## 1

#### Interpretation: The affirmative may not specify an actor in the resolution that does not have jurisdiction over all private entities

#### Violation: They specify India which only has jurisdiction over private entitites that exist within India

#### SStandards

#### 1. Limits

#### 2. TVA

#### Fairness – debate is a competitive activity that requires fairness for objective evaluation. Outweighs because it’s the only intrinsic part of debate – all other rules can be debated over but rely on some conception of fairness to be justified.

#### Drop the debater – a] deter future abuse and b] set better norms for debate.

#### Competing interps – [a] reasonability is arbitrary and encourages judge intervention since there’s no clear norm, [b] it creates a race to the top where we create the best possible norms for debate.

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

## 2

#### Our thesis – Capitalism has evolved, Information is the most important commodity in the new digital age, all activity is judged based upon your cognitive abilities. The future is grounded in capitalism and allows information to enhance itself, the 1acs imagining of a better world fails to recognize that the future is a disguise that allows capitalism to strengthen itself through the idea of production

**Berardi 09** Precarious Rhapsody Semiocapitalism and the pathologies of the post-alpha generation Franco “Bifo” Berardi ISBN 978-1-57027-207-3 Edited by Erik Empson & Stevphen Shukaitis Translated by Arianna Bove, Erik Empson, Michael Goddard, Giuseppina Mecchia, Antonella Schintu, and Steve Wright Minor Compositions London 2009//sjvc

The categories of the critique of political economy are now insuffi- cient because processes of subjectivation traverse fields that are much more complex. A new disciplinary field is starting to be delineated in the encounter between the territories of economics, semiotics and psycho- chemistry. Semio-capital is capital-flux that coagulates in semiotic artifacts with- out materializing itself. The concepts forged by two centuries of economic thought seem dissolved, inoperative and incapable of comprehending a great deal of the phenomena that have emerged in the sphere of social production since it became cognitive. Cognitive activity has always been the basis of all human production, even that of a more mechanical type. There is no process of human labor that does not imply an exercise of intelligence. But today, cognitive capacity is becoming the essential pro- ductive resource. In the sphere of industrial labor, the mind was put to work as a repetitive automatism, the physiological support of muscular movement. Today the mind is at work in so many innovations, languages and communicative relations. The subsumption of the mind in the process of capitalist valorization leads to a true mutation. The conscious and sensitive organism is submitted to a competitive pressure, to an acceleration of stimuli, to a constant attentive stress. As a consequence, the mental atmosphere, the info-sphere in which the mind is formed and enters into relations with other minds, becomes a psychopathogenic atmosphere. To understand semio-capital’s infinite game of mirrors we must outline a new disciplinary field, delimited by three aspects: –the critique of the political economy of connective intelligence; –the semiology of linguistic-economic fluxes;–the psychochemistry of the info-spheric atmosphere that studies the psychopathogenic effects of economic development on the human mind. The process of digital production is taking a biological form which can be likened to an organism: the nervous system of an organization is analogous with the human nervous system. Every industrial enterprise has ‘autonomic’ systems, operational processes that must function for its survival. What was lacking from organizations in the past were the links between pieces of information that resemble the interconnected neurons in the brain. The networked digital business functions as an excellent artificial nervous system. Information flows within it quickly and natu- rally, like thought in a human being, and we are able to use technology to govern and co-ordinate groups of people, with the same rapidity with which we can concentrate on a problem. According to Bill Gates (1999), the conditions are created for the realization of a new form of economic system, centered on what can be defined as “Business at the speed of thought.” In the connected world, the retroactive loops of general systems the- ory are fused with the dynamic logic of biogenetics in a post-human vision of digital production. Human minds and flesh are integrated with digital circuits thanks to interfaces of acceleration and simplification: a model of bio-info production is emerging that produces semiotic artifacts with the capacity for the auto-replication of living systems. Once fully operative, the digital nervous system can be rapidly installed in every form of organization. This means that only apparently Microsoft concerns itself with software, products and services. In reality, the hidden finality of software production is the wiring of the human mind in a network continuum of the cybernetic type destined to structure the fluxes of dig- ital information by means of the nervous system of all the key institutions of contemporary life. Microsoft will therefore be considered as a global virtual memory, exchangeable and ready to install. A cyber-panopticon inserted in the fleshy circuits of human subjectivity. Cybernetics finally becomes life, or, as Bill Gates likes to say, “information is our vital fluid.”

#### The future is grounded in capitalism and allows information to enhance itself, the 1acs imagining of a better world fails to recognize that the future is a disguise that allows capitalism to strengthen itself through the idea of production

**Berardi 11** After the Future Franco Berardi (“Bifo”) Edited by Gary Genosko and Nicholas Thoburn Translated by Arianna Bove, Melinda Cooper, Erik Empson, Enrico, Giuseppina Mecchia, and Tiziana Terranova//sjvc

In this book I want to reconsider the cultural history of the century from this point of view: the mythology of the future. The future is not an obvious concept, but a cultural construction and projection. For the human of the Middle Ages, living in the sphere of a theological culture, perfection was placed in the past, in the time when God created the universe and humankind. Therefore, historic existence is the dimension of the Fall, abandonment and forgetting of the original perfection and unity. The rise of the myth of the future is rooted in modern capitalism, in the experience of expansion of the economy and knowledge. The idea that the future will be better than the present is not a natural idea, but the imaginary effect of the peculiarity of the bourgeois production model. Since its beginning, since the discovery of the new continent, and the rewriting of the maps of the world, modernity is defined by an act of amplification of the very limits of the world, and the peculiarity of capitalist economy resides exactly in the accumulation of the surplus value that results in the constant enhancement of the sphere of material goods and knowledge. In the second part of the 19th century, and in the first part of the 20th, the myth of the future reached its peak, becoming something more that an implicit belief: a true faith, based on the concept of “progress”, the ideological translation of the reality of economic growth. Political action was reframed in the light of this faith in a progressive future. Liberalism and social democracy, nationalism and communism, and anarchism itself, all the different families of modern political theory share a common certainty: notwithstanding the darkness of the present, the future will be bright. In this book I will try to develop the idea that the future is over. It is not a new idea, as you know: born with punk, the 1970s and ’80s witnessed the beginning of the slow cancellation of the future. Now those bizarre predictions have become true. The idea that the future has disappeared is of course rather whimsical, as while I write these lines the future is not stopping to unfold.

#### The digital world creates massive amounts of information that infiltrate the imaginary which disrupts our unconscious. Thus the role of the ballot is to vote for the debater that best reduces exhaustion – you should be epistemically suspect of anything else because exhaustion directly affects our perception of the world

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Throughout the history of civilization, perception has been molded by artificial regimes of images and techniques of representation. Through digital technology the image begins to proliferate vertiginously and our faculty of imagination undergoes vortices of acceleration. The image should not be considered as the brute perception of empirical data brought to our visual attention by matter: it is rather the effect of a semi-conscious elaboration. The technical mode in which we receive and elaborate images acts upon the formation of the imaginary. The imaginary in turn shapes the imagination, the activity whereby we produce images, and imagine worlds and thus make them possible in real life. The repertoire of images at our disposal limits, exalts, amplifies or circumscribes the forms of life and events that, through our imagination, we can project onto the world, put into being, build and inhabit. Techno-communicative and psycho-cognitive mutations are as interdependent as the organism and its ecosystem. The conscious organism is also sensuous; it is a bundle of sensitive receptors. The world we inhabit increasingly resembles the outcome of a projective zapping where we combine sequences of different linguistic derivations. The social unconscious does not easily adapt to this transformation of the info-sphere, because the social investment of desire is structured around the nucleus of identity, and this nucleus is fleeing and dissolving in all directions. Suddenly awoken by the eruption of semiotic proliferation, and deprived of the filters that the critical and disciplinary mind of modernity once possessed, the conscious organism reacts with panic. The communicative power of digital technology produces an excess of information with respect to the time of attention socially available. How is sensibility redefined and how does it adapt to over stimulation? I think that the effect of semiocapitalist acceleration and over-exploitation of nervous energies is exhaustion. Nervous breakdown, psychopathology, panic, depression, suicidal epidemic. “A titanic battle is about to begin, a Darwinian struggle between competing psychopathies”, says Ballard in Super-Cannes, the book about the psychic catastrophe of the virtual class, published in the year 2000.

