agent?), see the section on Abbreviations. First and subsequent reference: When we first refer to something in written text, we often use an indefinite article to modify it. A newspaper has an obligation to seek out and tell the truth. In a subsequent reference to this newspaper, however, we will use the definite article: There are situations, however, when the newspaper must determine whether the public's safety is jeopardized by knowing the truth. Another example: "I'd like a glass of orange juice, please," John said. "I put the glass of juice on the counter already," Sheila replied. Exception: When a modifier appears between the article and the noun, the subsequent article will continue to be indefinite: "I'd like a big glass of orange juice, please," John said. "I put a big glass of juice on the counter already," Sheila replied. Generic reference: We can refer to something in a generic way by using any of the three articles. We can do the same thing by omitting the article altogether. A beagle makes a great hunting dog and family companion. An airedale is sometimes a rather skittish animal. The golden retriever is a marvelous pet for children. Irish setters are not the highly intelligent animals they used to be. The difference between the generic indefinite pronoun and the normal indefinite pronoun is that the latter refers to any of that class ("I want to buy a beagle, and any old beagle will do.") whereas the former (see beagle sentence) refers to all members of that class

#### The article “a” implies a nonspecific or generic reading of the word “just government”.

Walden 20 Walden University [The Writing Center provides a broad range of writing instruction and editing services for students at Walden University, including writing assistance for undergraduates, graduate students, and doctoral capstone writers], “"A" or "An"” last modified July 14 2020, <https://academicguides.waldenu.edu/writingcenter/grammar/articles> SM

When to Use "A" or "An" "A" and "an" are used with singular countable nouns when the noun is nonspecific or generic. I do not own a car. In this sentence, "car" is a singular countable noun that is not specific. It could be any car. She would like to go to a university that specializes in teaching. "University" is a singular countable noun. Although it begins with a vowel, the first sound of the word is /j/ or “y.” Thus, "a" instead of "an" is used. In this sentence, it is also generic (it could be any university with this specialization, not a specific one). I would like to eat an apple. In this sentence, "apple" is a singular countable noun that is not specific. It could be any apple.

#### “Democracy” is a generic indefinite singular.

Leslie 12 Leslie, Sarah-Jane. “Generics.” In Routledge Handbook of Philosophy of Language, edited by Gillian Russell and Delia Fara, 355–366. Routledge, 2012. <https://www.princeton.edu/~sjleslie/RoutledgeHandbookEntryGenerics.pdf> SM

GENERICS VS. EXISTENTIALS The interpretation of sentences containing bare plurals, indefinite singulars, or definite singulars can be either generic as in (1) respectively or existential/specific as in (2): (1) Tigers are striped A tiger is striped The tiger is striped. (2) Tigers are on the front lawn A tiger is on the front lawn The tiger is on the front lawn. The subjects in (1) are prima facie the same as in (2), yet their interpretations in (1) are intuitively quite different from those in (2). In (2) we are talking about some particular tigers, while in (1) we are saying something about tigers in general. There are some tests that are helpful in distinguishing these two readings. For example, the existential interpretation is upward entailing, meaning that the statement will always remain true if we replace the subject term with a more inclusive term. For example, if it is true that tigers are on the lawn, then it will also be true that animals are on the lawn. This is not so if the sentence is interpreted generically. For example, it is true that tigers are striped, but it does not follow that animals are striped (Lawler 1973 Laca 1990; Krifka et al 1995). Another test concerns whether we can insert an adverb of quantification (in the sense of Lewis 1975) with minimal change of meaning (Krifka et al 1995). For example, inserting “usually” in the sentences in (1) (e.g. “tigers are usually striped”) produces only a small change in meaning, while inserting “usually” in (2) dramatically alters the meaning of the sentence (e.g. “tigers are usually on the front lawn). (For generics such as “mosquitoes carry malaria”, the adverb “sometimes” is perhaps better used than “usually”.)

#### This applies to the res – 1] Upward entailment test – extemp 2] Adverb test – extemp

#### Violation: they spec India

#### Standards:

#### 1] Precision – the counter-interp justifies them arbitrarily doing away with random words in the resolution which decks negative ground and preparation because the aff is no longer bounded by the resolution. Independent voter for jurisdiction – the judge doesn’t have the jurisdiction to vote aff if there wasn’t a legitimate aff.

#### 2] Limits – there are infinite governments that could be just – explodes limits since there are tons of independent affs plus functionally infinite combinations, all with different advantages in different political situations. Kills neg prep and debatability since there are no DAs that apply to every aff – i.e. laws about the right to strike in the US are different than in New Zealand – means the aff is always more prepared and wins just for speccing.

#### 3] TVA – just read your aff as an advantage under a whole adv, solves your offense

#### Fairness – debate is a competitive activity that requires fairness for objective evaluation. Outweighs – it constrains your ability to evaluate the rest of the flow because they require fair evaluation.

#### Drop the debater – to deter future abuse and set better norms for debate.

#### Competing interps – reasonability is arbitrary and invites judge intervention but we creates a race to the top where we create the best norms for debate.

#### No RVIs – a] illogical, you don’t win for proving that you meet the burden of being fair, logic outweighs since it’s a prerequisite for evaluating any other argument, b] RVIs incentivize baiting theory and prepping it out which leads to maximally abusive practices

#### 1AR theory is dta and reasonability – sandbagging o/w, irresolvable o/w

#### RVI on 1AR theory – time skew o/w

### 1nc

#### Counterplan text: A just government ought to recognize a conditional right of workers to strike. The right to strike ought to be conditional upon one’s profession, with all workers except healthcare workers being guaranteed an unconditional right to strike.

