# Off

## Deindustrialization

#### A. Death of the planet is inevitable! Only nuclear war can destroy industrial society and sever our path of biospheric apocalypse.

PCD, 92; Physicians for Civil Defense 1992 [“APOCALYPSE NEEDED” Civil Defense Perspectives, January 1992 v. 8 n. 2, online @ <http://www.physiciansforcivildefense.org/cdp/V08_02.htm>, loghry]

As Helen Caldicott and other aspiring Messiahs have pointed out, ``We have met the enemy, and he is us.'' And what does the enemy threaten? It threatens our Patient the ``one patient none of us can afford to lose.'' The Patient has ``more than five billion dependents'' and might wear a hospital armband with the name Terra Firma, age 5,000,000,000 years, address Solar System 3rd Orbit (according to an advertisement for the PSR Quarterly). Each of us threatens the Patient daily by disposing of our toxic and radioactive waste directly into the sewer. Perhaps we use whipped cream from a spray can that is not labeled ``ozone friendly.'' Or we may fail to recycle our cardboard even though we could earn $0.75 by bringing a truckload to the recycling center. The damage to the Planet is accumulating relentlessly, threatening a fatal outcome within the next decade. The mechanism of death will be indirect perhaps through destruction of the ozone although the details have not yet been worked out. We don't understand how heavy molecules like chlorofluorocarbons manage to get into the stratosphere in high enough concentrations to zap the ozone layer. But we know they're there, even if we haven't measured them. There's not enough time for research to see whether a megaton of prevention will work an ounce of cure. Instead of an arms race, we need a ``race to save the Planet,'' which can replace the Cold War. The New Earth Order will transcend national sovereignty, but even that is not enough to stave off the environmental apocalypse. ``We must redraw the line between owner and community,'' said New York Times columnist Eric Freyfogle, lecturing to some Iowa farmers who are mired in 18th century ideology. ``Property is a malleable, evolving institution, something the community ought to regularly reshape to reflect its knowledge and needs.'' He tried to quiet the farmers' ``exaggerated fears'' by assuring them that some choices would still be open to them. They could still post a ``No Trespassing Sign'' to ``keep other humans at bay'' [except the ones telling them how to manage their crops]. He hopes they will soon ``join the dialogue'' because ``the land cannot wait much longer'' (Ariz Daily Star 1/10/92). Banning the (Population) Bomb Previously, the environmentalist lobby was too fearful of the right-to-life movement to speak forthrightly. But last May, leaders of more than 100 environmental organizations joined leading population control advocates in calling for an urgent response to global overpopulation (Science 252:1247, 1991). The ``carrying capacity'' of Planet Earth is being strained, in their view. The food supply is not the limiting factor, Paul Ehrlich's predictions of the Famines of 1974, 1985, and 2001 notwithstanding. Only Africa now suffers widespread famine, and only because of ``a network of social and political factors that could be corrected'' (Science 254:790, 1991). According to a Hudson Institute report, the globe could now feed another two billion people on good land diverted from crops by government policy in the US and Argentina, and another four billion if high-yield farming technologies were more widely adopted in the Third World (Wall St J 9/19/91). The problem is, according to a National Academy of Science report on global warming, that population growth is the ``biggest single driver of atmospheric pollution.'' Increasing numbers and, more importantly, better living conditions, lead to increased energy consumption. ``The conspicuous doubling of the average lifespan of whole populations...over the past 100 years is linked to the progressively increasing energy flow through society over the same time....The recent rise of energy consumption by Homo sapiens to levels 10-20 times above the basic metabolic rate is glaringly beneficial to the species.'' Therefore, ``there will be no voluntary way back from a high-energy to a low-energy economy,'' according to Manfred Schidlowski of the Max Planck Institut für Chemie (Nature 9/26/91). The ban-the-(atomic)-bomb movement accomplished the banning of strategic defense and the rejection of bomb shelters. Only because of this, nuclear weapons had (and have) the power to cause a near-apocalyptic destruction of our undefended industrialized society. In the guise of averting another apocalypse (global warming, ozone destruction, acid rain, etc.) which, unlike nuclear weapons effects, is purely hypothetical the environmentalists could achieve the actual destruction of our industrialized society.

#### B. Growth unsustainable and causes extinction, demands on space, water, forests, and habitat---tech can’t solve because collapse of ecosystem services is irreversible

David **Shearman 7**, Emeritus professor of medicine at Adelaide University, Secretary of Doctors for the Environment Australia, and an Independent Assessor on the IPCC; and Joseph Wayne Smith, lawyer and philosopher with a research interest in environmentalism, 2007, The Climate Change Challenge and the Failure of Democracy, p. 153-156

**Hundreds of scientists** writing in Millennium Assessment and other scientific reports **pronounce** that humanity is in peril **from environmental damage**. If liberal democracy is to survive it will need to offer leadership, resolve, and sacrifice to address the problem. To date there is not a shred of evidence that these will be provided nor could they be delivered by those at the right hand of American power. **Some liberal democracies that recognize** that global **warming** is a dire problem **are trying but** nevertheless **failing to have an impact** on greenhouse emissions. To arrest climate change, greenhouse reductions of 60 to 80 percent are required during the next few decades. By contrast the Kyoto Protocol prescribes reductions of only a few percent. **The magnitude of the problem** seems overwhelming, and indeed it is. So much so, it **is still denied by many because it cannot be resolved without cataclysmic changes to society**. **Refuge from necessary change is being sought in** technological advances that will allow fossil fuels to be used with impunity, **but this ignores** the kernel of **the issue. If all humanity had the ecological footprint of the average citizen of** Australia or **the U**nited **S**tates, at least **another three planets would be needed to support the present population of the world**.2 **The ecological services of the world** cannot be saved under a regime of attrition by growth economies **that each year use more land, water, forests, natural resources, and habitat**. Technological advances cannot retrieve dead ecological services. The measures required have been discussed and documented for several decades. None of them are revolutionary new ideas. We will discuss the main themes of a number of important issues such as the limits to growth, the separation of corporatism and governance, the control of the issue of credit (i.e., financial reform), legal reform, and the reclaiming of the commons. Each of these issues has been discussed in great depth in the literature, and a multitude of reform movements have been spawned. Unfortunately, given the multitude of these problems and the limited resources and vision of the reformers, each of the issues tends to be treated in isolation. From an ecological perspective, which is a vision seeking wholeness and integration, this is a mistake. These areas of reform are closely interrelated and must be tackled as a coherent whole to bring about change. Banking and financial reform is, for example, closely related to the issue of control and limitation of corporate power, because finance capital is the engine of corporate expansion. The issue of reclaiming the commons and protecting the natural environment from corporate plunder is also intimately connected to the issue of the regulation of corporate power. In turn this is a legal question, and in turn legal structures are highly influenced by political and economic factors. Finally, the issue of whether there are ecological limits to growth underlies all these issues. Only if an ecologically sustainable solution can be given to this totality of problems can we see the beginnings of a hope for reform of liberal democracy. And even then, there still remains a host of cultural and intellectual problems that will need to be solved. The prospects for reform are daunting, but let us now explore what in principle is needed. THE LIMITS TO GR OWTH **Our** loving **marriage to economic growth has to be dissolved**. The dollar value of all goods and services made in an economy in one year is expressed as the gross domestic product (GDP). It is a flawed measurement in that it does not measure the true economic and social advance of a society,3 but it is relevant to our discussion here for most of the activities it measures consume energy. **Each country aims for economic growth**, for every economy needs this for its success in maintaining employment and **for the perceived ever-expanding needs of its populace**. Politicians salivate about economic growth, it is their testosterone boost. Most would be satisfied with 3 percent per annum and recognize that this means that the size of the economy is 3 percent greater than the previous year. On this basis **the size of the economy doubles every 23 years**. In 43 years it has quadrupled. Now in 23 years let us suppose that energy needs will also double in order to run this economy. Therefore **if greenhouse emissions are to remain at today’s level, then** approximately **half the energy requirements in 23 years’ time will have to be alternative energy**. The **burgeoning energy requirements of the developing countries have not yet been included in these considerations**. To date, **these countries have been reluctant to consider greenhouse reductions** saying that they have a right to develop without hindrance, and in any case the developed countries are responsible for most of the present burden of carbon dioxide in the atmosphere. It is not difficult to calculate therefore that there is no future for civilization **in the present cultural maladaptation to the growth economy**. Sustainable economic growth is an oxymoron. These **arguments about doubling time apply to all other environmental calculations**. **Other forms of pollution that arise from the consumer society will** also **increase proportionally to growth**, the **human and animal wastes, mercury**, the **persistent organic pollutants**, and so on. And **even if some** of these **are ameliorated, others will arise** from the activities of the burgeoning population. Science tells us that we have already exceeded the capacity of the earth to detoxify these. **In advocating a no-growth economy it has been shown in** many studies **that beyond** the **basic needs** of health, nutrition, shelter, and cultural activity, **which can be provided with much less income than Westerners** presently **enjoy**, there is little correlation between wealth and happiness or well-being. **A no-growth economy**4 **would supply the essentials for life and happiness**. Human and economic activity fuelling the consumer market would be severely curtailed and the resources redeployed to truly sustainable enterprises, basic care and repair of the environment, conservation of energy, and the manufacture of items and systems that support these needs. **The standard of living as measured at present** (again **by flawed criteria) will fall, but there may be no alternative.** The fundamental question is how can a transition be made under a liberal democracy that has consumerism and a free market as its lifeblood?