#### Alt is to engage in depression politics where we turn exhaustion against itself through withdrawal, let exhaustion take over us instead of constantly fighting against it, embracing a “wu wei” civilization in which we no longer are subject to the constant push and processing of information through us as carriers

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In Baudrillard’s catastrophic vision I see a new way of thinking subjectivity: a reversal of the energetic subjectivation that animates the revolutionary theories of the 20th century, and the opening of an implosive theory of subversion, based on depression and exhaustion.

In the activist view exhaustion is seen as the inability of the social body to escape the vicious destiny that capitalism has prepared: deactivation of the social energies that once upon a time animated democracy and political struggle. But exhaustion could also become the beginning of a slow movement towards a “wu wei” civilization, based on the withdrawal, and frugal expectations of life and consumption. Radicalism could abandon the mode of activism, and adopt the mode of passivity. A radical passivity would definitely threaten the ethos of relentless productivity that neoliberal politics has imposed. The mother of all the bubbles, the work bubble, would finally deflate. We have been working too much during the last three or four centuries, and outrageously too much during the last thirty years. The current depression could be the beginning of a massive abandonment of competition, consumerist drive, and of dependence on work. Actually, if we think of the geopolitical struggle of the first decade – the struggle between Western domination and jihadist Islam – we recognize that the most powerful weapon has been suicide. 9/11 is the most impressive act of this suicidal war, but thousands of people have killed themselves in order to destroy American military hegemony. And they won, forcing the western world into the bunker of paranoid security, and defeating the hyper-technological armies of the West both in Iraq, and in Afghanistan. The suicidal implosion has not been confined to the Islamists. Suicide has became a form of political action everywhere. Against neoliberal politics, Indian farmers have killed themselves. Against exploitation hundreds of workers and employees have killed themselves in the French factories of Peugeot, and in the offices of France Telecom. In Italy, when the 2009 recession destroyed one million jobs, many workers, haunted by the fear of unemployment, climbed on the roofs of the factories, threatening to kill themselves. Is it possible to divert this implosive trend from the direction of death, murder, and suicide, towards a new kind of autonomy, social creativity and of life? I think that it is possible only if we start from exhaustion, if we emphasize the creative side of withdrawal. The exchange between life and money could be deserted, and exhaustion could give way to a huge wave of withdrawal from the sphere of economic exchange. A new refrain could emerge in that moment, and wipe out the law of economic growth. The self-organization of the general intellect could abandon the law of accumulation and growth, and start a new concatenation, where collective intelligence is only subjected to the common good.

## 3

### framework

#### [1] The appeal to util makes debate unsafe, since the logic of “the end justifies the means” can justify *any* reprehensible action.

**Anderson** Anderson, Kerby. [National Director of Probe Ministries International] “Utilitarianism: The Greatest Good for the Greatest Number.” *Probe*, 2004**. RP**

One problem with utilitarianism is that its leads to an ‘end justifies the means’ mentality. If any worthwhile end can justify the means to attain it, a true ethical foundation is lost. But we all know that the end does not justify the means. If that were so,then Hitler could justify the Holocaust because the end was to purify the human race. Stalin could justify his slaughter of millions because he was trying to achieve a communist utopia. The end never justifies the means. The means must justify themselves. A particular act cannot be judged as good simply because it may lead to a good consequence. The means must be judged by some objective and consistent standard of morality. Second, utilitarianism cannot protect the rights of minorities if the goal is the greatest good for the greatest number. Americans in the eighteenth century could justify slavery on the basis that it provided a good consequence for a majority of Americans. Certainly the majority benefited from cheap slave labor even though the lives of black slaves were much worse. A third problem with utilitarianism is predicting the consequences. If morality is based on results, then we would have to have omniscience in order to accurately predict the consequence of any action. But at best we can only guess at the future, and often these educated guesses are wrong. A fourth problem with utilitarianism is that consequences themselves must be judged. When results occur, we must still ask whether they are good or bad results. [Further][,] [u]tilitarianism provides no objective and consistent foundation to judge results because results are the mechanism used to judge the action itself. Inviolability is intrinsically valuable.

**Vote them down – this abhorrent discourse promotes terrible ideologies in the debate space.**

#### Discourse in round comes first – educators must take a stance against oppression in the activity – we can’t separate the flow from our performance.

**Vincent:** – (Christopher [Debate Coach, former college NDT debater] “Re-Conceptualizing Our Performances: Accountability In Lincoln Douglas Debate”

Charles Mills argues that “the moral concerns of African Americans have centered on the assertion of their personhood, a personhood that could generally be taken for granted by whites, so that blacks have had to see these theories from a location outside their purview.” For example, I witnessed a round at a tournament this season where a debater ran a utilitarianism disadvantage. His opponent argued that this discourse was racist because it ignores the way in which a utilitarian calculus has distorted communities of color by ignoring the wars and violence already occurring in those communities. In the next speech, the debater stood up, conceded it was racist, and argued that it was the reason he was not going for it and moved on, and still won the debate. This is problematic because it demonstrates exactly what Mill’s argument is. For the black debater this argument is a question of his or her personhood within the debate space and the white debater was not held accountable for the words that are said. Again for debaters of color, their performance is always attached to their body which is why it is important that the performance be viewed in relation to the speech act. **Whites are allowed to take for granted the impact their words have on the bodies in the space. They take for granted this notion of personhood and ignore the concerns of those who do not matter divorced from the flow.** It is never a question of “should we make arguments divorced from our ideologies,” it is a question of is it even possible. It is my argument that our performances, regardless of what justification we provide, are always a reflection of the ideologies we hold. Why should a black debater have to use a utilitarian calculus just to win a round, when that same discourse justifies violence in the community they go back home to? **Our performances and our decisions in the round, reflect the beliefs that we hold when we go back to our communities. As a community we must re-conceptualize this distinction the performance by the body and of the body by re-evaluating the role of the speech and the speech act**. It is no longer enough for judges to vote off of the flow anymore. **Students of color are being held to a higher threshold to better articulate why racism is bad**, which is the problem in a space that we deem to be educational. It is here where I shift my focus to a solution. **Debaters must be held accountable for the words they say in the round. We should no longer evaluate the speech. Instead we must begin to evaluate the speech act itself. Debaters must be held accountable for more than winning the debate. They must be held accountable for the implications of that speech**. As educators and adjudicators in the debate space we also have an ethical obligation to foster an atmosphere of education. **It is not enough for judges to offer predispositions suggesting that they do not endorse racist, sexist, homophobic discourse, or justify why they do not hold that belief, and still offer a rational reason why they voted for it. Judges have become complacent in voting on the discourse,** if the other debater does not provide a clear enough role of the ballot framing, or does not articulate well enough why the racist discourse should be rejected. Judges must be willing to foster a learning atmosphere by holding debaters accountable for what they say in the round. **They must be willing to vote against a debater if they endorse racist discourse.** They must be willing to disrupt the process of the flow for the purpose of embracing that teachable moment. The speech must be connected to the speech act. **We must view the entire debate as a performance of the body, instead of the argument solely on the flow**. Likewise, judges must be held accountable for what they vote for in the debate space. If a judge is comfortable enough to vote for discourse that is racist, sexist, or homophobic, they must also be prepared to defend their actions. We as a community do not live in a vacuum and do not live isolated from the larger society. That means that judges must defend their actions to the debaters, their coaches, and to the other judges in the room if it is a panel. Students of color should not have the burden of articulating why racist discourse must be rejected, but should have the assurance that the educator with the ballot will protect them in those moments. **Until we re-conceptualize the speech and the speech act, and until judges are comfortable enough to vote down debaters for a performance that perpetuates violence in the debate space, debaters and coaches alike will remain complacent in their privilege**. As educators we must begin to shift the paradigm and be comfortable doing this. As a community we should stop looking at ourselves as isolated in a vacuum and recognize that the discourse and knowledge we produce in debate has real implications for how we think when we leave this space. Our performances must be viewed as of the body instead of just by it. As long as we continue to operate in a world where our performances are merely by bodies, we will continue to foster a climate of hostility and violence towards students of color, and in turn destroy the transformative potential this community could have.