#### It’s competitive – a] the CP offers a conditional right, meaning it only applies in some instances, so it’s necessarily competitive and b] the plan defends all workers – 1ar clarification causes shiftiness that means we lose every time since we can’t generate new links in the 2nr.

#### Nurse strikes devastates hospitals

Wright 10 Sarah H. Wright July 2010 "Evidence on the Effects of Nurses' Strikes" <https://www.nber.org/digest/jul10/evidence-effects-nurses-strikes> (Researcher at National Bureau of Economic Research)

U.S. hospitals were excluded from collective bargaining laws for three decades longer than other sectors because of fears **that strikes by nurses might imperil patients' health**. Today, while unionization has been declining in general, it is growing rapidly in hospitals, with the number of unionized workers rising from 679,000 in 1990 to nearly one million in 2008. In Do Strikes Kill? Evidence from New York State (NBER Working Paper No. 15855), co-authors Jonathan Gruber and Samuel Kleiner carefully examine the effects of nursing strikes on patient care and outcomes. The researchers match data on nurses' strikes in New York State from 1984 to 2004 to data on hospital discharges, including information on treatment intensity, patient mortality, and hospital readmission. They conclude that nurses' strikes were **costly to hospital patients**: in-hospital mortality **increased by 19.4 percent** and hospital readmissions **increased by 6.5 percen**t for patients admitted during a strike. Among their sample of 38,228 such patients, an estimated **138 more individuals died than would have without a stri**ke, and 344 more patients were readmitted to the hospital than if there had been no strike. "Hospitals functioning during nurses' strikes **do so at a lower quality of patient care,"** they write. Still, at hospitals experiencing strikes, the measures of treatment intensity -- that is, the length of hospital stay and the number of procedures performed during the patient's stay -- show no significant differences between striking and non-striking periods. Patients appear to receive the same intensity of care during union work stoppages as during normal hospital operations. Thus, the poor outcomes associated with strikes suggest that they might reduce hospital productivity. These poor health outcomes increased for both emergency and non-emergency hospital patients, even as admissions of both groups decreased by about 28 percent at hospitals with strikes. The poor health outcomes were not apparent either before or after the strike in the striking hospitals, suggesting that they are attributable to the strike itself. And, the poor health outcomes do not appear to do be due to different types of patients being admitted during strike periods, because patients admitted during a strike are very similar to those admitted during other periods. Hiring replacement workers apparently does not help: hospitals that hired replacement workers **performed no better** during strikes than those that did not hire substitute employees. In each case, patients with conditions that required intensive nursing were more likely to fare worse in the presence of nurses' strikes.

#### Hospitals are the critical internal link for pandemic preparedness.

Al Thobaity 20, Abdullelah, and Farhan Alshammari. "Nurses on the frontline against the COVID-19 pandemic: an Integrative review." Dubai Medical Journal 3.3 (2020): 87-92. (Associate Professor of Nursing at Taif University)

The majority of infected or symptomatic people seek medical treatment in medical facilities, particularly hospitals, as a high number of cases, especially those in critical condition, will have an impact on hospitals [4]. The concept of hospital resilience in disaster situations is defined as the ability to recover from the damage caused by huge disturbances quickly [2]. The resilience of hospitals to pandemic cases depends on the preparedness of the institutions, and not all hospitals have the same resilience. A lower resilience will affect the **sustainability of the health services**. This also affects healthcare providers such as doctors, nurses, and allied health professionals [5, 6]. Despite the impact on healthcare providers, excellent management of a pandemic depends on the level of **preparedness of healthcare providers, including nurses**. This means that if it was impossible to be ready before a crisis or disaster, responsible people will do all but the impossible to save lives.

#### Independently, profit motive is key to solving pandemics.

Jackson 16 Kerry Jackson 12-19-2016 “Free Market Policies Needed To Incentivize Creation Of New Life-Saving Treatments” <https://www.pacificresearch.org/article/free-market-policies-needed-to-incentivize-creation-of-new-life-saving-treatments/> (Researcher at the Pacific Research Institute)