#### C. Nuc war solves growth

Melko 90 [Matthew Melko, Boston Nuclear Group, Peace in our time]

**If nuclear were then to follow, it seems probable that there would be a reversion to feudalism followed by a long recuperative period like that which followed the fall of Roman and Han empires. This reversion would take place because** as Rushton Coulborn (1956) argues, **feudalism is the normal recovery political structure after catastrophe of civilizational dimensions. People look for local alliances and these gradually extend. What would then emerge would probably not be a regenerated industrial society, but a largely agricultural civilization comparable to most those that preceded the industrial revolution.**

#### D. Life will be better after the war – we will learn from our mistakes and usher in a new era of peace.

Bruce Beach (Built twenty-three fallout shelters in Kansas and Utah in the 1960's, completed the US Office of Civil Defense course in 1970 and then the Radiological Defense Officer's course at Arnprior, Ontario in 1976, and the Radiological Scientific Officer's course in 1977. While in the USAF, he was a control tower operator and graduated as Honor Student from the AACS supply school. Because of this training he was asked to inspect the Titan missile sites after his honorable discharge. His master's degree is in Economics from Texas Christian University) 1/1/2002 [You Will Survive Doomsday, online @ http://www.webpal.org/webpal/d\_resources/survival/books/doomsday/index.htm, loghry]

(edited for gendered language)

MYTH #18: Life after doomsday won't be worth living. Hearing descriptions of this sort some persons wonder if life will be worth living afterwards. For some, most assuredly so. Others do not find life worth living today. How many times have you heard of a person like a famous movie star, who had wealth, fame, beauty, health, the company of famous illustrious persons, opportunities to travel to all sorts of places, and to participate in all sorts of interesting events, the fulfillment of the very aspirations of thousands of young ambitious people and yet that same person committed suicide. On the other hand there are many individuals who suffer daily from terrible physical afflictions and all sorts of personal misfortunes. Oftentimes in the greatest poverty. And yet, the world over, down through the centuries, they have gone on surviving. Many actually finding happiness, meaning, and perhaps even enlightenment in life. You will survive. The conditions of that survival are up to you. Undoubtedly, the events that are about to transpire will have a profound effect upon the attitudes of many people and perhaps upon mankind itself. From the cauldron of the holocaust there may spring forth a new race of (humans) ~~men~~ who are less concerned with self-interest and who will come to understand (human’s) ~~man's~~ true nature and (their) ~~his~~ divine destiny. Some of us may even feel that this event will herald the coming to maturity of the human race. Instead of no future, (humankind) ~~mankind~~ may have a glorious future. There will be great amounts of resources available, combined with (human’s) ~~man's~~ great advances in technology, to build a new and glorious world civilization. Providing, of course, that he has learned from this experience and does not just go about preparing for the next war in another twenty to thirty years. But, I leave each ~~man~~ unto his own vision. While, to myself, looking upon the immensity of the visible universe, and pondering the events that have happened upon this one single planet circling a solitary sun among the uncountable millions in our but one of the innumerable galaxies, I cannot help but wonder if the events that are about to transpire are not less than all that unique in the repetitive cycles of life and nature that we see about us everywhere.

## Future Weapons

#### A. supercolliders

#### 1. Particle accelerators destroy the universe, risk calc is on our side.

Sir Martin Rees (Astronomer Royal, and has been Master of Trinity College and Director of the Institute of Astronomy at Cambridge University. As a member of the UK’s House of Lords and former President of the Royal Society, he is much involved in international science and issues of technological risk.) 2018 [On the Future: Prospects for Humanity, Princeton University Press, p. 110-115, loghry]

But what about even more extreme experiments? Physicists aim to understand the particles that make up the world and the forces that govern those particles. They are eager to probe the most extreme energies, pressures, and temperatures; for this purpose, they build huge, elaborate machines—particle accelerators. The optimum way to produce an intense concentration of energy is to accelerate atoms to enormous speeds, close to the speed of light, and crash them together. When two atoms crash together, their constituent protons and neutrons implode to a density and pressure far greater than when they were packed into a normal nucleus, releasing their constituent quarks. They may then break up into still smaller particles. The conditions replicate, in microcosm, those that prevailed in the first nanosecond after the big bang. Some physicists raised the possibility that these experiments might do something far worse—destroy the Earth, or even the entire universe. Maybe a black hole could form, and then suck in everything around it. According to Einstein’s theory of relativity, the energy needed to make even the smallest black hole would far exceed what these collisions could generate. Some new theories, however, invoke extra spatial dimensions beyond our usual three; a consequence would be to strengthen gravity’s grip, rendering it less difficult for a small object to implode into a black hole. The second scary possibility is that the quarks would reassemble themselves into compressed objects called strangelets. That in itself would be harmless. However, under some hypotheses, a strangelet could, by contagion, convert anything else it encountered into a new form of matter, transforming the entire Earth into a hyperdense sphere about a hundred metres across. The third risk from these collision experiments is still more exotic, and potentially the most disastrous of all: a catastrophe that engulfs space itself. Empty space—what physicists call ‘the vacuum’—is more than just nothingness. It is the arena for everything that happens; it has, latent in it, all the forces and particles that govern the physical world. It is the repository of the dark energy that controls the universe’s fate. Space might exist in different ‘phases’, as water can exist in three forms: ice, liquid, or steam. Moreover, the present vacuum could be fragile and unstable. The analogy here is with water that is ‘supercooled’. Water can cool below its normal freezing point if it is pure and still; however, it only takes a small localised disturbance—for instance, a speck of dust falling into it—to trigger supercooled water’s conversion into ice. Likewise, some have speculated that the concentrated energy created when particles crash together could trigger a ‘phase transition’ that would rip the fabric of space. This would be a cosmic calamity—not just a terrestrial one. The most favoured theories are reassuring; they imply that the risks from the kind of experiments within our current powers are zero. However, physicists can dream up alternative theories (and write down equations for them) that are consistent with everything we know, and therefore can’t be absolutely ruled out, which would allow one or another of these catastrophes to happen. These alternative theories may not be frontrunners, but are they all so incredible that we needn’t worry? Physicists were (in my view quite rightly) pressured to address these speculative ‘existential risks’ when powerful new accelerators came on line at the Brookhaven National Laboratory and at CERN in Geneva, generating unprecedented concentrations of energy. Fortunately, reassurance could be offered; indeed, I was one of those who pointed out that ‘cosmic rays’—particles of much higher energies than can be made in accelerators—collide frequently in the galaxy but haven’t ripped space apart.14 And they have penetrated very dense stars without triggering their conversion into strangelets. So how risk averse should we be? Some would argue that odds of ten million to one against an existential disaster would be good enough, because that is below the chance that, within the next year, an asteroid large enough to cause global devastation will hit the Earth. (This is like arguing that the extra carcinogenic effect of artificial radiation is acceptable if it doesn’t so much as double the risk from natural radiation—radon in the local rocks, for example.) But to some, this limit may not seem stringent enough. If there were a threat to the entire Earth, the public might properly demand assurance that the probability is below one in a billion—even one in a trillion—before sanctioning such an experiment if the purpose was simply to assuage the curiosity of theoretical physicists. Can we credibly give such assurances? We may offer these odds against the Sun not rising tomorrow, or against a fair die giving one hundred sixes in a row, because we’re confident that we understand these things. But if our understanding is shaky—as it plainly is at the frontiers of physics—we can’t really assign a probability, or confidently assert that something is unlikely. It’s presumptuous to place confidence in any theories about what happens when atoms are smashed together with unprecedented energy. If a congressional committee asked: ‘Are you really claiming that there’s less than a one in a billion chance that you’re wrong?’ I’d feel uncomfortable saying yes.

#### B. AI

#### 1. Narrow and Generalized AI cause extinction

Ilan Noy & Tomáš Uher (Victoria University of Wellington, Wellington, New Zealand) 1/15/2022 [“Four New Horsemen of an Apocalypse? Solar Flares, Super-volcanoes, Pandemics, and Artificial Intelligence” EconDisCliCha (2022). <https://doi.org/10.1007/s41885-022-00105-x>, loghry]