#### Additionally:

#### [a] Reversibility: once oppressive rhetoric is used it cannot be taken back

#### [b] Norm setting: we are part of a larger debate community with extensive norms – letting bad discourse be rampant kills the community

#### [c] Competition: debate is an educational competition with no place for offensive rhetoric – that kills access to the lasting benefit debate provides

#### 2. calculative frameworks like util are a form of information overload, it requires that policymakers calculate the benefits and probability of every single scenario to determine its validity

#### 3. Information overload makes it impossible to understand the concept of pleasure and pain where all that exists in semiocapitalism is information which eliminates the possibility of pursuing things that make the subway worker happy, who instinctively pulls out their phone to check the news not because it makes them happy but because it’s the only way they can keep up with society

#### 4.. Semiocapitalism better explains and solves the aff – People want to go to space because it’s area for people to be more productive, ie creating military gains so they have more power for a better future

#### 5.. Absent Semiocapitalist society – things like manufacturers and entrepreneurs don’t exist/lack the capacity to create things like spacecraft and fuel

#### 6.. They don’t get to weigh the case

#### A. Fiat is illusory – nothing happens when you vote aff so the benefits of the plan never actualize

#### B. The aff requires futuristic ideals and excess information to come to the conclusion that an impact will occur, but the kritik questions whether or not we should use this logic in the first place

#### C. Case impacts are just showing how we can fare better in the semiocap system but never deconstructs semiocap itself

### Advantage

#### No extinction.

Kearny 87 [Creason. Cresson Kearny was a civil defense researcher at the Hudson Institute, a US Army Major and Legion of Merit recipient, had a degree in Civil Engineering from Princeton University, and had two degrees in Geology from Oxford University. Arnold Jagt is a systems engineer and content digitizer. (“NUCLEAR WAR SURVIVAL SKILLS” “Ch. 1: The Dangers from Nuclear Weapons: Myths and Facts”, <http://oism.org/nwss/nwss.pdf>)