“Our strongest antibiotics don’t work and patients are left with potentially untreatable infections,” Director Dr. Tom Frieden said when the CDC issued its warning. He asked doctors, hospitals and public health officials to “work together” to “stop these infections from spreading.” The 2014 Report to the President expressed a similar concern: “The evolution of antibiotic resistance is now occurring at an alarming rate and is outpacing the development of new countermeasures capable of thwarting infections in humans. This situation threatens patient care, economic growth, public health, agriculture, economic security and national security.” For those thinking this sort of thing shouldn’t be happening when medical science is more advanced than can almost be conceived, be assured that it is. And unless there are public policy interventions, it’s likely to get worse. “More and more microorganisms will continue to gain resistance to the current drug therapies because (antimicrobial resistance, or AMR) is basic evolution,” Wayne Winegarden writes in the Pacific Research Institute’s newly-released report “Incenting the Development of Antimicrobial Medicines to Address the Problem of Drug-Resistant Infections.” The International Federation of Pharmaceutical Manufacturers says the problem is caused by “a dearth of new antibiotic medicines.” At the same time that there’s been an increase in AMR, there has been “a sharp decline in the development of new antibiotic medicines.” The group reports that only two new classes of antibiotics have been discovered in the last three decades compared to 11 in the previous 50 years. The answers to many medical problems are still not within reach of researchers. But the hazards of AMR can be diminished. Winegarden suggests we begin with public health campaigns that encourage handwashing, which he calls a highly effective and low-cost way to reduce the spread of infection. He further recommends policy that would address the problem of antibiotic overuse and greater use of vaccines to cut the incidents of infection. But Winegarden’s primary concern is establishing the correct incentives for developing new antimicrobial medicines that would be effective against AMR microorganisms. He’s specifically referring to policies “based on a thorough understanding of the disincentives that are currently inhibiting their development.” “These disincentives are well-recognized,” he writes. “Despite the medical need, and despite the generally strong return on investment for many other drug classes, the return on investment for developing new antimicrobial medicines (particularly antibiotics) is too low.” Producing a new drug is a grinding and expensive endeavor. It can take 10 to 15 years to develop a single prescription drug that is introduced to the market, and a company can spend as much as $5.5 billion on research and development for each medication that is eventually approved and prescribed. Less than 2 percent of all projects launched to create new drugs succeed. This is not an environment in which pharmaceutical companies can get too amped up about pursuing new treatments. Yet new drug approvals increased over the last decade. Don’t look for a surge of antimicrobial drugs in that pipeline, though. Winegarden says that particular drug class is among several that “face unique impediments” that serve as disincentives for innovation. To overcome the steep hill that impedes the development of new AMR drugs, lawmakers must implement policies that unleash the incentives of the free market. Policymakers also should look at the 1983 federal Orphan Drug Act and its market-oriented reforms that increased the number of drugs developed to treat rare diseases. More than 400 have been introduced to the market since the law was enacted, compared to fewer than 10 in the 1970s. Put another way, government needs to remove its anchors from the process and let the market do what it does so well. In this case, that’s restoring patients’ health, enriching innovative companies that create jobs, and inspiring biotech start-ups such as the group of Stanford undergraduates that has been capitalized to develop new antibiotics. If the proper incentives are in place, the needed treatments will follow.

#### New Pandemics are deadlier and faster are coming – COVID is just the beginning

Antonelli 20 Ashley Fuoco Antonelli 5-15-2020 <https://www.advisory.com/daily-briefing/2020/05/15/weekly-line> "Weekly line: Why deadly disease outbreaks could become more common—even after Covid-19" (Associate Editor — American Health Line)

While the new coronavirus pandemic suddenly took the world by storm, the truth is public health experts for years have warned that a virus similar to the new coronavirus would cause the next pandemic—and they say **deadly infectious disease outbreaks could become more common**. Infectious disease experts are always on the lookout for the next pandemic, and in a report published two years ago, researchers from the Johns Hopkins Bloomberg School of Public Health **predicted that the pathogen most likely to cause the next pandemic would be a virus similar to the common cold**. Specifically, the researchers predicted that the pathogen at fault for the next pandemic would be: A microbe for which people have not yet **developed immunities**, meaning that a large portion of the human population would be susceptible to infection; Contagious during the so-called "incubation period"—the time when people are infected with a pathogen but are not yet showing symptoms of the infection or are showing only mild symptoms; and Resistant to any known prevention or treatment methods. The researchers also concluded that such a pathogen would have a "low but significant" fatality rate, meaning the pathogen wouldn't kill human hosts fast enough to inhibit its spread. As **Amesh Adalja**—a senior scholar at the Johns Hopkins Center for Health Security, who led the report—told Live Science's Rachael Rettner at the time, "**It just has to make a lot of people sick" to disrupt society**. The researchers said RNA viruses—which include the common cold, influenza, and severe acute respiratory syndrome (or SARS, which is caused by a type of coronavirus)—fit that bill. And even though we had a good bit of experience dealing with common RNA viruses like the flu, Adalja at the time told Rettner that there were "a whole host of viral families that get very little attention when it comes to pandemic preparedness." Not even two years later, the new coronavirus, which causes Covid-19, emerged and quickly spread throughout the world, reaching pandemic status in just a few months. To date, officials have reported more than 4.4 million cases of Covid-19 and 302,160 deaths tied to the new coronavirus globally. In the United States, the number of reported Covid-19 cases has reached more than 1.4 million and the number of reported deaths tied to the new coronavirus has risen to nearly 86,000 in just over three months. Although public health experts had warned about the likelihood of a respiratory-borne RNA virus causing the next global pandemic, many say the world was largely unprepared to handle this type of infectious disease outbreak. And as concerning as that revelation may be on its own, **perhaps even more worrisome is that public health experts predict life-threatening infectious disease outbreaks are likely to become more common—meaning we could be susceptible to another pandemic in the future**. Why experts think deadly infectious disease outbreaks could become more common As the Los Angeles Times's Joshua Emerson Smith notes, infectious disease experts for more than ten years now have noted that "[o]utbreaks of dangerous new diseases with the potential to become pandemics have been on the rise—from HIV to swine flu to SARS to Ebola." For instance, a report published in Nature in 2008 found that **the number of emerging infectious disease events that occurred in the 1990s was more than three times higher than it was in the 1940s**. Many experts believe the recent increase in infectious disease outbreaks is tied to human behaviors that disrupt the environment, "such as **deforestation and poaching**," which have led "to increased contact between highly mobile, urbanized human populations and wild animals," Emerson Smith writes. In the 2008 report, for example, researchers noted that about 60% of 355 emerging infectious disease events that occurred over a 50-year period could be largely linked to wild animals, livestock, and, to a lesser extent, pets. Now, researchers believe the new coronavirus first jumped to humans from animals at a wildlife market in Wuhan, China. Along those same lines, some experts have argued that global climate change has driven an increase in infectious diseases—and could continue to do so. A federally mandated report released by the U.S. Global Change Research Program in 2018 warned that warmer temperatures could expand the geographic range covered by disease-carrying insects and pests, which could result in more Americans being exposed to ticks carrying Lyme disease and mosquitos carrying the dengue, West Nile, and Zika viruses. And experts now say continued warming in global temperatures, deforestation, and other environmentally disruptive behaviors have broadened that risk by bringing more people into contact with disease-carrying animals. Further, experts note that infectious diseases today are able to spread much faster and farther than they could decades ago because of increasing globalization and travel. While some have suggested the Covid-19 pandemic could stifle that trend, others argue globalization is likely to continue—meaning so could infectious diseases' far spread.