Broadly speaking, the use of AI can lead to harmful outcomes either if the AI is programmed to achieve a harmful goal, or if the AI is programmed to achieve a beneficial goal but employs a harmful method for achieving it (Future of Life Institute, n.d.; Turchin and Denkenberger 2018a). The latter case is especially relevant for AGI, as it is argued that application of such systems could lead to catastrophic outcomes without any bad intentions or development of harmful methods by its creators (Omohundro 2008). The development of machines that may potentially become smarter and more powerful than humans could mark the end of an era characterized by humanity’s control of its future (Russell 2019). If such a powerful agent does not share our values, the result could be catastrophic (Bostrom 2014; Ord 2020). To prevent the potential disastrous outcomes of future AI, researchers argue it is crucial to align the value and motivation systems of AI systems with human values, a task that is referred to as the alignment problem (Bostrom 2014; Yudkowsky 2016; Critch and Krueger 2020). However, objectively formulating and programming human values into a computer is a complicated task. At present, we do not seem to know how to do it. Predicting the potential catastrophic impacts of AI is made difficult by several factors. Firstly, the risk posed by AI is unprecedented and cannot be reliably assessed using historical data and extrapolation, unlike the other types of existential risks explored in this review (space weather, super-volcanoes, and pandemics). Secondly, with respect to general and super-intelligence, it may be practically or even inherently impossible for us to predict how a system more intelligent than us will act (Yampolskiy 2020). Considering the difficulty of predicting catastrophic societal impacts associated with AI, we are limited here to hypothetical scenarios of basic pathways describing how the disastrous outcomes could be manifested. When considering potential global catastrophic or existential risks stemming from AI, it is useful to distinguish between narrow AI and AGI, as the speculated possible outcomes associated with each type can differ greatly. For narrow AI systems to cause catastrophic outcomes, the potential scenarios include events such as software viruses affecting hardware or critical infrastructure globally, AI systems serving as weapons of mass destruction (such as slaughter-bots), or AI-caused biotechnological or nuclear catastrophe (Turchin and Denkenberger 2018a, b; Tegmark 2017; Freitas 2000). Interestingly, Turchin and Denkenberger (2018a) argue that the catastrophic risks stemming from narrow AI are relatively neglected despite their potential to materialize sooner than the risks from AGI. Still, the probability of narrow AI to cause an existential catastrophe appears to be relatively lower than in the case of AGI (Ord 2020). With respect to the global catastrophic and existential risk of misaligned AGI, much of the expected risk seems to lie in an AGI system’s extraordinary ability to pursue its goals. According to Bostrom’s instrumental convergence thesis, instrumental aims such as developing more resources and/or power for gaining control over humans would be beneficial for achieving almost any final goal the AGI system might have (Bostrom 2012). Hence, it can be argued that almost any misaligned AGI system would be motivated to gain control over humans (often described in the literature as a ‘decisive strategic advantage’) to eliminate the possibility of human interference with the system’s pursuit of its goals (Bostrom 2014; Russell 2019). Once humans have been controlled, the system would be free to pursue its main goal, whatever that might be. In line with this instrumental convergence thesis, an AGI system whose values are not perfectly aligned with human values would be likely to pursue harmful instrumental goals, including seizing control and thus potentially creating catastrophic outcomes for humanity (Russell and Norvig 2016; Bostrom 2002, 2003a; Taylor et al. 2016; Urban 2015; Ord 2020; Muehlhauser 2014). A popular example of such a scenario is the paperclip maximizer, which firstly appeared in a mailing list of AI researchers in the early 2000’s (Harris 2018); a later version is included in Bostrom (2003a). Most versions of this scenario involve an AGI system with an arbitrary goal of manufacturing paperclips. In pursuit of this goal, it will inevitably transform Earth into a giant paperclip factory and therefore destroy all life on it. There are other scenarios that end up with potential extinction. Ord (2020) presents one in which the system increases its computational resources by hacking other systems, which enables it to gain financial and human resources to further increase its power in pursuit of its defined goal.

#### 2. Foolish humans have already trained AI to map the universe, which means our impact happens fast

Kavli Institute (a research institute of the University of California, Santa Barbara. KITP is one of the most renowned institutes for theoretical physics in the world) 9/1/2019 [“Cutting Edge AI Learns to Model Our Universe” online @ <https://scitechdaily.com/cutting-edge-ai-learns-to-model-our-universe/>, loghry]

Researchers have successfully created a model of the Universe using artificial intelligence, reports a new study. Researchers seek to understand our Universe by making model predictions to match observations. Historically, they have been able to model simple or highly simplified physical systems, jokingly dubbed the “spherical cows,” with pencils and paper. Later, the arrival of computers enabled them to model complex phenomena with numerical simulations. For example, researchers have programmed supercomputers to simulate the motion of billions of particles through billions of years of cosmic time, a procedure known as the N-body simulations, in order to study how the Universe evolved to what we observe today. “Now with machine learning, we have developed the first neural network model of the Universe, and demonstrated there’s a third route to making predictions, one that combines the merits of both analytic calculation and numerical simulation,” said Yin Li, a Postdoctoral Researcher at the Kavli Institute for the Physics and Mathematics of the Universe, University of Tokyo, and jointly the University of California, Berkeley. At the beginning of our Universe, things were extremely uniform. As time went by, the denser parts grew denser and sparser parts became sparser due to gravity, eventually forming a foam-like structure known as the “cosmic web.” To study this structure formation process, researchers have tried many methods, including analytic calculations and numerical simulations. Analytic methods are fast, but fail to produce accurate results for large density fluctuations. On the other hand, numerical (N-body) methods simulate structure formation accurately, but tracking gazillions of particles is costly, even on supercomputers. Thus, to model the Universe, scientists often face the accuracy versus efficiency trade-off. However, the explosive growth of observational data in quality and quantity calls for methods that excel in both accuracy and efficiency. To tackle this challenge, a team of researchers from the US, Canada, and Japan, including Li, set their sights on machine learning, a cutting-edge approach to detecting patterns and making predictions. Just as machine learning can transform a young man’s portrait into his older self, Li and colleagues asked whether it can also predict how universes evolve based on their early snapshots. They trained a convolutional neural network with simulation data of trillions of cubic light-years in volume, and built a deep learning model that was able to mimic the structure formation process. The new model is not only many times more accurate than the analytic methods, but is also much more efficient than the numerical simulations used for its training. “It has the strengths of both previous [analytic calculation and numerical simulation] methods,” said Li. Li says the power of AI emulation will scale up in the future. N-body simulations are already heavily optimized, and as a first attempt, his team’s AI model still has large room for improvement. Also, more complicated phenomena incur a larger cost on simulation, but not likely so on emulation. Li and his colleagues expect a bigger performance gain from their AI emulator when they move on to including other effects, such as hydrodynamics, into the simulations. “It won’t be long before we can uncover the initial conditions of and the physics encoded in our Universe along this path,” he said.

#### C. nanotech

#### 1. Nano weapons will be deployed purposefully or by accident and will destroy the Earth

Chris Phoenix & Mike Treder (director of research at the Center for Responsible Nanotechnology & executive director of the Center for Responsible Nanotechnology) 2008 [“Nanotechnology as global catastrophic risk” in Global Catastrophic Risks, Oxford Press, p. 487-488, loghry]

Because weapons figure in several global catastrophic risks, it is necessary to discuss briefly the kinds of weapons that might be built with molecular manufacturing. Increased material strength could increase the performance of almost all types of weapons. More compact computers and actuators could make weapons increasingly autonomous and add new capabilities. Weapons could be built on a variety of scales and in large quantities. It is possible, indeed easy, to imagine combining such capabilities: for example, one could imagine an uncrewed airplane in which 95% of the dry weight is cargo, the said cargo consisting of thousands of sub-kilogram or even sub-gram airplanes that could, upon release, disperse and cooperatively seek targets via optical identification, and then deploy additional weapons capabilities likewise limited mainly by imagination. The size of the gap between such speculation and actual development is open to debate. Smart weapons presumably would be more effective in general than uncontrolled weapons. However, it will be a lot easier to cut-and-paste a motor in a computer-aided design programme than to control that motor as part of a real-world robot. It seems likely, in fact, that software will require the lion's share of the development effort for 'smart' weapons that respond to their environment. Thus, the development of novel weapon functionality may be limited by the speed of software development. To date, there does not appear to have been a detailed study of molecular manufacturing-built weapons published, but it seems plausible that a single briefcase full of weaponry could kill a large percentage of a stadium full of unprotected people (to take one scenario among many that could be proposed). Small robots could implement some of the worst properties of land mines (delayed autonomous action), cluster bombs (dispersal into small lethal units), and poison gas (mobile and requiring inconvenient degrees of personal protection). A wide variety of other weapons may also be possible, but this will suffice to put a lower bound on the apparent potential destructive power of molecular manufacturing-built products. An idea that has caused significant concern (Joy, 2000) since it was introduced two decades ago (Drexler, 1986) is the possibility that small, self­ contained, mobile, self-copying manufacturing systems might be able to gain sufficient resources from the ecosphere to replicate beyond human control. Drexler's original concern of accidental release was based on a now-obsolete model of manufacturing systems (Phoenix and Drexler, 2004). However, there is at least the theoretical possibility that someone will design and release such a thing deliberately, as a weapon (though for most purposes it would be more cumbersome and less effective than non-replicating weapons) or simply as a hobby. Depending on how small such a device could be made, it might be quite difficult to clean up completely; furthermore, if made of substances not susceptible to biological digestion, it might not have to be very efficient in order to perpetuate itself successfully.

#### 2. Nanobots will escape earth and turn the solar system into mush

George Dvorsky (senior staff reporter at Gizmodo) 3/30/2016 [“12 Ways Humanity Could Destroy The Entire Solar System” online @ <https://io9.gizmodo.com/12-ways-humanity-could-destroy-the-entire-solar-system-1696825692>, loghry]

Somewhat similar to self-replicating space probes, there’s also the potential for something much smaller, yet equally as dangerous: exponentially replicating nanobots. A grey goo disaster, where an uncontrollable swarm of nanobots or macrobots consume all planetary resources to create more copies of itself, need not be confined to planet Earth. Such a swarm could hitch a ride aboard an escaping spaceship or planetary fragment, or even originate in space as part of some megastructure project. Once unleashed in the Solar System, it would quickly turn everything into mush.