An all-out nuclear war between Russia and the United States would be the worst catastrophe in history, a tragedy so huge it is difficult to comprehend. Even so, it would be far from the end of human life on earth. The dangers from nuclear weapons have been distorted and exaggerated, for varied reasons. These exaggerations have become demoralizing myths, believed by millions of Americans. While working with hundreds of Americans building expedient shelters and life-support equipment, I have found that many people at first see no sense in talking about details of survival skills. Those who hold exaggerated beliefs about the dangers from nuclear weapons must first be convinced that nuclear war would not inevitably be the end of them and everything worthwhile. Only after they have begun to question the truth of these myths do they become interested, under normal peacetime conditions, in acquiring nuclear war survival skills. Therefore, before giving detailed instructions for making and using survival equipment, we will examine the most harmful of the myths about nuclear war dangers, along with some of the grim facts. ° Myth: Fallout radiation from a nuclear war would poison the air and all parts of the environment. It would kill everyone. (This is the demoralizing message of On the Beach and many similar pseudoscientific books and articles.) ° Facts: When a nuclear weapon explodes near enough to the ground for its fireball to touch the ground, it forms a crater. (See Fig. 1.1.) Fig. 1.1. A surface burst. In a surface or near-surface burst, the fireball touches the ground and blasts a crater. ORNL-DWG 786264 Book Page: 12 Many thousands of tons of earth from the crater of a large explosion are pulverized into trillions of particles. These particles are contaminated by radioactive atoms produced by the nuclear explosion. Thousands of tons of the particles are carried up into a mushroom-shaped cloud, miles above the earth. These radioactive particles then fall out of the mushroom cloud, or out of the dispersing cloud of particles blown by the winds thus becoming fallout. Each contaminated particle continuously gives off invisible radiation, much like a tiny X-ray machine while in the mushroom cloud, while descending, and after having fallen to earth. The descending radioactive particles are carried by the winds like the sand and dust particles of a miles-thick sandstorm cloud except that they usually are blown at lower speeds and in many areas the particles are so far apart that no cloud is seen. The largest, heaviest fallout particles reach the ground first, in locations close to the explosion. Many smaller particles are carried by the winds for tens to thousands of miles before falling to earth. At any one place where fallout from a single explosion is being deposited on the ground in concentrations high enough to require the use of shelters, deposition will be completed within a few hours. The smallest fallout particles those tiny enough to be inhaled into a person's lungs are invisible to the naked eye. These tiny particles would fall so slowly from the four-mile or greater heights to which they would be injected by currently deployed Soviet warheads that most would remain airborne for weeks to years before reaching the ground. By that time their extremely wide dispersal and radioactive decay would make them much less dangerous. Only where such tiny particles are promptly brought to earth by rain- outs or snow-outs in scattered "hot spots," and later dried and blown about by the winds, would these invisible particles constitute a long-term and relatively minor post-attack danger. The air in properly designed fallout shelters, even those without air filters, is free of radioactive particles and safe to breathe except in a few' rare environments as will be explained later. Fortunately for all living things, the danger from fallout radiation lessens with time. The radioactive decay, as this lessening is called, is rapid at first, then gets slower and slower. The dose rate (the amount of radiation received per hour) decreases accordingly. Figure 1.2 illustrates the rapidity of the decay of radiation from fallout during the first two days after the nuclear explosion that produced it. R stands for roentgen, a measurement unit often used to measure exposure to gamma rays and X rays. Fallout meters called dosimeters measure the dose received by recording the number of R. Fallout meters called survey meters, or dose-rate meters, measure the dose rate by recording the number of R being received per hour at the time of measurement. Notice that it takes about seven times as long for the dose rate to decay from 1000 roentgens per hour (1000 R/hr) to 10 R/hr (48 hours) as to decay from 1000 R/hr to 100 R/hr (7 hours). (Only in high-fallout areas would the dose rate 1 hour after the explosion be as high as 1000 roentgens per hour.) Book Page: 13 If the dose rate 1 hour after an explosion is 1000 R/hr, it would take about 2 weeks for the dose rate to be reduced to 1 R/hr solely as a result of radioactive decay. Weathering effects will reduce the dose rate further,' for example, rain can wash fallout particles from plants and houses to lower positions on or closer to the ground. Surrounding objects would reduce the radiation dose from these low-lying particles. Figure 1.2 also illustrates the fact that at a typical location where a given amount of fallout from an explosion is deposited later than 1 hour after the explosion, the highest dose rate and the total dose received at that location are less than at a location where the same amount of fallout is deposited 1 hour after the explosion. The longer fallout particles have been airborne before reaching the ground, the less dangerous is their radiation. Within two weeks after an attack the occupants of most shelters could safely stop using them, or could work outside the shelters for an increasing number of hours each day. Exceptions would be in areas of extremely heavy fallout such as might occur downwind from important targets attacked with many weapons, especially missile sites and very large cities. To know when to come out safely, occupants either would need a reliable fallout meter to measure the changing radiation dangers, or must receive information based on measurements made nearby with a reliable instrument. The radiation dose that will kill a person varies considerably with different people. A dose of 450 R resulting from exposure of the whole body to fallout radiation is often said to be the dose that will kill about half the persons receiving it, although most studies indicate that it would take somewhat less.1 (Note: A number written after a statement refers the reader to a source listed in the Selected References that follow Appendix D.) Almost all persons confined to expedient shelters after a nuclear attack would be under stress and without clean surroundings or antibiotics to fight infections. Many also would lack adequate water and food. Under these unprecedented conditions, perhaps half the persons who received a whole-body dose of 350 R within a few days would die.2 Fortunately, the human body can repair most radiation damage if the daily radiation doses are not too large. As will be explained in Appendix B, a person who is healthy and has not been exposed in the past two weeks to a total radiation dose of more than 100 R can receive a dose of 6 R each day for at least two months without being incapacitated. Only a very small fraction of Hiroshima and Nagasaki citizens who survived radiation doses some of which were nearly fatal have suffered serious delayed effects. The reader should realize that to do essential work after a massive nuclear attack, many survivors must be willing to receive much larger radiation doses than are normally permissible. Otherwise, too many workers would stay inside shelter too much of the time, and work that would be vital to national recovery could not be done. For example, if the great majority of truckers were so fearful of receiving even non-incapacitating radiation doses that they would refuse to transport food, additional millions would die from starvation alone. ° Myth: Fallout radiation penetrates everything; there is no escaping its deadly effects. ° Facts: Some gamma radiation from fallout will penetrate the shielding materials of even an excellent shelter and reach its occupants. However, the radiation dose that the occupants of an excellent shelter would receive while inside this shelter can be reduced to a dose smaller than the average American receives during his lifetime from X rays and other radiation exposures normal in America today. The design features of such a shelter include the use of a sufficient thickness of earth or other heavy shielding material. Gamma rays are like X rays, but more penetrating. Figure 1.3 shows how rapidly gamma rays are reduced in number (but not in their ability to penetrate) by layers of packed earth. Each of the layers shown is one halving-thickness of packed earth- about 3.6 inches (9 centimeters).3 A halving- thickness is the thickness of a material which reduces by half the dose of radiation that passes through it. The actual paths of gamma rays passing through shielding materials are much more complicated, due to scattering, etc., than are the straight-line paths shown in Fig. 1.3. But when averaged out, the effectiveness of a halving-thickness of any material is approximately as shown. The denser a substance, the better it serves for shielding material. Thus, a halving-thickness of concrete is only about 2.4 inches (6.1 cm). Book Page: 14 Fig. 1.3. Illustration of shielding against fallout radiation. Note the increasingly large improvements in the attenuation (reduction) factors that are attained as each additional halving-thickness of packed earth is added. ORNL-DWG 78-18834 If additional halving-thicknesses of packed earth shielding are successively added to the five thicknesses shown in Fig. 1.3, the protection factor (PF) is successively increased from 32 to 64, to 128, to 256, to 512, to 1024, and so on. ° Myth: A heavy nuclear attack would set practically everything on fire, causing "firestorms" in cities that would exhaust the oxygen in the air. All shelter occupants would be killed by the intense heat. ° Facts: On aclear day, thermal pulses (heat radiation that travels at the speed of light) from an air burst can set fire to easily ignitable materials (such as window curtains, upholstery, dry newspaper, and dry grass) over about as large an area as is damaged by the blast. It can cause second-degree skin burns to exposed people who are as far as ten miles from a one-megaton (1 MT) explosion. (See Fig. 1.4.) (A 1-MT nuclear explosion is one that produces the same amount of energy as does one million tons of TNT.) If the weather is very clear and dry, the area of fire danger could be considerably larger. On a cloudy or smoggy day, however, particles in the air would absorb and scatter much of the heat radiation, and the area endangered by heat radiation from the fireball would be less than the area of severe blast damage. Book Page: 15 Fig. 1.4. An air burst. Thefireball does not touch the ground. No crater. An air burst produces only extremely small radioactive particles-so small that they are airborne for days to years unless brought to earth by rain or snow. Wet deposition of fallout from both surface and air bursts can result in '"hot spots" at, close to, or far from ground zero. However, such '"hot spots" from air bursts are much less dangerous than the fallout produced by the surface or near-surface bursting of the same weapons. The main dangers from an air burst are the blast effects, the thermal pulses of intense light and heat radiation, and the very penetrating initial nuclear radiation from the fireball. ORNL.DWG 78.6267 "Firestorms" could occur only when the concentration of combustible structures is very high, as in the very dense centers of a few old American cities. At rural and suburban building densities, most people in earth- covered fallout shelters would not have their lives endangered by fires. ° Myth: In theworst-hit parts of Hiroshima and Nagasaki where all buildings were demolished, everyone was killed by blast, radiation, or fire. ° Facts: InNagasaki, some people survived uninjured who were far inside tunnel shelters built for conventional air raids and located as close as one-third mile from ground zero (the point directly below the explosion). This was true even though these long, large shelters lacked blast doors and were deep inside the zone within which all buildings were destroyed. (People far inside long, large, open shelters are better protected than are those inside small, open shelters.) Fig. 1.5. Undamaged earth-covered family shelter in Nagasaki. Many earth-covered family shelters were essentially undamaged in areas where blast and fire destroyed all buildings. Figure 1.5 shows a typical earth covered, backyard family shelter with a crude wooden frame. This shelter was essentially undamaged, although less than 100 yards from ground zero at Nagasaki.4 The calculated maximum overpressure (pressure above the normal air pressure) was about 65 pounds per square inch (65 psi). Persons inside so small a shelter without a blast doorwould have been killed by blast pressure at this distance from the explosion. However, in a recent blast test,5 an earth-covered, expedient Small-Pole Shelter equipped with blast doors was undamaged at 53 psi. The pressure rise inside was slight not even enough to have damaged occupants' eardrums. If poles are available, field tests have indicated that many families can build such shelters in a few days. The great life-saving potential of blast-protective shelters has been proven in war and confirmed by blast tests and calculations. For example, the area in which the air bursting of a 1-megaton weapon would wreck a 50-psi shelter with blast doors in about 2.7 square miles. Within this roughly circular area, practically all them occupants of wrecked shelters would be killed by blast, carbon monoxide from fires, or radiation. The same blast effects would kill most people who were using basements affording 5 psi protection, over an area of about 58 square miles.6 ° Myth: Because some modern H-bombs are over 1000 times as powerful as the A-bomb that destroyed most of Hiroshima, these H-bombs are 1000 times as deadly and destructive. ° Facts: A nuclear weapon 1000 times as powerful as the one that blasted Hiroshima, if exploded under comparable conditions, produces equally serious blast damage to wood-frame houses over an area up to about 130 times as large, not 1000 times as large. Book Page: 16 For example, air bursting a 20-kiloton weapon at the optimum height to destroy most buildings will destroy or severely damage houses out to about 1.42 miles from ground zero.6 The circular area of at least severe blast damage will be about 6.33 square miles. (The explosion of a 20 kiloton weapon releases the same amount of energy as 20 thousand tons of TNT.) One thousand 20-kiloton weapons thus air burst, well separated to avoid overlap of their blast areas, would destroy or severely damage houses over areas totaling approximately 6,330 square miles. In contrast, similar air bursting of one 20- megaton weapon (equivalent in explosive power to 20 million tons of TNT) would destroy or severely damage the great majority of houses out to a distance of 16 miles from ground zero.6 The area of destruction would be about 800 square miles - not 6,330 square miles. Today few if any of Russia's huge intercontinental ballistic missiles (ICBMs) are armed with a 20-megaton warhead. Now a huge Russian ICBM, the SS-18, typically carries 10 warheads, each having a yield of 500 kilotons, each programmed to hit a separate target. See Jane's Weapon Systems, 1987-88. ° Myth: A Russian nuclear attack on the United States would completely destroy all American