## Case

### Top Level

#### SPARK is counterintuitive and you won’t want to vote for it but we’ll read the best evidence in this debate which will guarantee you vote negative – we’ll explicitly concede that extinction comes first which means even though nuclear war would cause a massive amount of suffering if we win it doesn’t cause extinction and resolves different existential threats utilitarian calculus would dictate that we should allow nuclear war to happen.

### 1NC – Generic

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

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

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, as Australian researchers recently demonstrated when they created a modified mousepox virus with 100% mortality while trying to design a contraceptive virus for mice for use in pest control [37]. While this particular virus doesn’t affect humans, it is suspected that an analogous alteration would increase the mortality of the human smallpox virus. What underscores the future hazard here is that the research was quickly published in the open scientific literature [38]. It is hard to see how information generated in open biotech research programs could be contained no matter how grave the potential danger that it poses; and the same holds for research in nanotechnology. Genetic medicine will also lead to better cures and vaccines, but there is no guarantee that defense will always keep pace with offense. (Even the accidentally created mousepox virus had a 50% mortality rate on vaccinated mice.) Eventually, worry about biological weapons may be put to rest through the development of nanomedicine, but while nanotechnology has enormous long-term potential for medicine [39] it carries its own hazards. 4.6 Accidental misuse of nanotechnology (“gray goo”) The possibility of accidents can never be completely ruled out. However, there are many ways of making sure, through responsible engineering practices, that species-destroying accidents do not occur. One could avoid using self-replication; one could make nanobots dependent on some rare feedstock chemical that doesn’t exist in the wild; one could confine them to sealed environments; one could design them in such a way that any mutation was overwhelmingly likely to cause a nanobot to completely cease to function [40]. Accidental misuse is therefore a smaller concern than malicious misuse [23,25,41]. However, the distinction between the accidental and the deliberate can become blurred. While “in principle” it seems possible to make terminal nanotechnological accidents extremely improbable, the actual circumstances may not permit this ideal level of security to be realized. Compare nanotechnology with nuclear technology. From an engineering perspective, it is of course perfectly possible to use nuclear technology only for peaceful purposes such as nuclear reactors, which have a zero chance of destroying the whole planet. Yet in practice it may be very hard to avoid nuclear technology also being used to build nuclear weapons, leading to an arms race. With large nuclear arsenals on hair-trigger alert, there is inevitably a significant risk of accidental war. The same can happen with nanotechnology: it may be pressed into serving military objectives in a way that carries unavoidable risks of serious accidents. In some situations it can even be strategically advantageous to deliberately make one’s technology or control systems risky, for example in order to make a “threat that leaves something to chance” [42]. 4.7 Something unforeseen We need a catch-all category. It would be foolish to be confident that we have already imagined and anticipated all significant risks. Future technological or scientific developments may very well reveal novel ways of destroying the world. Some foreseen hazards (hence not members of the current category) which have been excluded from the list of bangs on grounds that they seem too unlikely to cause a global terminal disaster are: solar flares, supernovae, black hole explosions or mergers, gamma-ray bursts, galactic center outbursts, supervolcanos, loss of biodiversity, buildup of air pollution, gradual loss of human fertility, and various religious doomsday scenarios. The hypothesis that we will one day become “illuminated” and commit collective suicide or stop reproducing, as supporters of VHEMT (The Voluntary Human Extinction Movement) hope [43], appears unlikely. If it really were better not to exist (as Silenus told king Midas in the Greek myth, and as Arthur Schopenhauer argued [44] although for reasons specific to his philosophical system he didn’t advocate suicide), then we should not count this scenario as an existential disaster. The assumption that it is not worse to be alive should be regarded as an implicit assumption in the definition of Bangs. Erroneous collective suicide is an existential risk albeit one whose probability seems extremely slight. (For more on the ethics of human extinction, see chapter 4 of [9].) 4.8 Physics disasters The Manhattan Project bomb-builders’ concern about an A-bomb-derived atmospheric conflagration has contemporary analogues. There have been speculations that future high-energy particle accelerator experiments may cause a breakdown of a metastable vacuum state that our part of the cosmos might be in, converting it into a “true” vacuum of lower energy density [45]. This would result in an expanding bubble of total destruction that would sweep through the galaxy and beyond at the speed of light, tearing all matter apart as it proceeds. Another conceivability is that accelerator experiments might produce negatively charged stable “strangelets” (a hypothetical form of nuclear matter) or create a mini black hole that would sink to the center of the Earth and start accreting the rest of the planet [46]. These outcomes seem to be impossible given our best current physical theories. But the reason we do the experiments is precisely that we don’t really know what will happen. A more reassuring argument is that the energy densities attained in present day accelerators are far lower than those that occur naturally in collisions between cosmic rays [46,47]. It’s possible, however, that factors other than energy density are relevant for these hypothetical processes, and that those factors will be brought together in novel ways in future experiments. The main reason for concern in the “physics disasters” category is the meta-level observation that discoveries of all sorts of weird physical phenomena are made all the time, so even if right now all the particular physics disasters we have conceived of were absurdly improbable or impossible, there could be other more realistic failure-modes waiting to be uncovered. The ones listed here are merely illustrations of the general case.