#### D. Space Rats

#### 1. Colonization and exploration require probes

Stephen Webb (Physicist, Learning and Teaching Solutions at the Open University, England) 2015 [If the Universe is Teeming with Aliens … Where is Everybody? Springer Pub., 2nd Edition, p. 119, loghry]

Can such a probe ever be built? Well, it’s possible in principle. A spaceship containing a sufficient number of human couples, the appropriate life support systems, stored knowledge in the form of large databases and a sophisticated onboard factory would constitute a Bracewell–von Neumann probe. It would be impractical, of course: the cost benefits mentioned above would vanish because of the need to feed, shelter and entertain the human passengers. In principle, however, it would work: the system could reproduce itself and continue the process of exploration. The trick to creating a more practical Bracewell–von Neumann probe would be to replace humans with some form of artificial intelligence. Certainly there are significant technical and engineering hurdles to overcome, but this is the sort of technology humankind will have to develop if we want to explore and exploit the Asteroid Belt, for example, or the Oort Cloud. And if in the next few centuries we might use probes for interplanetary exploration and exploitation,158 surely a technological civilization in advance of us by thousands or millions of years might develop interstellar probes. There seems to be no fundamental reason why they couldn’t.

#### 2. space rats come back as something much much worse

George Dvorsky (senior staff reporter at Gizmodo) 3/30/2016 [“12 Ways Humanity Could Destroy The Entire Solar System” online @ <https://io9.gizmodo.com/12-ways-humanity-could-destroy-the-entire-solar-system-1696825692>, loghry]

Say we send out a fleet of exponentially self-replicating von Neumann probes to colonize the Galaxy. Assuming they’re programmed very, very poorly, or somebody deliberately creates an evolvable probe, they could mutate over time and transform into something quite malevolent. Eventually, our clever little space-faring devices could come back to haunt us by ripping our Solar System to shreds, or by sucking up resources and pushing valuable life out of existence. ( Image: Babylon 5.)

#### E. Warp Drives

#### Warp drives inevitable – tears a hole in the universe

Tristan Greene (sailor gleefully writing about human-centric artificial intelligence advances, political policy concerning tech, and the horrors of living on dry land) 10/1/2019 [“New physics research boldly indicates ‘warp drives’ may be possible” online @ <https://thenextweb.com/science/2019/10/01/new-physics-research-boldly-indicates-warp-drives-may-be-possible/>, loghry]

We’re going to need warp engines, or something similar, to “boldly go” much further than the confines of our own solar system. But rules are rules and we’re unlikely to figure out how to move a spaceship faster than the speed of light any time soon. There might, however, be a way to cheat. Joseph Agnew, an undergraduate from the University of Alabama in Huntsville’s Propulsion Research Center, thinks we can create a warp engine capable of riding a space wave into the future. No, that’s not a crappy advertisement for a 1980s cola product. It’s science. According to his fascinating research paper: One particular concept, which will be discussed here, stood out among the rest, and was brought into existence mathematically through the work of Miguel Alcubierre. Inspired in part by the drive of like name in the Star Trek series, he devised this metric which served as a solution for Einstein’s General Relativity Equations, and described a fascinating superluminal-apparent concept. In essence, what this metric describes is a way of inducing a curvature of spacetime in a manner akin to an ocean wave. One creates a ‘high-pressure’ curvature behind, and a ‘low pressure’ curvature in front, and the vessel inside of this resulting ‘bubble’ is moved with space to a destination. Basically if you can’t go faster than light, make the universe expand and contract around you so that you’ve actually moved farther than you could have traveling at the speed of light, without ever breaking Einstein’s speed limit. Alcubierre’s reseach paper described a groundbreaking warp theory that worked within the confines of Einstein’s relativity. The very idea that such an idea could logically be put to paper in the context of scientific rigor is astounding. But the big question of “how” remained. As Agnew put it in his paper: It is a great advancement to describe a set of equations that appear to allow spacetime to behave in a certain manner, but scrutinization is required to find the mathematical and physical objections to its actual manifestation. On the mathematical side, there were raised flags about the energy states and requirements of the drive, the ability to control the warp bubble from inside, both when moving and when stationary, and the potential causality violations associated with ‘apparent’ superluminal speeds. On the physical side, the primary question was “how?”, which came with an array of sub-topics which needed to be addressed, such as the existence of exotic matter and of spacetime curvature, and the ability to harness and manipulate those. Agnew lays out some potential solutions – based on what must have been years of exhaustive research – that have a plausible foundation in current technology. In essence, if the plan is to create a giant wave in the space-time continuum in order to warp a space craft from point A to point B, the problem can be broken down into finding the fuel, figuring out how to make a wave, and making sure we don’t break something important… like reality. The first part’s easy, we just need to continue our research on exotic matter and we’ll eventually, hopefully find a way to power this thing. The second part, creating the wave, might sound like the hard part, but really it’s just a matter of extending the current breakthrough research into gravity waves – perhaps we can use exotic matter-powered electro magnets to cause some sort of programmable black hole. The real hard part is dealing with the radiation and determining what happens when we have the human audacity to believe it’s okay to go around stretching and squishing the very fabric of the universe. There’s some concern that high speed quantum collisions could have some uh, negative effects such as ripping a hole in the universe itself. But, according to Agnew, there’s reason for hope there as well: One of the most useful developments on this front, from a very recent 2018 paper, describes the problem in question, and proposes that it may be a non-factor. To summarize their highly important progress, they note that the incoming matter and photons will be slowed down when entering the front, warped region (using the Broeck metric), and therefore will not initiate high velocity collisions. Agnew’s research is both a roadmap for current researchers and a really cool paper to inspire future ones. The ideas inside it are outrageous, but the most compelling research often is. A warp drive is clearly plausible and, despite the fact that only a handful of researchers are taking it seriously, the past decade has brought a series of significant breakthroughs in relative fields that makes it seem downright likely.

# On

## Trade

### **Oppenheimer**

#### No explanation for how trade solves warming- and there’s no extinction claim to nuclear war.

## Outreach

### **Ehtisham**

#### Doesn’t make a claim that nuc war causes extinction.

### Tan

#### il to escalation- proves out timeframe but not theirs because there isn’t an extinction claim.

### Tech reg

#### They don’t solve any tech scenarios and link to our tech optimism offense, we read yellow

Daniel 20 – (\*Owen Cotton-Barratt \*\*Max Daniel and \*\*\*Anders Sandberg \*Research Scholars Programme Director @ Future of Humanity Institute @ Oxford University, DPhil in pure mathematics from Oxford University, worked as a Research Fellow at the University of Southampton \*\*Research Scholars Project Manager @ Future of Humanity Institute @ Oxford University, master’s in mathematics with a minor in philosophy from Heidelberg University \*\*\*Researcher @ Future of Humanity Institute @ Oxford University, Senior Research Fellow on the ERC UnPrEDICT Programme, Ph.D. in computational neuroscience from Stockholm University; published May 2020, Global Policy Volume 11, Issue 3, "Defence in Depth Against Human Extinction: Prevention, Response, Resilience, and Why They All Matter," doa: 11-8-2021) url: https://onlinelibrary.wiley.com/doi/pdf/10.1111/1758-5899.12786