cities. ° Facts: As long as Soviet leaders are rational they will continue to give first priority to knocking out our weapons and other military assets that can damage Russia and kill Russians. To explode enough nuclear weapons of any size to completely destroy American cities would be an irrational waste of warheads. The Soviets can make much better use of most of the warheads that would be required to completely destroy American cities; the majority of those warheads probably already are targeted to knock out our retaliatory missiles by being surface burst or near-surface burst on their hardened silos, located far from most cities and densely populated areas. Unfortunately, many militarily significant targets - including naval vessels in port and port facilities, bombers and fighters on the ground, air base and airport facilities that can be used by bombers, Army installations, and key defense factories - are in or close to American cities. In the event of an all-out Soviet attack, most of these '"soft" targets would be destroyed by air bursts. Air bursting (see Fig. 1.4) a given weapon subjects about twice as large an area to blast effects severe enough to destroy "soft" targets as does surface bursting (see Fig. 1.1) the same weapon. Fortunately for Americans living outside blast and fire areas, air bursts produce only very tiny particles. Most of these extremely small radioactive particles remain airborne for so long that their radioactive decay and wide dispersal before reaching the ground make them much less life- endangering than the promptly deposited larger fallout particles from surface and near-surface bursts. However, if you are a survival minded American you should prepare to survive heavy fallout wherever you are. Unpredictable winds may bring fallout from unexpected directions. Or your area may be in a "hot spot" of life-endangering fallout caused by a rain-out or snow-out of both small and tiny particles from distant explosions. Or the enemy may use surface or near-surface bursts in your part of the country to crater long runways or otherwise disrupt U.S. retaliatory actions by producing heavy local fallout. Today few if any of Russia's largest intercontinental ballistic missiles (ICBMs) are armed with a 20-megaton warhead. A huge Russian ICBM, the SS-18, typically carries 10 warheads each having a yield of 500 kilotons, each programmed to hit a separate target. See "Jane's Weapon Systems. 1987-1988." However, in March 1990 CIA Director William Webster told the U.S. Senate Armed Services Committee that ".... The USSR's strategic modernization program continues unabated," and that the SS-18 Mod 5 can carry 14 to 20 nuclear warheads. The warheads are generally assumed to be smaller than those of the older SS-18s. ° Myth: So much food and water will be poisoned by fallout that people will starve and die even in fallout areas where there is enough food and water. ° Facts: If the falloutparticles do not become mixed with the parts of food that are eaten, no harm is done. Food and water in dust-tight containers are not contaminated by fallout radiation. Peeling fruits and vegetables removes essentially all fallout, as does removing the uppermost several inches of stored grain onto which fallout particles have fallen. Water from many sources -- such as deep wells and covered reservoirs, tanks, and containers -- would not be contaminated. Even water containing dissolved radioactive elements and compounds can be made safe for drinking by simply filtering it through earth, as described later in this book. ° Myth: Most of the unborn children and grandchildren of people who have been exposed to radiation from nuclear explosions will be genetically damaged will be malformed, delayed victims of nuclear war. ° Facts: The authoritative study by the National Academy of Sciences, A Thirty Year Study of the Survivors qf Hiroshima and Nagasaki, was published in 1977. It concludes that the incidence of abnormalities is no higher among children later conceived by parents who were exposed to radiation during the attacks on Hiroshima and Nagasaki than is the incidence of abnormalities among Japanese children born to un-exposed parents. This is not to say that there would be no genetic damage, nor that some fetuses subjected to large radiation doses would not be damaged. But the overwhelming evidence does show that the exaggerated fears of radiation damage to future generations are not supported by scientific findings. ° Myth: Overkill would result if all the U.S. and U.S.S.R, nuclear weapons were used meaning not only that the two superpowers have more than enough weapons to kill all of each other's people, but also that they have enough weapons to exterminate the human race. Book Page: 17 ° Facts: Statements that the U.S. and the Soviet Union have the power to kill the world's population several times over are based on misleading calculations. One such calculation is to multiply the deaths produced per kiloton exploded over Hiroshima or Nagasaki by an estimate of the number of kilotons in either side's arsenal. (A kiloton explosion is one that produces the same amount of energy as does 1000 tons of TNT.) The unstated assumption is that somehow the world's population could be gathered into circular crowds, each a few miles in diameter with a population density equal to downtown Hiroshima or Nagasaki, and then a small (Hiroshima-sized) weapon would be exploded over the center of each crowd. Other misleading calculations are based on exaggerations of the dangers from long-lasting radiation and other harmful effects of a nuclear war. ° Myth: Blindness and a disastrous increase of cancers would be the fate of survivors of a nuclear war, because the nuclear explosions would destroy so much of the protective ozone in the stratosphere that far too much ultraviolet light would reach the earth's surface. Even birds and insects would be blinded. People could not work outdoors in daytime for years without dark glasses, and would have to wear protective clothing to prevent incapacitating sunburn. Plants would be badly injured and food production greatly reduced. ° Facts: Large nuclear explosions do inject huge amounts of nitrogen oxides (gasses that destroy ozone) into the stratosphere. However, the percent of the stratospheric ozone destroyed by a given amount of nitrogen oxides has been greatly overestimated in almost all theoretical calculations and models. For example, the Soviet and U.S. atmospheric nuclear test explosions of large weapons in 1952-1962 were calculated by Foley and Ruderman to result in a reduction of more than 10 percent in total ozone. (See M. H. Foley and M. A. Ruderman, 'Stratospheric NO from Past Nuclear Explosions", Journal of Geophysics, Res. 78, 4441-4450.) Yet observations that they cited showed no reductions in ozone. Nor did ultraviolet increase. Other theoreticians calculated sizable reductions in total ozone, but interpreted the observational data to indicate either no reduction, or much smaller reductions than their calculated ones. A realistic simplified estimate of the increased ultraviolet light dangers to American survivors of a large nuclear war equates these hazards to moving from San Francisco to sea level at the equator, where the sea level incidence of skin cancers (seldom fatal) is highest- about 10 times higher than the incidence at San Francisco. Many additional thousands of American survivors might get skin cancer, but little or no increase in skin cancers might result if in the post-attack world deliberate sun tanning and going around hatless went out of fashion. Furthermore, almost all of today's warheads are smaller than those exploded in the large- weapons tests mentioned above; most would inject much smaller amounts of ozone-destroying gasses, or no gasses, into the stratosphere, where ozone deficiencies may persist for years. And nuclear weapons smaller than 500 kilotons result in increases (due to smog reactions) in upper tropospheric ozone. In a nuclear war, these increases would partially compensate for the upper-level tropospheric decreases-as explained by Julius S. Chang and Donald J. Wuebbles of Lawrence Livermore National Laboratory. ° Myth: Unsurvivable "nuclear winter" surely will follow a nuclear war. The world will be frozen if only 100 megatons (less than one percent of all nuclear weapons) are used to ignite cities. World-enveloping smoke from fires and the dust from surface bursts will prevent almost all sunlight and solar heat from reaching the earth's surface. Universal darkness for weeks! Sub-zero temperatures, even in summertime! Frozen crops, even in the jungles of South America! Worldwide famine! Whole species of animals and plants exterminated! The survival of mankind in doubt! ° Facts: Unsurvivable "nuclear winter" is a discredited theory that, since its conception in 1982, has been used to frighten additional millions into believing that trying to survive a nuclear war is a waste of effort and resources, and that only by ridding the world of almost all nuclear weapons do we have a chance of surviving. Non-propagandizing scientists recently havecalculated that the climatic and other environmental effects of even an all-out nuclear war would be much less severe than the catastrophic effects repeatedly publicized by popular astronomer Carl Sagan and his fellow activist scientists, and by all the involved Soviet scientists. Conclusions reached from these recent, realistic calculations are summarized in an article, "Nuclear Winter Reappraised", featured in the 1986 summer issue of Foreign Affairs, the prestigious quarterly of the Council on Foreign Relations. The authors, Starley L. Thompson and Stephen H. Schneider, are atmospheric scientists with the National Center for Atmospheric Research. They showed " that on scientific grounds the global apocalyptic conclusions of the initial nuclear winter hypothesis can now be relegated to a vanishing low level of probability." Book Page: 18 Their models indicate that in July (when the greatest temperature reductions would result) the average temperature in the United States would be reduced for a few days from about 70 degrees Fahrenheit to approximately 50 degrees. (In contrast, under the same conditions Carl Sagan, his associates, and the Russian scientists predicted a resulting average temperature of about 10 degrees below zero Fahrenheit, lasting for many weeks!) Persons who want to learn more about possible post-attack climatic effects also should read the Fall 1986 issue of Foreign Affairs. This issue contains a long letter from Thompson and Schneider which further demolishes the theory of catastrophic "nuclear winter." Continuing studies indicate there will be even smaller reductions in temperature than those calculated by Thompson and Schneider. Soviet propagandists promptly exploited belief in unsurvivable "nuclear winter" to increase fear of nuclear weapons and war, and to demoralize their enemies. Because raging city firestorms are needed to inject huge amounts of smoke into the stratosphere and thus, according to one discredited theory, prevent almost all solar heat from reaching the ground, the Soviets changed their descriptions of how a modern city will burn if blasted by a nuclear explosion. Figure 1.6 pictures how Russian scientists and civil defense officials realistically described - before the invention of "nuclear winter" - the burning of a city hit by a nuclear weapon. Buildings in the blasted area for miles around ground zero will be reduced to scattered rubble - mostly of concrete, steel, and other nonflammable materials - that will not burn in blazing fires. Thus in the Oak Ridge National Laboratory translation (ORNL-TR-2793) of Civil Defense. Second Edition (500,000 copies), Moscow, 1970, by Egorov, Shlyakhov, and Alabin, we read: "Fires do not occur in zones of complete destruction . . . that are characterized by an overpressure exceeding 0.5 kg/cm2 [- 7 psi]., because rubble is scattered and covers the burning structures. As a result the rubble only smolders, and fires as such do not occur." Fig. 1.6. Drawing with Caption in a Russian Civil Defense Training Film Strip. The blazing fires ignited by a surface burst are shown in standing buildings outside the miles-wide "zone of complete destruction," where the blast-hurled "rubble only smolders." Translation: [Radioactive] contamination occurs in the area of the explosion and also along the trajectory of the cloud which forms a radioactive track. Book Page: 19 Firestorms destroyed the centers of Hamburg, Dresden, and Tokyo. The old-fashioned buildings of those cities contained large amounts of flammable materials, were ignited by many thousands of small incendiaries, and burned quickly as standing structures well supplied with air. No firestorm has ever injected smoke into the stratosphere, or caused appreciable cooling below its smoke cloud. The theory that smoke from burning cities and forests and dust from nuclear explosions would cause worldwide freezing temperatures was conceived in 1982 by the German atmospheric chemist and environmentalist Paul Crutzen, and continues to be promoted by a worldwide propaganda campaign. This well funded campaign began in 1983 with televised scientific-political meetings in Cambridge and Washington featuring American and Russian scientists. A barrage of newspaper and magazine articles followed, including a scaremongering article by Carl Sagan in the October 30, 1983 issue of Parade, the Sunday tabloid read by millions. The most influential article was featured in the December 23,1983 issue of Science (the weekly magazine of the American Association for the Advancement of Science): "Nuclear winter, global consequences of multiple nuclear explosions," by five scientists, R. P. Turco, O. B. Toon, T. P. Ackerman, J. B. Pollack, and C. Sagan. Significantly, these activists listed their names to spell TTAPS, pronounced "taps," the bugle call proclaiming "lights out" or the end of a military funeral. Until 1985, non-propagandizing scientists did not begin to effectively refute the numerous errors, unrealistic assumptions, and computer modeling weakness' of the TTAPS and related "nuclear winter" hypotheses. A principal reason is that government organizations, private corporations, and most scientists generally avoid getting involved in political controversies, or making statements likely to enable antinuclear activists to accuse them of minimizing nuclear war dangers, thus undermining hopes for peace. Stephen Schneider has been called a fascist by some disarmament supporters for having written "Nuclear Winter Reappraised," according to the Rocky Mountain News of July 6, 1986. Three days later, this paper, that until recently featured accounts of unsurvivable "nuclear winter," criticized Carl Sagan and defended Thompson and Schneider in its lead editorial, "In Study of Nuclear Winter, Let Scientists Be Scientists." In a free country, truth will out - although sometimes too late to effectively counter fast-hittingpropaganda. Effective refutation of "nuclear winter" also was delayed by the prestige of politicians and of politically motivated scientists and scientific organizations endorsing the TTAPS forecast of worldwide doom. Furthermore, the weakness' in the TTAPS hypothesis could not be effectively explored until adequate Government funding was made available to cover costs of lengthy, expensive studies, including improved computer modeling of interrelated, poorly understood meteorological phenomena. Serious climatic effects from a Soviet-U.S. nuclear war cannot be completely ruled out. However, possible deaths from uncertain climatic effects are a small danger compared to the incalculable millions in many countries likely to die from starvation caused by disastrous shortages of essentials of modern agriculture sure to result from a Soviet-American nuclear war, and by the cessation of most international food shipments.