#### Also risks infinite torture.

**Turchin and Denkenberger 18** {Turchin is a researcher at the Science for Life Extension Foundation; Denkenberger is with the Global Catastrophic Risk Institute (GCRI) @ Tennessee State University, Alliance to Feed the Earth in Disasters (ALLFED). 5-3-2018. “Classification of Global Catastrophic Risks Connected with Artificial Intelligence.”}//JM

6.4. AI that is programmed to be evil We could imagine a perfectly aligned AI, which was deliberately programmed to be bad by its creators. For example, a hacker could create an AI with a goal of killing all humans or torturing them. The Foundational Research Institute suggested the notion of s-risks, that is, the risks of extreme future suffering, probably by wrongly aligned AI (Daniel 2017). AI may even upgrade humans to make them feel more suffering, like in the short story “I have no mouth but I must scream” (Ellison 1967). The controversial idea of “Roko’s Basilisk” is that a future AI may torture people who did not do enough to create this malevolent AI. This idea has attracted attention in the media and is an illustration of “acausal” (not connected by causal links) blackmail by future AI (Auerbach 2014). However, this cannot happen unless many people take the proposition seriously.

#### Nuclear war wouldn’t cause extinction, but it would spur political will for collective action on global warming and meaningful disarmament.

Samuel Miller-McDonald 19. 01-04-19. Samuel Miller McDonald is a writer and geography PhD student at University of Oxford studying the intersection of grassroots movements and energy transition. “Deathly Salvation.” [https://www.the-trouble.com/content/2019/1/4/deathly-salvation //](https://www.the-trouble.com/content/2019/1/4/deathly-salvation%20//) BBM