Both the risks discussed by Avin et al. (2018) and extinction risks by definition involve risks of a massive loss of lives. This sets them apart from other risks where the adverse outcome would also have global scale but could be limited to less severe damage such as economic losses. Such risks are being studied by a growing literature on ‘global systemic risk’ (Centeno et al., 2015). Rather than reviewing that literature here, we’ll point out throughout the article where we believe it contains useful lessons for the study of extinction risks. Finally, it’s worth keeping in mind that extinction is not the only outcome that would permanently curtail humanity’s potential; see Bostrom (2013) for other ways in which this could happen. A classification of these other existential risks is beyond the scope of this article, as is a more comprehensive survey of the large literature on global risks (e.g. Baum and Barrett, 2018; Baum and Handoh, 2014; Bostrom and Cirkovi c 2008; Posner, 2004). Classification by origin: types of prevention failures Avoiding catastrophe altogether is the most desirable outcome. The origin of a risk determines how it passes through the prevention layer, and hence the kind of steps society can take to strengthen prevention (Figure 2). Natural risks The simplest explanation for a risk to bypass our background prevention of harm-creating activities is if the origin is outside of human control: a natural risk. Examples include a large enough asteroid striking the earth, or a naturally occurring but particularly deadly pandemic. We sometimes can take steps to avoid natural risks. For example, we may be able to develop methods for deflecting asteroids. Preventing natural risks generally requires proactive understanding and perhaps detection, for instance scanning for asteroids on earth-intersecting orbits. Such risks share important properties with anthropogenic risks, as any explanation for how they might materialise must include an explanation of why the human-controlled prevention layer failed. Anthropogenic risks All non-natural risks are in some sense anthropogenic, but we can classify them further. Some may have a localised origin, needing relatively small numbers of people to trigger them. Others require large-scale and widespread activity. In each case there are at least a couple of ways that it could get through the prevention layer. Note that there is a spectrum in terms of the number of people who are needed to produce different risks, so the division between ‘few people’ and ‘many people’ is not crisp. We might think of the boundary as being around one hundred thousand or one million people, and things close to this boundary will have properties of both classes. However, it appears to us that for many of the plausible risks the number required is either much smaller (e.g., an individual or a cohesive group of people such as a company or military unit) or much larger than this (e.g., the population of a major power or even the whole world), so the qualitative distinction between ‘few people’ and ‘many people’ (and the different implications of these for responding) seems to us a useful one. Also potentially relevant are the knowledge and intentions of the people conducting the risky activity. They may be ignorant of or aware of the possible harm; if the latter, they may or may not intend it. Anthropogenic risks from small groups The case of a risk where relatively few people are involved in triggering and they are unaware of the potential harm is an unseen risk. 4 This is likely to involve a new kind of activity; it is most plausible with the development of unprecedented technologies (GPP, 2015), such as perhaps advanced artificial intelligence (Bostrom, 2014), nanotechnology (Auplat, 2012, 2013; Umbrello and Baum, 2018), or high-energy physics experiments (Ord et al., 2010). The case of a localised unintentional trigger which was foreseen as a possibility (and the dynamics somewhat understood) is an accident risk. This could include a nuclear war starting because of a fault in a system or human error, or the escape of an engineered pathogen from an experiment despite safety precautions. If the harm was known and intended, we have a malicious risk. This is a scenario where a small group of people wants to do widespread damage;5 see Torres (2016, 2018b) for a typology and examples. Malicious risks tend to be extreme forms of terrorism, where there is a threat which could cause global damage. Anthropogenic risks from large groups Turning to scenarios where many people are involved, we ask why so many would pursue an activity which causes global damage. Perhaps they do not know about the damage. This is a latent risk. For them to remain ignorant for long enough, it is likely that the damage is caused in an indirect or delayed manner. We have seen latent risks realised before, but not ones that threatened extinction. For example, asbestos was used in a widespread manner before it was realised that it caused health problems. And it was many decades after we scaled up the burning of fossil fuels that we realised this contributed to climate change. If our climate turns out to be more sensitive than expected (Nordhaus, 2011; Wagner and Weitzman, 2015; Weitzman, 2009), and continued fossil fuel use triggers a truly catastrophic shift in climate, then this could be a latent risk today. In some cases people may be aware of the damage and engage in the activity anyway. This failure to internalise negative externalities is typified by ‘tragedy of the commons’ scenarios, so we can call this a commons risk. For example, failure to act together to tackle global warming may be a commons risk (but lack of understanding of the dynamics causes a blur with latent risk). In general, commons risks require some coordination failure. They are therefore more likely if features of the risk inhibit coordination; see for example Barrett (2016) and Sandler (2016) for a game-theoretic analysis of such features. Finally, there are cases where a large number of people engage in an activity to cause deliberate harm: conflict risk. This could include wars and genocides. Wars share some features with commons risk: there are solutions which are better for everybody but are not reached. In most conflicts, actors are intentionally causing harm, but only as an instrumental goal. Risk creators and risk reducers n the above we classify risks according to who creates the risk and their state of knowledge. We have done this because if we want to prevent risk it will often be most effective to go to the source. But we could also ask who is in a position to take actions to avoid the risk. In many cases those creating it have most leverage, but in principle almost any actor could take steps to reduce the occurrence rate. If risk prevention is underprovided, this is likely to be a tragedy of the commons scenario, and share characteristics with commons risk. From a moral and legal standpoint intentionality often matters. The possibility of being found culpable is an important incentive for avoiding risk-causing activities and part of risk management in most societies. If creating or hiding potential catastrophic risks is made more blameworthy, prevention will likely be more effective. Unfortunately it also often motivates concealment that can create or aggravate risk; see Chernov and Sornette (2015) for case studies of how this misincentive can weaken prevention and response. This shows the importance of making accountability effectively enforceable. Policy implications for preventing extinction risk To be able to prevent natural risks, we need research aimed at identifying potential hazards, understanding their dynamics, and eventually develop ways to reduce their rate of occurrence. To avoid unseen and latent risks, we can promote norms such as appropriate risk management principles at institutions that engage in plausibly risky activities; note that there is an extensive literature on rivalling risk management principles (e.g. Foster et al., 2000; O’Riordan and Cameron, 1994; Sandin, 1999; Sunstein, 2005; Wiener, 2011), especially in the face of catastrophic risks (Baum, 2015; Bostrom, 2013; Buchholz and Schymura, 2012; Sunstein, 2007, 2009; Tonn, 2009; Tonn and Stiefel, 2014) – advocating for any particular principle is beyond the scope of this article. See also Jebari (2015) for a discussion of how heuristics from engineering safety may help prevent unseen, latent, and accident risks. Regular horizon scanning may identify previously unknown risks, enabling us to develop targeted prevention measures. Organisations must be set up in such a way that warnings of newly discovered risks reach decision-makers (see Clarke and Eddy, 2017, for case studies where this failed). Accidents may be prevented by general safety norms that also help reduce unseen risk. In addition, building on our understanding of specific accident scenarios, we can design failsafe systems or follow operational routines that minimise accident risk. In some cases, we may want to eschew an accident-prone technology altogether in favour of safer alternatives. Accident prevention may benefit from research on high reliability organisations (Roberts and Bea, 2001) and lessons learnt from historical accidents. Where effective prevention measures have been identified, it may be beneficial to codify them through norms and law at the national and international levels. Alternatively, if we can internalise the expected damages of accidents through mechanisms such as insurance, we can leverage market incentives.6 Solving the coordination problems at the heart of commons and conflict risks is sometimes possible by fostering national or international cooperation, be it through building dedicated institutions or through establishing beneficial customs.7 One idea is to give a stronger political voice to future generations (Jones et al., 2018; Tonn, 1991, 2018). Lastly, we can prevent malicious risks by combating extremism. Technical (Trask, 2017) as well as institutional (Lewis, 2018) innovations may help with governance challenges in this area, a survey of which is beyond the scope of this article.

#### Techno-optimism guarantees extinction

Thorpe 16. Charles, Associate Professor in the Department of Sociology and the Science Studies Program at the University of California, San Diego, USA. “Necroculture.”