#### Island populations survive a nuclear winter.

Turchin and Green 18 (Alexey Turchin – Scientist for the Foundation Science for Life Extension in Moscow, Russia, Founder of Digital Immortality Now, author of several books and articles on the topics of existential risks and life extension. Brian Patrick Green – Director of technology ethics at the Markkula Center for Applied Ethics, teaches AI ethics in the Graduate School of Engineering at Santa Clara University. <MKIM> “Islands as refuges for surviving global catastrophes”. September 2018. DOA: 7/20/19. https://www.emerald.com/insight/content/doi/10.1108/FS-04-2018-0031/full/html?fullSc=1&mbSc=1&fullSc=1)

Different types of possible catastrophes suggest different scenarios for how survival could happen on an island. What is important is that the island should have properties which protect against the specific dangers of particular global catastrophic risks. Specifically, different islands will provide protection against different risks, and their natural diversity will contribute to a higher total level of protection: **Quarantined island survives pandemic** . An island could impose effective quarantine if it is sufficiently remote and simultaneously able to protect itself, possibly using military ships and air defense. **Far northern aboriginal people survive an ice age**. Many far northern people have adapted to survive in extremely cold and dangerous environments, and under the right circumstances could potentially survive the return of an ice age. However, their cultures are endangered by globalization. If these people become dependent on the products of modern civilization, such as rifles and motor boats, and lose their native survival skills, then their likelihood of surviving the collapse of the outside world would decrease. Therefore, preservation of their survival skills may be important as a defense against the risks connected with **extreme cooling**. Remote polar island with high mountains survives brief global warming of median surface temperatures, up to 50˚C. There is a theory that the climates of planets similar to the Earth could have several semi-stable temperature levels (Popp et al., 2016). If so, because of climate change, the Earth could transition to a second semi-stable state with a median global temperature of around 330 K, about 60˚C, or about 45˚C above current global mean temperatures. But even in this climate, **some regions of Earth could still be survivable for humans**, such as the Himalayan plateau at elevations above 4,000 m, but below 6,000 (where oxygen deficiency becomes a problem), or on polar islands with mountains (however, global warming affects polar regions more than equatorial regions, and northern island will experience more effects of climate change, including thawing permafrost and possible landslides because of wetter weather). In the tropics, the combination of increased humidity and temperature may increase the wet bulb temperature above 36˚C, especially on islands, where sea moisture is readily available. In such conditions, proper human perspiration becomes impossible (Sherwood and Huber, 2010), and there will likely be increased mortality and morbidity because of tropical diseases. If temperatures later returned to normal – either naturally or through climate engineering – **the rest of the Earth could be repopulated**. ‘‘Swiss Family Robinsons’’ survive on a tropical island, unnoticed by a military robot ‘‘mutiny’’. Most AI researchers ignore medium-term AI risks, which are neither near-term risks, like unemployment, nor remote risks, like AI superintelligence. But a large drone army – if one were produced – could receive a wrong command or be infected by a computer virus, leading it to attack people indiscriminately. Remote islands without robots could provide protection in this case, allowing survival until such a drone army ran out of batteries, fuel, ammunition or other supplies: Primitive tribe survives civilizational collapse. The inhabitants of **North Sentinel Island**, near the Andaman Islands in the Indian Ocean, are hostile and uncontacted. **The Sentinelese survived the 2004 Indian Ocean tsunami apparently unaffected** (Voanews, 2009), and if the rest of humanity disappear, **they might well continue their existence without change.** Tropical Island survives extreme global nuclear winter and glaciation event. Were a **nuclear**, bolide impactor or volcanic “**winter**” scenario to unfold, these islands would remain surrounded by Warm Ocean, and local volcanism or other energy sources might provide heat, energy and food. Such island refuges may have helped life on Earth survive during the **“Snowball Earth”** event in Earth’s distant past (Hoffman et al., 1998). Remote island base for project “Yellow submarine”. Some catastrophic risks such as a gamma ray burst, a global nuclear war with high radiological contamination or multiple pandemics might be best survived **underwater in nuclear submarines** (Turchin and Green, 2017). However, after a catastrophe, the submarine with survivors would eventually need a place to dock, and an island with some prepared amenities would be a reasonable starting point for rebuilding civilization. Bunker on remote island. For risks which include multiple or complex catastrophes, such as a bolide impact, extreme volcanism, tsunamis, multiple pandemics and nuclear war with radiological contamination, **island refuges could be strengthened with bunkers**. Richard Branson survived hurricane Irma on his own island in 2017 by seeking refuge in his concrete wine cellar (Clifford, 2017). Bunkers on islands would have higher survivability compared to those close to population centers, as they will be neither a military target nor as accessible to looters or unintentionally dangerous (e.g. infected) refugees. These bunkers could potentially be connected to water sources by underwater pipes, and passages could provide cooling, access and even oxygen and food sources