The global economy is hurtling humanity toward extinction. Greenhouse gas emissions are on track to warm the planet by six degrees Celsius above preindustrial averages. A six-degree increase risks killing most life on earth, as global warming did during the Late Permian when volcanoes burned a bunch of fossilized carbon (e.g., coal, oil, and gas). Called the Great Dying, that event was, according to New York Magazine, “The most notorious [extinction event…]; it began when carbon warmed the planet by five degrees, accelerated when that warming triggered the release of methane in the Arctic, and ended with 97 percent of all life on Earth dead.” Mainstream science suggests that we’re on our way there. During the winter of 2017, the Arctic grew warmer than Europe, sending snow to the Mediterranean and Sahara. The planet may have already passed irreversible thresholds that could accelerate further feedback loops like permafrost melt and loss of polar ice. Patches of permafrost aren’t freezing even during winter, necessitating a rename (may I suggest ‘nevafrost’?). In the summer of 2018, forests north of the Arctic Circle broke 90 degrees Fahrenheit and burned in vast wildfires. We’re reaching milestones far faster than scientists have even recently predicted. As Guardian columnist George Monbiot noted, “The Arctic meltdown […] is the kind of event scientists warned we could face by 2050. Not by 2018.” Mass marine death that rapidly emits uncontrollable greenhouse gasses is another feedback loop that seems ready to strike. The ocean is now more acidic than any time in the last 14 million years, killing everything from snails to whales. It’s growing rapidly more acidic. Meanwhile, from the global South to wealthier industrialized countries, people are already dying and being displaced from the impacts of extreme climate change via extreme droughts, floods, wildfires, storms, and conflicts like the Syrian civil war. Authoritarianism is on the rise due directly to these climate emergencies and migrations. The IPCC has recently alerted the world that we have about a decade to dramatically cut emissions before collapse becomes inevitable. We could prevent human extinction if we act immediately. But the world is unanimously ignoring climate change. Nations will almost certainly fail to avert biosphere collapse. That is because doing so will require a rapid decarbonization of the global economy. But why does decarbonization--an innocuous enough term--seem so implausible? Well, let’s put it this way: a sufficient transition to non-carbon energy would require all the trains, buses, planes, cars, and ships in the world to almost immediately stop and be replaced with newly manufactured vehicles to run on non-carbon fuel, like hydrogen cells, renewable electricity, or some carbon-neutral biofuel. All this new manufacturing will have to be done with low-carbon techniques, many of which don’t exist yet and may be impossible to achieve at scale. This means all the complex supply chains that move most of the world’s food, water, medicine, basically all consumer goods, construction materials, clothing, and everything else billions of people depend on to survive will have to be fundamentally reformed, in virtually every way, immediately. It also means that all the electric grids and indoor heating and cooling systems in the world must be rapidly transformed from centralized coal and gas power plants to a mixture of solar, wind, and nuclear—both distributed and centralized—dispersed through newly built micro-grids and smart-grids, and stored in new battery infrastructure. These new solar panels, batteries, and nuclear plants will somehow have to be built using little carbon energy, again something that may be impossible to achieve at a global scale. The cost of this transition is impossible to know, but surely reaches the tens of trillions of dollars. It needs to happen in just about every industrialized nation on the planet and needs to happen now—not in 2050, as the Paris Agreement dictates, or the 2030s, as reflected in many governments’ decarbonization goals. The engineering and administrative obstacles are immense; disentangling century-old, haphazard electric grid systems, for example, poses an almost unimaginable cascade of institutional and logistical hurdles. Imagine the difficulty of persuading millions of municipalities around the world to do anything simultaneously; now, imagine convincing them all to fundamentally shift the resource infrastructure on which their material existence depends immediately. Perhaps even more daunting are the political obstacles, with diverse financial interests woven together in a tapestry of inertia and self-interest. Virtually all retirement funds, for instance, are invested in fossil fuel companies. Former and current fossil fuel industry managers sit on all manner of institutional committees in which energy and investment decisions are made: trustee boards of universities, regulatory commissions, city councils, congressional committees, philanthropic boards, federal agencies, the Oval Office couch. Lots of people make lots of money from fossil fuels. Will they sacrifice deeply vested interests to prevent collapse? They certainly have not shown signs of doing so yet, when the stakes are as dire as they’ve ever been; most have instead ruthlessly obstructed meaningful action. Will enough people be willing to do what it takes to forcibly remove them from the most powerful institutions in the world? That also seems unlikely, given meager public involvement in this issue so far. This is the obstacle of collective action: everyone has to sacrifice, but no one wants to start. Who will assent to giving up their steady returns from fossil fuels if everyone else refuses? When people are living so precariously as it is (43% of American can’t afford basic necessities), how can we ask them to undertake energy transition? The US drags its feet on decarbonizing and justifies it by arguing that China has not made strong enough commitments. Which country will voluntarily give up access to strategic fossil fuel reserves? Much of our geopolitical dynamics and wars have revolved around access to mineral resources like oil. Is the US going to put itself in a disadvantaged position for the climate? Shell withdraws research funding for renewables because ExxonMobil goes full steam ahead on oil, and, hey, they must compete. Fossil fuel funded politicians of both parties certainly will not aid transition. If untangling the webs of influence, interests, and engineering preventing decarbonization weren’t daunting enough, the world will also have to suck billions of tons of greenhouse gases out of the atmosphere that have already been emitted. Keeping the planet to even a deadly 1.5 degrees Celsius increase of warming depends on it. This sounds simpler than it is, as if a big vacuum cleaner could siphon particulates from the sky. But no one really knows how to extract and sequester carbon at the scale necessary to prevent catastrophic climate change. Engineers have thrown out a lot of ideas—some more plausible than others—but most scientists who have looked at proposals generally agree that it’s wishful thinking. As Huffington Post quotes Clive Hamilton, “In order to capture just a quarter of the emissions from the world's coal-fired power plants we would need a system of pipelines that would transport a volume of fluid twice the size of the global crude-oil industry.” Of course, manufacturing, shipping, and constructing those pipelines would require immense carbon energy inputs and emissions. And that’s just to capture the emissions from coal! Like energy transition, carbon capture and sequestration requires governments to act collectively to invest trillions of dollars in risky, experimental, and probably mostly ineffectual sequestration technologies. Again, it’s a collective action problem: nobody wants to be the one to sacrifice while no one else is putting themselves on the line. And the miniscule likelihood that energy transition will occur under a Trump-Digs-Coal presidency—and the Trumpian nationalists winning elections across the world—casts further doubt on the possibility of rapid decarbonization. The administration’s energy department has projected that, “The carbon footprint of the United States will barely go down at all for the foreseeable future and will be slightly higher in 2050,” as InsideClimateNews notes. The world, today, is still setting records for carbon emissions and there’s no sign that will change anytime soon. The only period in US history the nation has undertaken anything near the magnitude of collective action necessary for mitigation was during the Second World War and the rebuilding effort in its aftermath. But even those projects involved a fraction of the capital and coordination that will be necessary for sufficient energy transition and carbon sequestration. More importantly, today’s collective action will have to be politically justified without the motivation of defeating a personified enemy—a Hitler, if you will. Today, with interpersonal alienation running rampant and extremely consolidated wealth and power, industrial economies seem infinitely far from a cultural, political atmosphere in which collective action policies are even close to possible. To the contrary, wealthy countries are all still slashing public goods, passing austerity budgets, and investing heavily in fossil fuel infrastructure. Even most elected Democrats are dragging their feet on passing climate policy. The world is going in the exact opposite direction from one in which humans can live. We’ve tied ourselves in a perfect Gordian knot. The global economy is a vast machine, operating beyond the control of even the most powerful individuals, and it has a will of its own to consume and pollute. It’s hard to believe that this massive metal beast will be peacefully undone by the people who survive by it, and we all survive by it in some way, often against our wills; it bribes and entraps us all in ways large and small. But a wrench could clog the gears, and maybe only a wrench can stop it. One wrench that could slow climate disruption may be a large-scale conflict that halts the global economy, destroys fossil fuel infrastructure, and throws particulates in the air. At this point, with insane people like Trump, Putin, Xi, May, and Macron leading the world’s biggest nuclear powers, large-scale conflagration between them would probably lead to a nuclear exchange. Nobody wants nuclear war. Rather, nobody sane and prosocial wants nuclear war. It is an absolute horror that would burn and maim millions of living beings, despoil millions of hectares, and scar the skin of the earth and dome of the sky for centuries, maybe millennia. With proxy conflict brewing between the US and Russia in the Middle East and the Thucydides trap ready to ensnare us with an ascendant China, nuclear war looks like a more realistic possibility than it has since the 1980s. A devastating fact of climate collapse is that there may be a silver lining to the mushroom cloud. First, it should be noted that a nuclear exchange does not inevitably result in apocalyptic loss of life. Nuclear winter—the idea that firestorms would make the earth uninhabitable—is based on shaky science. There’s no reliable model that can determine how many megatons would decimate agriculture or make humans extinct. Nations have already detonated 2,476 nuclear devices. An exchange that shuts down the global economy but stops short of human extinction may be the only blade realistically likely to cut the carbon knot we’re trapped within. It would decimate existing infrastructures, providing an opportunity to build new energy infrastructure and intervene in the current investments and subsidies keeping fossil fuels alive. In the near term, emissions would almost certainly rise as militaries are some of the world’s largest emitters. Given what we know of human history, though, conflict may be the only way to build the mass social cohesion necessary for undertaking the kind of huge, collective action needed for global sequestration and energy transition. Like the 20th century’s world wars, a nuclear exchange could serve as an economic leveler. It could provide justification for nationalizing energy industries with the interest of shuttering fossil fuel plants and transitioning to renewables and, uh, nuclear energy. It could shock us into reimagining a less suicidal civilization, one that dethrones the death-cult zealots who are currently in power. And it may toss particulates into the atmosphere sufficient to block out some of the solar heat helping to drive global warming. Or it may have the opposite effects. Who knows? What we do know is that humans can survive and recover from war, probably even a nuclear one. Humans cannot recover from runaway climate change. Nuclear war is not an inevitable extinction event; six degrees of warming is. Given that mostly violent, psychopathic individuals manage the governments and industries of the world, it may only be possible for anti-social collective action—that is, war—to halt, or at least slow, our inexorable march toward oblivion. A courageous, benevolent ruler might compel vast numbers of people to collective action. But we have too few of those, and the legal, political, and military barriers preventing them from rising are immense. Our current crop of villainous presidents, prime ministers, and CEOs, whether lusting for chaos or pursuing their own petty ends, may inadvertently conspire to break the machine now preventing our future. When so bereft of heroes, we may need to rely on humanity’s antagonists and their petty incompetence to accidentally save the day. It is a stark reflection of how homicidal our economy is—and our collective adherence to its whims—that nuclear war could be a rational course of action.