As the world appeared headed for 1970s-style stagflation, Jeffrey Sachs asserted that new technologies offered a way out of both the food crisis and the broader economic crisis. Sachs argued for massive investment in sustainable technologies such as solar power, electricity storage and transmission, hybrid engines, carbon capture, cellulose-based ethanol, “safe nuclear power,” new drought-resistant crop varieties, and new irrigation techniques that “can help impoverished farmers move from one subsistence crop to several high-value crops year round.” He opined that “countless other technologies on the horizon can reconcile a world of growing energy demands with increasingly scarce fossil fuels and rising threats of human-made climate change.” 120 This new techno-salvationism offers to overcome the problems generated by past development and by earlier failed technological fixes. Climate change has exacerbated the depletion of world food stocks. But the legacy of the Green Revolution has also added to the problem, since it led to the development of agriculture that was highly dependent on energy and petrochemical inputs and water. The new “green revolution” means using biotechnology, including genetic modification, to try to increase yields despite shortages of water and the growing cost of energy and petrochemical inputs. Techno-enthusiasts become more insistent about the “imperative” for such technological fixes in proportion with the irrational, crisis-ridden nature of the prevailing economic system and its destructive relationship to the natural world. 122 As the world’s politicians appear paralyzed in the face of global warming, techno-salvationism is rampant in this area. The Bush administration backed a range of technological fi xes to the crisis, including “giant mirrors in space or refl ective dust pumped into the atmosphere.” 123 Private corporations are seeking to profi t from developing “geoengineering” solutions to climate change. Proposals have included spreading iron filings on the ocean surface to encourage plankton and sequester carbon dioxide. 124 There have been protests against an Indian and German expedition to the Antarctic to engage in experimentation involving the spreading of 20 tons of iron sulfate over a 300-sq-km area in the Southern Ocean. 125 The environmental imbalance produced by carbon pollution creates a potentially lucrative demand for technoscientific products and expertise, and there are companies waiting to take advantage of such opportunities. Modern industrial civilization is doing away with the relatively stable and benign climate that has existed for 10,000 years since the last Ice Age. As the environmental journalist Fred Pearce puts it: ARTIFICIAL LIFE ON A DEAD PLANET 77 It is arguable that this rather benign world has been the main reason why our species was able to leave the caves and create the urban, industrial civilisation we enjoy today. Our complex society rests on our being able to plant crops and build cities, knowing that the rains will come and the cities will not be fl ooded by incoming tides. When that certainty fails. . . even the most sophisticated society is brought to its knees. But there is now a growing fear among scientists that, thanks to man-made climate change, we are about to return to a world of climactic turbulence, where tipping points are constantly crossed. 126 The life-sustaining environment that was a taken-for-granted common good can no longer be taken for granted, and the maintenance of equilibrium in the atmosphere and ecosystem becomes potentially an artificial technological accomplishment. As our life on Earth becomes increasingly precarious, it becomes also increasingly artificial. Even the problem of algal blooms in the oceans, caused by pollution and climate change, has become a focus for technosalvationist hopes. The problem was highlighted when 32 % of the 50-sq-km area off the coast of Qingdao, devoted to Olympic sailing during the Beijing Olympics, was covered in algae. However, as well as raising awareness about the danger to ocean life caused by the industrial transformation of the environment, the algae also led to technovisionary speculation about the possibility of new biofuels. A Financial Times article noted: “But the crazy growth rates of algae under favourable conditions–doubling their mass every day or two–is one reason why they are seen as an attractive future prospect by the biofuels industry.”. 127 An economic system that requires “crazy growth rates” fi nds a match in an equally virulent and invasive species. Not content with existent green algae, bioscientists are seeking to engineer new varieties that may be more effi ciently harnessed to capitalism’s energy requirements: algae for biofuels is one of the potential applications that Craig Venter promises for synthetic life. 128 The notion of a technological fix to environmental problems is also dear to the hearts of nanovisionaries. Drexler’s nanotechnology manifesto, Engines of Creation, contains a chapter on “The Limits to Growth,” which presents the nanosphere as holding the solution to problems of resource limits: “When we develop pollution-free nanomachines to gather solar energy and resources, Earth will be able to support a civilization far larger and wealthier than any yet seen. . . The potential of Earth makes the resources we now use seem insignifi cant by comparison.” 129 Historian W. Patrick McCray argues that the techno-futurist thought of Eric Drexler and Ray Kurzweil was developed in reaction against the 1970s’ discourse of “limits to growth.” In opposition to the image of Earth as a closed system, in which resources were being rapidly depleted, and the law of entropy applied, techno-futurists like Drexler looked to the infi nities of outer space. Before transferring these fantasies of superseding limits into the realm of nanotechnology, Drexler was an enthusiast for space colonies. 130 Access to resources beyond Earth remains central to Drexler’s vision: “Yet Earth is but a speck. . . The resources of the solar system are truly vast, making the resources of Earth seem insignifi cant by comparison.” 131Similar extraterrestrial fantasies are found in the writings of technovisionaries such as Kurzweil and Moravec. In Moravec, techno-futurist fantasies of artifi cial intelligence extending out beyond Earth into the universe combine with a romantic-primitivist critique of industrialism. Moravec’s narrative begins with a loss of Eden and develops toward technological salvation. “A thousand centuries ago,” he tells us, “the world was fully automated. Our ancestors were supported by the maintenance-free, self-operating machinery called Nature. But, in an Adamic bargain predating Faust, they meddled with the mechanism. By tilling and planting, they magnifi ed the machinery’s productivity but trapped themselves in a routine of heavy, unpleasant labor.” 132 From agriculture developed urban civilization and modern industrial society. Unchanged biologically from our Stone Age ancestors, we are today born into a highly technologized, unnatural environment. There is a mismatch between the human organism and the industrial urban environment that “induces alienation in the midst of unprecedented physical plenty.” 133 Since Moravec conceives of alienation in biological and essentialist terms, he can suggest that the problem is destined to be overcome by transcending and eliminating the biological human organism. “Technological evolution” will again restore us to our natural state of idleness as machines take over work, and “intelligence” will take fl ight from our unwieldy bodies to inhabit realms beyond Earth itself. 134 Kurzweil’s fantasy of “the Singularity,” similarly to Moravec, denies limits by imaginatively escaping from the constraints of Earth as the relevant environment. In Kurzweil, the rejection of spatial limits (of Earth) and of temporal limits (via radical life extension) is achieved ultimately through decorporealization. When minds can be uploaded as information to computational hardware, then at that point the longevity of one’s mind fi le will not depend on the continued viability of any particular hardware medium (for example, the survival of a biological body and brain). Ultimately, software-based humans. . . will live out on the Web, projecting bodies whenever they need or want them, including virtual bodies in diverse realms of virtual reality. . . and physical bodies comprising nanobot swarms and other forms of nanotechnology. 135 Following abstract labor and abstract life, these fantasies involve a further abstraction: human existence is decorporealized and abstracted as “intelligence” and therefore delinked from its material ecological basis. Kurzweil’s fantasy of endless growth deals with the problem of ecological limits just by denying the salience of ecology, seeking what he calls “transcendence” in a decorporealized, informatic consciousness. 136 But the fantasy of transcendence arrives at a state of incorporeal oneness with the universe that seems to be close to religious notions of the afterlife. 137 This artificial life of uploaded, incorporeal intelligence seems to be a form of death. ARTIFICIAL LIFE/DEAD PLANET Artificial life and a dead planet are twin expressions of a world built on the basis of alienated labor. The alienation of one’s own living activity produces an alienated relationship with the broader world of the living. The degradation of labor is implicated in the degradation of life. The imposition of capital’s framework of value devalues the particularities and qualitative potentiality of the individual human being. 138 The broader living world of nature is also deprived of value, as that which cannot be rendered in cash terms no longer has value; hence, much of the Earth becomes a sink for pollution and other “externalities” of capitalist production. The standardization and disciplining of human productive activity is accompanied by the standardization and control of the reproductive processes of natural organisms. The living is reified, then, symbolically in terms of the way in which it is valued—quality being reduced to quantity—and practically, as both human activity and nature more broadly are degraded, standardized, and routinized, becoming increasingly thing-like. As Philip K. Dick perceived, the reifi cation of the living is accompanied by the animation of the non-living.

### Q

Your ev said they can get nucs, when

Seems like it would be a really long time, when?

## Resources

### Renewables bad

#### Renewables don’t solve warming.

Gunderson et al. ’18 [Ryan; Sociology @ Miami; Diana Stuart; PhD Environmental Studies and Earth Science @ Northern Arizona; Brian Petersen; PhD Environmental Studies, Sustainable Communities @ Northern Arizona; “Ideological obstacles to effective climate policy: The greening of markets, technology, and growth,” *Capital & Class* *42*(1), 133-160]

National climate policies and international climate agreements to reduce carbon emissions, exhibited by Article 10 of the Paris Climate Agreement, often focus on technological fixes that further extend the capitalist logic underpinning carbon emissions rather than the root causes leading to climate change. This represents an ideological, not a pragmatic, reasoned response because, as argued below, techno-optimists displace the technical potential-productive relations contradiction by viewing technology as neutral and disinterested, or, malleable and applicable independent of social context. In other words, techno-optimism in climate policy and its failure to reduce GHG emissions partially results from an assumption that displaces a cause of climate change – the use of technology to increase resource throughput for capital accumulation onto technology itself. Techno-optimism in environmental thought comes in at least three distinct variants. First, those supporting ecological modernization focus on technology and the shift in the responsibility for environmental outcomes from a command-and-control state to a more central role for the market and other non-state actors (Mol 1995). Second, reformists, namely environmentalists and environmental non-governmental organizations, seek solutions that fit within existing institutions (Demaria et al. 2013) rather than calling for alternatives to the reigning capitalist system. Regarding climate change, this means finding market approaches that facilitate and promote alternative technologies as a means to address climate change, a position captured by market logic that fails to see the futility in a platform predicated on growth-based alternative energy production. Finally, policy elites and corporatists favor a neoliberal approach to governance that privileges entrepreneurial motives to meet societal needs by diminishing or eliminating governmental regulation and oversight to the greatest extent possible. Unlike ecological modernization proponents who see a role for government in a shift to new technology, this perspective seeks to drastically reduce or even eliminate government intervention in the market and instead rely on technological solutions to address climate change that come from the private sector. Techno-optimists point to alternative energy, energy efficiency, and/or geoengineering as potential advancements that could help ameliorate the negative consequences posed by climate change. Although technological advances **theoretically** hold the potential to address the challenges posed by climate change, these approaches have **limited viability in contemporary societies.** By producing energy without fossil fuels, alternative energy appears as the most obvious means by which to reduce GHG emissions globally. However, alternative energy sources such as wind and solar do not **necessarily lead** to diminished fossil fuel derived emissions, at least at the levels needed to effectively address climate change. York (2012) shows that although alternative energy production has increased, it has not proportionally displaced fossil fuel emissions from energy production. In contrast, on average one unit of alternative energy production displaced only one-quarter of a unit of fossil fuel produced energy and only one-tenth of a unit of fossil fuel generated electricity. This does not bode well given energy demand projections. The US Energy Information Administration projects a 48% increase in global energy consumption by 2040 and that despite significant investment in renewable energy fossil fuels will supply greater than 75% of total energy (Showstack 2016). As energy demand increases, especially for electricity, renewable energy production would have to grow at a rate faster than any energy technology in history to meet climate stabilization goals (Hook et al. 2012). An additional problem relates to efficiency and energy use. As William Stanley Jevons identified in the 1860s, increased efficiency (coal-powered steam engines in this case) **can lead to an increase in total consumption.** This counter-intuitive outcome has come to be known as Jevons paradox. A rebound effect refers to situations in which energy efficiency gains are lost due to increased resource use due to those gains (Santarius 2012). There are different levels of rebound effects. Rebound effects above 100% are termed ‘backfire effects’ or ‘backfires’, which means total resource use is higher after the improved efficiency was implemented due to improvements in efficiency. Although the exact mechanisms that lead to this outcome remain unclear (Santarius 2012; Sorrel 2007; York & McGee 2016), **many empirical examples confirm the overall trend.** These include the findings that countries with high levels of efficiency tend to have higher rates of carbon dioxide emissions, electricity consumption, and energy use (York & McGee 2016; for reviews, see Alcott 2005; Polimini et al. 2008; Santarius 2012). These findings undermine the claims made by techno-optimists that greening technology alone can stabilize the global climate. Perhaps the strongest manifestations of techno-optimism in proposed climate policy are found in geoengineering strategies, which also fail to address or acknowledge the limitations of technological interventions for addressing climate change. Geoengineering represents a technological approach to alter the Earth’s climate system in an attempt to alleviate the impacts of climate change (Boucher et al. 2013). Geoengineering interventions include injecting aerosols (sulfur) into the atmosphere to reflect incoming solar radiation and fertilizing the ocean to sequester carbon, among many others. These and other geoengineering approaches have the potential to contribute to climate stabilization, but they also pose significant risks. For example, injecting sulfur into the atmosphere, modeled on volcanic eruptions, would reduce incoming solar radiation, but it would require continued effort (Keith 2013), has the potential to significantly affect weather patterns and agricultural production (Robock 2008), and could lead to prolonged droughts (Ferraro et al. 2014). More importantly, however, this intervention could prevent actions to reduce GHG emissions. Doing so would reduce the need to reduce GHG emissions, potentially leading to dramatic temperature rise should the intervention stop (Robock et al. 2010). Similarly, iron fertilization in the open oceans could detrimentally affect food webs and ecological functions (Strong et al. 2009) and lead to harmful algal blooms (Allsopp et al. 2007), among other serious risks. Proponents of renewable energy, energy efficiency, and/or geoengineering have put forth seemingly viable options to address the challenges posed by climate change. These approaches, however, are aligned with the current socio-economic order that created the climate crisis. They are not alternatives to it. The reliance on technology as the solution to the climate change problem comes in different variants, but all reflect an ideological position: they conceal the technical potential-productive relations contradiction. More specifically, they displace the contradiction by presupposing that technology is neutral and disinterested, free to be used and shaped by rational individuals uninfluenced by social-structural context. This assumption is problematic for a number of reasons (for review in environmental context, see Whyte et al. forthcoming). As Marcuse (2011) points out, the ends that technology serve are prepared by the ‘pregiven empirical reality’ (p. 152), or, ‘in line with the prevalent interests in the respective society’ (Marcuse 2001: 44). In other words, technology embodies the values and power of the society for which it functions. In world-system and ecological context, Hornborg (1992, 2001, 2009) uses the term ‘fetishism’ to describe the common illusion of the autonomy of productive technologies, which conceals various socio-ecological processes, such as unequal exchange and the Global North’s forgotten dependence on land. Techno-optimists wrongly view old technologies as the cause of climate change and can be reformed, rather than interpreting ‘dirty’ and ‘green’ technologies in social-structural context. The latter allows one to see that the potential of reducing GHG depends on changing the social structures and interests that condition them. For example, the Jevons paradox may partially result from capitalism’s aim to maximize profits through two routes: (1) reduce costs of production and (2) produce/ sell more, requiring resource use (York & McGee 2016). Improvements in efficiency reduce costs, thereby increasing profits, which are reinvested to expand production, requiring higher rates of resource use. By displacing the technical potential-productive relations contradiction in this way, climate policy that depends on the greening of technology reproduces existing systems to the exclusion of social alternatives. Focusing on technological solutions in a marketbased system omits consideration of both more effective alternatives (discussed below) and, perhaps more importantly, ignores the institutionalized social relations that led to the problems forming in the first place. In all cases, techno-optimist perspectives implicitly or explicitly rely on the market for solutions. Even if proponents are unaware, climate policy that depends on green technology represents a continuation of a larger project to serve capitalist interests. It does so by relying on technology rather than social change to reduce carbon emissions, thereby allowing the fossil-fuel-based economy to continue unfettered. Technological solutions devised to alter social processes that lead to reduced emissions hold great potential (Keary 2016) but simply focusing on technology as the solution to climate change represents an ideological rather than a practical solution. Few proponents of renewable energy, energy efficiency, and/or geoengineering prioritize total energy reduction or technologies that might guide social behaviors in a new direction. Instead, they focus on techno-fixes designed to increase economic growth and hold assumptions that displace the technical potential- productive relations contradiction. This represents an ideological approach orchestrated to fit ‘solutions’ into an existing economic paradigm rather than looking for effective, long-term alternatives.(11-13)