#### Extinction is inevitable from future technology.

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

4.1 Deliberate misuse of nanotechnology In a mature form, molecular nanotechnology will enable the construction of bacterium-scale self-replicating mechanical robots that can feed on dirt or other organic matter [22-25]. Such replicators could eat up the biosphere or destroy it by other means such as by poisoning it, burning it, or blocking out sunlight. A person of malicious intent in possession of this technology might cause the extinction of intelligent life on Earth by releasing such nanobots into the environment.[9] The technology to produce a destructive nanobot seems considerably easier to develop than the technology to create an effective defense against such an attack (a global nanotech immune system, an “active shield” [23]). It is therefore likely that there will be a period of vulnerability during which this technology must be prevented from coming into the wrong hands. Yet the technology could prove hard to regulate, since it doesn’t require rare radioactive isotopes or large, easily identifiable manufacturing plants, as does production of nuclear weapons [23]. Even if effective defenses against a limited nanotech attack are developed before dangerous replicators are designed and acquired by suicidal regimes or terrorists, there will still be the danger of an arms race between states possessing nanotechnology. It has been argued [26] that molecular manufacturing would lead to both arms race instability and crisis instability, to a higher degree than was the case with nuclear weapons. Arms race instability means that there would be dominant incentives for each competitor to escalate its armaments, leading to a runaway arms race. Crisis instability means that there would be dominant incentives for striking first. Two roughly balanced rivals acquiring nanotechnology would, on this view, begin a massive buildup of armaments and weapons development programs that would continue until a crisis occurs and war breaks out, potentially causing global terminal destruction. That the arms race could have been predicted is no guarantee that an international security system will be created ahead of time to prevent this disaster from happening. The nuclear arms race between the US and the USSR was predicted but occurred nevertheless. 4.2 Nuclear holocaust[winter] The US and Russia still have huge stockpiles of nuclear weapons. But would an all-out nuclear war really exterminate humankind? Note that: (i) For there to be an existential risk it suffices that we can’t be sure that it wouldn’t. (ii) The climatic effects of a large nuclear war are not well known (there is the possibility of a nuclear winter). (iii) Future arms races between other nations cannot be ruled out and these could lead to even greater arsenals than those present at the height of the Cold War. The world’s supply of plutonium has been increasing steadily to about two thousand tons, some ten times as much as remains tied up in warheads ([9], p. 26). (iv) Even if some humans survive the short-term effects of a nuclear war, it could lead to the collapse of civilization. A human race living under stone-age conditions may or may not be more resilient to extinction than other animal species. 4.3 We’re living in a simulation and it gets shut down A case can be made that the hypothesis that we are living in a computer simulation should be given a significant probability [27]. The basic idea behind this so-called “Simulation argument” is that vast amounts of computing power may become available in the future (see e.g. [28,29]), and that it could be used, among other things, to run large numbers of fine-grained simulations of past human civilizations. Under some not-too-implausible assumptions, the result can be that almost all minds like ours are simulated minds, and that we should therefore assign a significant probability to being such computer-emulated minds rather than the (subjectively indistinguishable) minds of originally evolved creatures. And if we are, we suffer the risk that the simulation may be shut down at any time. A decision to terminate our simulation may be prompted by our actions or by exogenous factors. While to some it may seem frivolous to list such a radical or “philosophical” hypothesis next the concrete threat of nuclear holocaust, we must seek to base these evaluations on reasons rather than untutored intuition. Until a refutation appears of the argument presented in [27], it would intellectually dishonest to neglect to mention simulation-shutdown as a potential extinction mode. 4.4 Badly programmed superintelligence When we create the first superintelligent entity [28-34], we might make a mistake and give it goals that lead it to annihilate humankind, assuming its enormous intellectual advantage gives it the power to do so. For example, we could mistakenly elevate a subgoal to the status of a supergoal. We tell it to solve a mathematical problem, and it complies by turning all the matter in the solar system into a giant calculating device, in the process killing the person who asked the question. (For further analysis of this, see [35].) 4.5 Genetically engineered biological agent With the fabulous advances in genetic technology currently taking place, it may become possible for a tyrant, terrorist, or lunatic to create a doomsday virus, an organism that combines long latency with high virulence and mortality [36]. Dangerous viruses can even be spawned unintentionally, as Australian researchers recently demonstrated when they created a modified mousepox virus with 100% mortality while trying to design a contraceptive virus for mice for use in pest control [37]. While this particular virus doesn’t affect humans, it is suspected that an analogous alteration would increase the mortality of the human smallpox virus. What underscores the future hazard here is that the research was quickly published in the open scientific literature [38]. It is hard to see how information generated in open biotech research programs could be contained no matter how grave the potential danger that it poses; and the same holds for research in nanotechnology. Genetic medicine will also lead to better cures and vaccines, but there is no guarantee that defense will always keep pace with offense. (Even the accidentally created mousepox virus had a 50% mortality rate on vaccinated mice.) Eventually, worry about biological weapons may be put to rest through the development of nanomedicine, but while nanotechnology has enormous long-term potential for medicine [39] it carries its own hazards. 4.6 Accidental misuse of nanotechnology (“gray goo”) The possibility of accidents can never be completely ruled out. However, there are many ways of making sure, through responsible engineering practices, that species-destroying accidents do not occur. One could avoid using self-replication; one could make nanobots dependent on some rare feedstock chemical that doesn’t exist in the wild; one could confine them to sealed environments; one could design them in such a way that any mutation was overwhelmingly likely to cause a nanobot to completely cease to function [40]. Accidental misuse is therefore a smaller concern than malicious misuse [23,25,41]. However, the distinction between the accidental and the deliberate can become blurred. While “in principle” it seems possible to make terminal nanotechnological accidents extremely improbable, the actual circumstances may not permit this ideal level of security to be realized. Compare nanotechnology with nuclear technology. From an engineering perspective, it is of course perfectly possible to use nuclear technology only for peaceful purposes such as nuclear reactors, which have a zero chance of destroying the whole planet. Yet in practice it may be very hard to avoid nuclear technology also being used to build nuclear weapons, leading to an arms race. With large nuclear arsenals on hair-trigger alert, there is inevitably a significant risk of accidental war. The same can happen with nanotechnology: it may be pressed into serving military objectives in a way that carries unavoidable risks of serious accidents. In some situations it can even be strategically advantageous to deliberately make one’s technology or control systems risky, for example in order to make a “threat that leaves something to chance” [42]. 4.7 Something unforeseen We need a catch-all category. It would be foolish to be confident that we have already imagined and anticipated all significant risks. Future technological or scientific developments may very well reveal novel ways of destroying the world. Some foreseen hazards (hence not members of the current category) which have been excluded from the list of bangs on grounds that they seem too unlikely to cause a global terminal disaster are: solar flares, supernovae, black hole explosions or mergers, gamma-ray bursts, galactic center outbursts, supervolcanos, loss of biodiversity, buildup of air pollution, gradual loss of human fertility, and various religious doomsday scenarios. The hypothesis that we will one day become “illuminated” and commit collective suicide or stop reproducing, as supporters of VHEMT (The Voluntary Human Extinction Movement) hope [43], appears unlikely. If it really were better not to exist (as Silenus told king Midas in the Greek myth, and as Arthur Schopenhauer argued [44] although for reasons specific to his philosophical system he didn’t advocate suicide), then we should not count this scenario as an existential disaster. The assumption that it is not worse to be alive should be regarded as an implicit assumption in the definition of Bangs. Erroneous collective suicide is an existential risk albeit one whose probability seems extremely slight. (For more on the ethics of human extinction, see chapter 4 of [9].) 4.8 Physics disasters The Manhattan Project bomb-builders’ concern about an A-bomb-derived atmospheric conflagration has contemporary analogues. There have been speculations that future high-energy particle accelerator experiments may cause a breakdown of a metastable vacuum state that our part of the cosmos might be in, converting it into a “true” vacuum of lower energy density [45]. This would result in an expanding bubble of total destruction that would sweep through the galaxy and beyond at the speed of light, tearing all matter apart as it proceeds. Another conceivability is that accelerator experiments might produce negatively charged stable “strangelets” (a hypothetical form of nuclear matter) or create a mini black hole that would sink to the center of the Earth and start accreting the rest of the planet [46]. These outcomes seem to be impossible given our best current physical theories. But the reason we do the experiments is precisely that we don’t really know what will happen. A more reassuring argument is that the energy densities attained in present day accelerators are far lower than those that occur naturally in collisions between cosmic rays [46,47]. It’s possible, however, that factors other than energy density are relevant for these hypothetical processes, and that those factors will be brought together in novel ways in future experiments. The main reason for concern in the “physics disasters” category is the meta-level observation that discoveries of all sorts of weird physical phenomena are made all the time, so even if right now all the particular physics disasters we have conceived of were absurdly improbable or impossible, there could be other more realistic failure-modes waiting to be uncovered. The ones listed here are merely illustrations of the general case.