#### Rigorous climate simulations prove that hydrophilic black carbon would cause 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.**

#### Isolated island populations repopulate Earth after radiation and nuclear winter – bunkers and submarines expand the likelihood of survival.

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Different types of possible catastrophes suggest different scenarios for how survival could happen on an island. What is important is that the island should have properties which protect against the specific dangers of particular global catastrophic risks. Specifically, different islands will provide protection against different risks, and their natural diversity will contribute to a higher total level of protection: **Quarantined island survives pandemic** . An island could impose effective quarantine if it is sufficiently remote and simultaneously able to protect itself, possibly using military ships and air defense. **Far northern aboriginal people survive an ice age**. Many far northern people have adapted to survive in extremely cold and dangerous environments, and under the right circumstances could potentially survive the return of an ice age. However, their cultures are endangered by globalization. If these people become dependent on the products of modern civilization, such as rifles and motor boats, and lose their native survival skills, then their likelihood of surviving the collapse of the outside world would decrease. Therefore, preservation of their survival skills may be important as a defense against the risks connected with **extreme cooling**. Remote polar island with high mountains survives brief global warming of median surface temperatures, up to 50˚C. There is a theory that the climates of planets similar to the Earth could have several semi-stable temperature levels (Popp et al., 2016). If so, because of climate change, the Earth could transition to a second semi-stable state with a median global temperature of around 330 K, about 60˚C, or about 45˚C above current global mean temperatures. But even in this climate, **some regions of Earth could still be survivable for humans**, such as the Himalayan plateau at elevations above 4,000 m, but below 6,000 (where oxygen deficiency becomes a problem), or on polar islands with mountains (however, global warming affects polar regions more than equatorial regions, and northern island will experience more effects of climate change, including thawing permafrost and possible landslides because of wetter weather). In the tropics, the combination of increased humidity and temperature may increase the wet bulb temperature above 36˚C, especially on islands, where sea moisture is readily available. In such conditions, proper human perspiration becomes impossible (Sherwood and Huber, 2010), and there will likely be increased mortality and morbidity because of tropical diseases. If temperatures later returned to normal – either naturally or through climate engineering – **the rest of the Earth could be repopulated**. ‘‘Swiss Family Robinsons’’ survive on a tropical island, unnoticed by a military robot ‘‘mutiny’’. Most AI researchers ignore medium-term AI risks, which are neither near-term risks, like unemployment, nor remote risks, like AI superintelligence. But a large drone army – if one were produced – could receive a wrong command or be infected by a computer virus, leading it to attack people indiscriminately. Remote islands without robots could provide protection in this case, allowing survival until such a drone army ran out of batteries, fuel, ammunition or other supplies: Primitive tribe survives civilizational collapse. The inhabitants of **North Sentinel Island**, near the Andaman Islands in the Indian Ocean, are hostile and uncontacted.