### Survivability

#### First, Nuc War is incapable of wiping out all life on earth

#### A. All major effects of nuc war will be short-lived. The biosphere survives.

Edward Zuckerman (investigative journalist who literally "owns" the field of Continuity of Government research) 1984 [The Day After World War III, p. 312, loghry]

Other potential disasters foreseen by the committee included the possibility that radiation could cause mutations in disease-producing organisms, leading to virulent strains that might spread to produce worldwide disease epidemics among crops and farm animals, epidemics that would be especially disastrous because they would occur at a time when the United States had suddenly stopped exporting grain to hungry nations and important centers of agricultural research and technology in the Northern Hemisphere had been destroyed. Despite all this, the report did not write off the earth or its inhabitants. In fact, it concluded that almost every nuclear war effect it investigated would be short-lived. Sixty percent of the depleted ozone would be restored in two to four years, it said. "Because of resiliency of natural ecosystems, recovery [from all effects] during the subsequent 25 years could be expected to be fairly complete. Global radiation would produce only a 2 percent increase in normal cancer death rate and a .2 to 2 percent increase in genetic disease; "no serious long-term damage to farm crops or a would be expected." In a cover letter accompanying the report, National Academy of Sciences President Philip Handler summed "If I may restate [the] principal question as, 'Would the bios and the species, Homo sapiens, survive?,' the response by our committee is, 'yes.' "

#### B. Only 10% of the global population dies in an all out nuclear war-this assumes epidemics, famine and fallout.

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]

In the following article Dr Brian Martin, without belittling the horrendous effects of nuclear war, dispels a little of the gloom surrounding the subject - from Australia's point of view at least - by arguing that contrary to Tom Lehrer's assertions we may not 'all go together when we go'. While a full-scale nuclear war would devastate some parts of the earth, particularly in the northern hemisphere, present evidence indicates that 'nuclear war poses no threat to the survival of the human species'. Ever since the first nuclear bomb was exploded at Alamogordo, New Mexico, on 16 July 1945, the threat of nuclear war has existed. So far the only nuclear bombs used in war were the two dropped by the United States on Hiroshima and Nagasaki on the sixth and ninth of August 1945. Today the United States possesses some 30,000 nuclear weapons, the Soviet Union some 20,000, and China, France and Britain several hundred to a few thousand each.[1] A few other countries such as Israel have or may soon have small nuclear arsenals. The Hiroshima and Nagasaki bombs killed a total of perhaps 300,000 people - different estimates have been offered.[2] What would be the result of all-out nuclear war using today's weapon arsenals? This question has become more important in many people's minds in the 1980s as world attention has again focussed on the threat of nuclear war. In the immediate vicinity of a nuclear explosion, most casualties result from blast, heat and fallout during the first few days.[3] The blast or heat from a one megatonne bomb - about 75 times the power of the Hiroshima bomb, and a size often found in nuclear arsenals - would kill almost all people, even those in shelters, out to a distance of two kilometres. Beyond ten kilometres the chance of death even for people without special protection would be very small. If the bomb is exploded at an altitude higher than the radius of the fireball from the explosion, as happened at Hiroshima and Nagasaki, local fallout is minimal. If exploded at or near the earth's surface, fallout lethal to unprotected people will be deposited downwind - most often to the east toward which prevailing upper atmospheric winds blow - for a distance of up to hundreds of kilometres. After a fortnight the radiation levels will have dropped to about one thousandth of what they were one hour after the blast. A major global nuclear war could kill up to 400-500 million people from these effects, mainly in the United States, Soviet Union and Europe, and to a lesser extent China and Japan.[4] The death toll would depend on a range of factors, such as the areas actually hit by weapons and the extent of evacuation and fallout protection. This death toll would be made up mainly of the people in the immediate vicinity or downwind of nuclear explosions, and would total about ten percent of the world's population. This figure would be much higher if most of the largest population centres in countries all around the world were bombed,[5] but there are no known plans for systematically bombing the largest population centres in areas such as India, Southeast Asia and China.[6] On the other hand, if a nuclear war were limited in any sense - for example, restricted to Europe or to military targets - the immediate death toll would be less. If agricultural or economic breakdown or epidemics occurred in the aftermath of nuclear war, many more people could die, perhaps as many as a few hundred million in the worst case.[7] These would be primarily in the most heavily bombed areas, namely the United States, Soviet Union and Europe. Nuclear war would also result in various long range effects, beyond the range of blast, heat and local fallout. These effects - effects hundreds or thousands of kilometres from nuclear explosions - are known as 'global' effects. The most well known is global radioactive fallout. Many people believe that this fallout, or some other effect, would cause the death of most or all the people on earth in the event of major nuclear war. This is the idea portrayed in the popular novel On the Beach.[8] However, the available scientific evidence provides no support for such a doomsday scenario. My aim here is to describe in general terms the main global effects of nuclear war with direct consequences for human health. Four main categories will be treated: global fallout,[9] ozone, climate and fires.

#### Second, nuc winter is a lie

#### A. Nuc winter theory is wrong, even a 10k megaton explosion wouldn’t cause.

Rees 2003 [Sir Martin Rees, Astronomer Royale, UK, Our Final Hour, p. 30-31, loghry]

The nuclear stockpile in the 1980s was equivalent to ten tons of TNT for each person in Russia, Europe, and America. Carl Sagan and others initiated a debate about whether an all-out nuclear exchange would trigger a nuclear winter: a worldwide blocking-out of the Sun, with results, including mass extinction, similar to those that would be triggered by the impact of a giant asteroid or comet. The eventual best guess was that not even the detonation of ten thousand megatons would have caused a prolonged worldwide blackout, though there are still uncertainties in the modelling (in particular, how high in the stratosphere the debris would reach, and how long it would stay there). But the "nuclear winter" scenario raised the disquieting prospect that the main victims of a nuclear war would be the populations of South Asia, Africa, and Latin America, mostly noncombatants in the Cold War.

#### B. Nuc winter theory empirically denied. History disproves extinction scenarios-Natural disasters prove our argument.