#### Tech development shuts off from a collapse.

Baum 19 Seth Baum, executive director of the [Global Catastrophic Risk Institute](https://gcrinstitute.org/), 4-8-2019, "Why catastrophes can change the course of humanity," BBC, https://www.bbc.com/future/article/20190408-how-catastrophes-can-change-the-path-of-humanity, SJBE

**To better understand how a catastrophe could shape humanity’s future, let’s consider one example: an all-out nuclear war that involved all of the world’s nuclear-armed countries: China, France, India, Israel, North Korea, Pakistan, Russia, the United Kingdom and the US**. Only the most expansive war would manage to draw in all of these countries. A more probable scenario would only involve Russia and the US, which together hold over 90% of the global nuclear arsenal. But for the sake of discussion, let’s consider **the worst-case nuclear war**. Even in the worst case, **much of the world would presumably be spared from immediate destruction**. Africa and Latin America in particular are full of countries that are neither close allies nor adversaries of any of the nuclear-armed countries. Residents of these countries would presumably survive the initial nuclear explosions, as would people who live in the targeted countries but away from the cities and military sites that get bombed. The harm from nuclear war would spread far beyond the bombed areas **The survivors’ world would instantly be changed. In addition to the social and political turmoil, they would also lose many important nodes in the global economy.** Many global supply chains are designed to be highly efficient under normal conditions but are fragile to even small disruptions – and this disruption would not be small at all. **Within weeks or even days, communities all over the world could face shortages of consumer goods, replacement parts for critical industrial infrastructure, and other basics**. Soon after, the global environmental effects would start to kick in. Nuclear explosions are so powerful that they can send the dust and ash from burning cities all the way into the stratosphere, which is the second layer of the atmosphere, located 7km (4 miles) above the surface at the poles and 20km (12 miles) at the equator. The stratosphere is above the clouds, so anything that gets up there doesn’t wash out in the rain. Instead, it spreads around the world within a few months and stays aloft for a few years. While aloft, it blocks incoming sunlight, cooling the surface and reducing precipitation, all of which is bad news for agriculture. (Find out more about [how prepared we are for the impact of nuclear war](http://www.bbc.com/future/story/20170821-how-prepared-are-we-for-the-impact-of-a-nuclear-war)). **The famine from a worst-case nuclear war would kill many people all around the world, possibly more than would die from the war itself. But it might not kill everyone. There are some food stockpiles that could keep some people alive until the skies clear. Additional food could be grown from artificial light or other sources, assuming supplies for that were intact. The combination of global famine plus the destruction of the war itself would severely strain our modern global civilisation.** It is possible that the survivors could keep life as we know it more or less intact. **But with all the pressures they face, it would be understandable if our civilisation collapsed, just as previous civilisations from Egypt to Easter Island once did (see “**[**Are we headed for civilisation collapse?**](http://www.bbc.com/future/story/20190218-are-we-on-the-road-to-civilisation-collapse)**”).** What the intersection of famine and destruction following a nuclear war tells us is that catastrophes are often interconnected. The consequences – and vulnerability – a single catastrophe creates can linger from many years after the event. A nuclear war isn’t just a nuclear war: it is also an economic recession and an agriculture failure. How well civilisation endures it may depend a lot on how much it has already been weakened by global warming and other environmental degradation. The effects of the nuclear war could precipitate additional catastrophes, such as a pandemic (due to weakened public health infrastructure) or a catastrophic failure of geoengineering (leading to accelerated climate change). This is a scenario my colleagues and I have called a “[double catastrophe](http://sethbaum.com/ac/2013_DoubleCatastrophe.html)”. Because of all these interconnections, it is important to study catastrophes all together, instead of in isolation. People often ask me which risks are the biggest, but this is the wrong way to look at it. We face an interconnected system of catastrophic risk, not a collection of isolated risks. My colleagues and I have developed the concept of “[integrated assessment](https://ssrn.com/abstract=3046816)” of catastrophic risks to study the interconnected risk and develop the best ways of addressing it. Regardless of what all the catastrophe entails, it raises the question of what happens next. If humanity goes extinct, this question is of course easy to answer: we’re all dead. But if some people survive, the answer is a subtler matter. **If civilisation ceased functioning, survivors would be largely on their own to keep themselves alive and healthy.** Today, most people live in urban areas and may struggle to grow their food. (Ask yourself: would you know how to survive without civilisation providing you your basic needs?) Ironically, some of the most well-off people in the post-catastrophe world could be the subsistence farmers who are today considered to be among the world’s poorest. (Read more about [what happens, and how people react, in a food crisis](http://www.bbc.com/future/story/20190319-what-happens-when-the-food-runs-out)). One critical task would be reproduction. Survivor populations would need to be large enough and close enough together in order to produce new generations of humans. Otherwise, the population would die out. **Scientists have proposed that as few as 150 or as many as 40,000 people could be needed to sustain a genetically viable population**. The more favourable the conditions, the fewer people are needed, and the more likely a population is to succeed. A post-catastrophe world would also have some major disadvantages. **For example, a lot of the most accessible fossil fuels and other resources have already been extracted and used up. Some industrial pollutants also would persist for many years.**