**The Sentinelese survived the 2004 Indian Ocean tsunami apparently unaffected** (Voanews, 2009), and if the rest of humanity disappear, **they might well continue their existence without change.** Tropical Island survives extreme global nuclear winter and glaciation event. Were a **nuclear**, bolide impactor or volcanic “**winter**” scenario to unfold, these islands would remain surrounded by Warm Ocean, and local volcanism or other energy sources might provide heat, energy and food. Such island refuges may have helped life on Earth survive during the **“Snowball Earth”** event in Earth’s distant past (Hoffman et al., 1998). Remote island base for project “Yellow submarine”. Some catastrophic risks such as a gamma ray burst, a global nuclear war with high radiological contamination or multiple pandemics might be best survived **underwater in nuclear submarines** (Turchin and Green, 2017). However, after a catastrophe, the submarine with survivors would eventually need a place to dock, and an island with some prepared amenities would be a reasonable starting point for rebuilding civilization. Bunker on remote island. For risks which include multiple or complex catastrophes, such as a bolide impact, extreme volcanism, tsunamis, multiple pandemics and nuclear war with radiological contamination, **island refuges could be strengthened with bunkers**. Richard Branson survived hurricane Irma on his own island in 2017 by seeking refuge in his concrete wine cellar (Clifford, 2017). Bunkers on islands would have higher survivability compared to those close to population centers, as they will be neither a military target nor as accessible to looters or unintentionally dangerous (e.g. infected) refugees. These bunkers could potentially be connected to water sources by underwater pipes, and passages could provide cooling, access and even oxygen and food sources.

### Starr

#### The evidence is in the context of half of Russia and the US’ nuclear arsenals – they haven’t read evidence that indicates such a large amount of nuclear weapons would be used – the most likely scenario is launch of a few nukes since most of our nukes aren’t ready to launch immediately anyways and lack of

#### Firestorms are an internal link to nuke winter, not an independent impact.

#### Ozone

#### Not extinction – bounces back.

Brian **Martin 82** [Brian Martin (Professor of Social Sciences @ the University of Wollongong) December 1982 “The global health effects of nuclear war” Current Affairs Bulletin, Vol. 59, No. 7, pp. 14-26, online @ http://www.uow.edu.au/arts/sts/bmartin/pubs/82cab/index.html, loghry]

Another major threat to ozone comes from nuclear explosions. Nitric oxide is produced essentially by the 'burning' of nitrogen in the atmosphere, and this occurs whenever air temperatures are sufficiently hot: in automobile engines, in aircraft engines and in nuclear explosions. Studies of the creation of oxides of nitrogen by nuclear explosions were first undertaken as part of the SST debate, to determine whether the nuclear weapons tests in the 1950s and 1960s had reduced observed ozone levels.[28] It was only in 1974 that John Hampson made a point which had been overlooked, namely that large-scale nuclear war could cause a major and disastrous reduction in ozone levels.[29] Calculations made in the mid-1970s assuming large nuclear arsenals with many high-yield explosions concluded that reductions of ozone could reach 50 per cent or more in the northern hemisphere, with smaller reductions in the southern hemisphere.[30] But since the number of high-yield weapons in present nuclear arsenals is now smaller, much less oxides of nitrogen would be deposited in the stratosphere by nuclear war than assumed in earlier calculations, and so significant ozone reductions are unlikely.[31] This conclusion remains tentative. The actual behaviour of stratospheric ozone is quite complicated, involving many chemical compounds and numerous chemical reactions, the changing effects of temperature, the angle and intensity of sunlight, and the effect of air motions. Computer models of the effects of nuclear war on ozone are able to take into account only a part of this complexity, and new information about chemical reaction rates in particular have led in the past to periodic revisions in the calculated effects of added oxides of nitrogen. If significant ozone reduction did occur, the most important direct effect on humans would be an increase in skin cancer. However, this is seldom lethal, and could be avoided by reducing exposure to sunlight. Potentially more serious would be effects on crops.[32] Some of the important grains, for example, are sensitive to uv. Whether the net effects on crop yields would be significant is hard to estimate. But whatever the reduction in ozone, ozone levels would return pretty much to normal after a few years.[9] It seems unlikely that in the context of a major nuclear war the changes in uv alone would be of serious concern. In particular, the threat of human extinction raised by Jonathan Schell in The Fate of the Earth,[33] based mostly on effects of increased uv from ozone reduction, seems very small indeed. It is sometimes claimed that nuclear war could destroy ozone to such an extent that humans and animals would be blinded by excess uv. Even if large numbers of high-yield weapons were exploded, this possibility seems very unlikely except for a contribution to snow blindness in the far north. Stratospheric ozone can never be completely removed, but at most reduced greatly. Even if a 50 per cent or more reduction in ozone occurred - and as noted this seems improbable with present nuclear arsenals - protection from uv for humans could be obtained from sunglasses or just ordinary glasses, which absorb uv. For animals, the following considerations are relevant. Ozone levels vary considerably from place to place and from time to time, both seasonally and daily (sometimes by up to 50 per cent). Sunlight at the equator typically passes through only half as much ozone as at the mid-latitudes, yet animals at the equator are not known to go blind more often than elsewhere. Furthermore, most ozone reductions from a nuclear war would be in the mid and high latitudes,

where ozone levels are higher to start with and where the 'path length' of sunlight through ozone is increased due to its oblique angle of incidence. But this does not mean complacency is warranted, as the concerns of John Hampson illustrate.