J.R. Nyquist (WorldNetDaily contributing editor and a renowned expert in geopolitics and international relations, is the author of "Origins of the Fourth World War.") 5/20/1999 [“IS NUCLEAR WAR SURVIVABLE?” online @ <http://www.wnd.com/1999/05/6341/>, loghry]

Nuclear winter is the theory that the mass use of nuclear weapons would create enough smoke and dust to blot out the sun, causing a catastrophic drop in global temperatures. According to Carl Sagan, in this situation the earth would freeze. No crops could be grown. Humanity would die of cold and starvation. In truth, natural disasters have frequently produced smoke and dust far greater than those expected from a nuclear war. In 1883 Krakatoa exploded with a blast equivalent to 10,000 one-megaton bombs, a detonation greater than the combined nuclear arsenals of planet earth. The Krakatoa explosion had negligible weather effects. Even more disastrous, going back many thousands of years, a meteor struck Quebec with the force of 17.5 million one-megaton bombs, creating a crater 63 kilometers in diameter. But the world did not freeze. Life on earth was not extinguished.

#### C. Climactic effects of nuc war have always been overstated – the models are not suited for predicting the future and often return opposite results with identical data sets. (\*ASSUMES TOON)

Singer 08 [S. Fred Singer (atmospheric physicist) 2008, “Nature, Not Human Activity, Rules the Climate” The Heartland Institute, online @ http://www.bobbrinsmead.com/e\_NIPCC\_final.pdf, logs]

Computer models are notoriously inadequate in simulating or projecting regional effects, particularly when it comes to precipitation. This fact can be demonstrated most clearly in the U.S.-National Assessment of Climate Change report [NACC 2000] that used both the Hadley model and Canadian model to project future changes for 18 regions of the United States. As can be seen from Figure 16, in about half the regions the two models gave opposite results. For example, the Dakotas would become either a desert or a swamp by 2100, depending on the model chosen. It is significant that the U.S.-NACC report failed to meet the tests of the Information Quality Act [2004] and was withdrawn from official government report status. While useful in experiments to study the sensitivity of changes in climate parameters, computer models are unsuited for predictions of future climate. Kevin Trenberth, a lead author of the IPCC-TAR report, recently wrote [Trenberth 2007]: In fact there are no predictions by IPCC at all. And there never have been. The IPCC instead proffers ‘what if’ projections of future climate that correspond to certain emissions scenarios. There are a number of assumptions that go into these emissions scenarios. They are intended to cover a range of possible self consistent ‘story lines’ that then provide decision makers with information about which paths might be more desirable. But they do not consider many things like the recovery of the ozone layer, for instance, or observed trends in forcing agents. There is no estimate, even probabilistically, as to the likelihood of any emissions scenario and no best guess. Even if there were, the projections are based on model results that provide differences of the future climate relative to that today. There is neither an El Niño sequence nor any Pacific Decadal Oscillation that replicates the recent past; yet these are critical modes of variability that affect Pacific Rim countries and beyond. The Atlantic Multidecadal Oscillation, that may depend on the thermohaline circulation and thus ocean currents in the Atlantic, is not set up to match today’s state, but it is a critical component of the Atlantic hurricanes, and it undoubtedly affects forecasts for the next decade from Brazil to Europe. The starting climate state in several of the models may depart significantly from the real climate owing to model errors. I postulate that regional climate change is impossible to deal with properly unless the models are initialized. The ‘nuclear winter’ episode of 1983-84 represents a good example of how global climate models can give false results and mislead the public and even many experts. Ideologically driven, the ‘nuclear-winter’ hypothesis relied on a model calculation that used artificial assumptions designed to give the desired result, incomplete physics that neglected important atmospheric processes, and also some physics that was plain wrong. The ‘phenomenon’ was hyped by the popular press, endorsed by a National Academy of Sciences panel, and taken quite seriously by government agencies, including the Pentagon. It is now being resurrected in an ‘improved’ form [Robock 2007], but with the same problems as the original version. Conclusion: The climate models used by the IPCC do not depict the chaotic, open-ended climate system. They cannot make reliable predictions and should not be used in formulating government policy.

#### D. Climate sims prove rainout effect that quickly reverses nuclear cooling

Reisner et al. 18 (Jon Reisner – Climate and atmospheric scientist at the Los Alamos National Laboratory. Gennaro D’Angelo – Climate scientist at the Los Alamos National Laboratory, Research scientist at the SETI institute, Associate specialist at the University of California, Santa Cruz, NASA Postdoctoral Fellow at the NASA Ames Research Center, UKAFF Fellow at the University of Exeter. Eunmo Koo - Scientist at Applied Terrestrial, Energy, and Atmospheric Modeling (ATEAM) Team, in Computational Earth Science Group (EES-16) in Earth and Environmental Sciences Division and Co-Lead of Parallel Computing Summer Research Internship (PCSRI) program at the Los Alamos National Laboratory, former Staff research associate at UC Berkeley. Wesley Even - Computational scientist in the Computational Physics and Methods Group at Los Alamos National Laboratory. Matthew Hecht – Atmospheric scientist at the Los Alamos National Laboratory. Elizabeth Hunke - Lead developer for the Los Alamos Sea Ice Model (CICE) at the Los Alamos National Laboratory responsible for development and incorporation of new parameterizations, model testing and validation, computational performance, documentation, and consultation with external model users on all aspects of sea ice modeling, including interfacing with global climate and earth system models. Darin Comeau – Climate scientist at the Los Alamos National Laboratory. Randy Bos - Project leader at the Los Alamos National Laboratory, former Weapons Effects program manager at Tech-Source. James Cooley – Computational scientist at the Los Alamos National Laboratory specializing in weapons physics, emergency response, and computational physics. <MKIM> “Climate impact of a regional nuclear weapons exchange:An improved assessment based on detailed source calculations”. 3/16/18. DOA: 7/13/19. <https://agupubs.onlinelibrary.wiley.com/doi/full/10.1002/2017JD027331>)

\*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.**

#### Third, no fallout extinction

#### A. Continued Testing In The 60’s Proves That Any Fallout Radiation From A Nuc War Would Not Be Fatal

Lovelock 06 [James Lovelock (Inventor: Gaia theory, fellow Royal Society, fellow Green College: Oxford) 2006, The Revenge of Gaia p. 95, loghry]

Before the Cold War intensified in the late 1950s there was widespread hope that nuclear energy was good and could play its part in reconstructing a decent civilization. In the United Kingdom, one of several European nations where the science of nuclear fission was born in the 1930s, our Queen opened in 1956 the world's first nuclear power station at Calder Hall. It was an event welcomed almost everywhere. The euphoria did not last; gradually as the Cold War intensified and the two superpowers tested larger and ever larger weapons, the all-pervasive fear of all things nuclear became widespread. This period of madness culminated in 1962 in the test explosions of hydrogen bombs equal in power to 20,000 of the bombs dropped on Hiroshima. The superpowers were rattling the Earth to show how strong they were, strong enough for mutually assured destruction. Mad it may have been, but it showed that each superpower now possessed the capacity to destroy civilization. There were several interesting consequences of these vast explosions. They released into the global atmosphere radioactivity as great as that from two Chernobyl disasters every week for a whole year. The stratospheric winds carried the radioactive debris around the world and we all breathed in, or swallowed, such fission products as caesium 137 and strontium 90 and unexploded plutonium. Soon it was possible to demonstrate the presence of the strontium isotope in the bones of anyone in the world. Whatever harm to humans was done by these tests and their fallout, there is no evidence or theoretical conclusions to suggest that it held back the progressive increase in our lifespans; we now live longer than ever before – indeed European governments are now worried about how to pay the pensions of their ancient citizenry. It may comfort us to know that these tests, which produced as much fallout as a medium-scale nuclear war, posed no great threat to the Earth or to the health and well-being of its inhabitants.

#### B. Fallout won’t cause mass deaths. It’s localized and short-term, gone in two weeks. More die from car accidents. Hiroshima and Nagasaki prove.

J.R. Nyquist (WorldNetDaily contributing editor and a renowned expert in geopolitics and international relations, is the author of "Origins of the Fourth World War.") 5/20/1999 [“IS NUCLEAR WAR SURVIVABLE?” online @ <http://www.wnd.com/1999/05/6341/>, loghry]

OK, so nuclear winter isn’t going to happen. What about nuclear fallout? Wouldn’t the radiation from a nuclear war contaminate the whole earth, killing everyone? The short answer is: absolutely not. Nuclear fallout is a problem, but we should not exaggerate its effects. As it happens, there are two types of fallout produced by nuclear detonations. These are: 1) delayed fallout; and 2) short-term fallout. According to researcher Peter V. Pry, “Delayed fallout will not, contrary to popular belief, gradually kill billions of people everywhere in the world.” Of course, delayed fallout would increase the number of people dying of lymphatic cancer, leukemia, and cancer of the thyroid. “However,” says Pry, “these deaths would probably be far fewer than deaths now resulting from … smoking, or from automobile accidents.” The real hazard in a nuclear war is the short-term fallout. This is a type of fallout created when a nuclear weapon is detonated at ground level. This type of fallout could kill millions of people, depending on the targeting strategy of the attacking country. But short-term fallout rapidly subsides to safe levels in 13 to 18 days. It is not permanent. People who live outside of the affected areas will be fine. Those in affected areas can survive if they have access to underground shelters. In some areas, staying indoors may even suffice. Contrary to popular misconception, there were no documented deaths from short-term or delayed fallout at either Hiroshima or Nagasaki. These blasts were low airbursts, which produced minimal fallout effects. Today’s thermonuclear weapons are even “cleaner.” If used in airburst mode, these weapons would produce few (if any) fallout casualties.