# NC

## 1

#### Interp: “The member nations” is a definite plural, thus the aff must not defend any subset of member states.

Marriam Webster https://www.merriam-webster.com/dictionary/definite%20article

the word *th*e used in English to refer to a person or thing that is identified or specified

#### The use of the word “the” in the res denotes to all 164 member nations of the WTO.

#### Violation: The plan text specs [Jordan] member state

#### Standards

#### 1] Limits—there are 164 new affs a] negs only have the innovation DA as a generic, that means crazy aff prep skew b] only big teams can compete—since small teams cannot prep for every single unpredictable aff

WTO “WTO Members and Observers," No Publication, https://www.wto.org/english/thewto\_e/whatis\_e/tif\_e/org6\_e.htm

164 members since 29 July 2016 , with dates of WTO membership. Click any member to see key information on trade statistics, WTO commitments, disputes, trade policy reviews, and notifications.

#### 2] Precision—anything other interp lets affs do away with random words in the res a] that means no solid neg ground b] The judge doesn’t have the jurisdiction to vote on affs that don’t affirm

#### Voters

#### Fairness first—debate is a game if it’s not fair people won’t play

#### DTD—a] debaters only listen to ballots it creates the best norms, and they ruined my ability to compete b] the argument is their case that means the debate can’t start

#### No RVI a] debaters will bait theory for RVI’s making LD more abusive b] you don’t get a cookie for being fair

#### Competing interps a] Reasonability is arbitrary and requires judge intervention b] competing interps is a race to the top for the best norms

#### T before theory a] I only get 2 months to set norms they get 4 years b] any NC abuse was a necessary check against 1AC abuse

## 2

#### The aff’s positioning of competition as intrinsic good acts to maintain the stability of capital accumulation.

Christophers 16 [Brett Christophers, Professor in the Department of Social and Economic Geography at Uppsala University, “The Great Leveler: Capitalism and Competition in the Court of Law,” 2016, Harvard University Press, pp. 8-15, EA]

The aforementioned argument that capitalism has historically migrated from a state of competitiveness to a state of monopoly or oligopoly is deficient in four primary respects, both empirical and conceptual in nature.

First, there is something deeply misleading about the either/or nature of this historical narrative. One of the most important—although rarely acknowledged—of Marx’s insights was that capitalism always, everywhere, requires both. It needs competition, assuredly, not least to drive technological innovation and the reinvestment of profits, and thus growth. But it also needs monopoly—not merely to enhance visibility within and control over otherwise potentially chaotic business environments, but also to underwrite capitalist, market-based trade per se. Not for nothing does David Harvey argue, after Marx, that the “monopoly power of private property” is “both the beginning point and the end point of all capitalist activity.”20 For the legal institution of private property does confer monopoly: the exclusive power to dispose of said property as the owner alone sees fit.

Capital’s seemingly paradoxical need for both competition and monopoly is explored in Chapter 1, which extracts from Marx a conceptualization of capitalism that critically informs the remainder of the book: that of capitalism always, necessarily, teetering on a knife edge, balanced precariously between the contradictory forces of competition and monopoly, and perennially in danger of lapsing too far to one side or the other. “The problem,” Harvey shrewdly observes, “is to keep economic relations competitive enough while sustaining the individual and class monopoly privileges of private property that are the foundation of capitalism as a political-economic system.”21

And it is here that our economic laws crucially enter the picture. In metaphorical terms, the law acts as a powerful leveler: a pincer of sorts on the critical, combustible nexus of monopoly and competition, applicable from one side of the knife edge, the other, or both. Antitrust (competition) law, meaningfully enforced, serves to constrain monopoly power where it coheres too readily, thus boosting competition; IP law acts from the other side, allowing a degree of monopoly power where none “naturally” coheres, and limiting competition in the process. This conceptualization of economic law is sketched out in Chapter 3. Together, such laws help to ensure that over the long term, market-based capitalism is not too competitive (driving down prices and profits) but, in Harvey’s terms, remains competitive enough (avoiding stagnation and rent-seeking). In the process, the laws in question historically have contributed substantially to keeping capitalist accumulation regimes broadly in balance.

At the pivot of this overall mechanism sits the phenomenon of profit. Following the lead of scholars such as Robert Brenner, this book places front and center the relationship between profitability and the interrelated dynamics of competition and monopoly.22 As, indeed, did the classicals: Profit rates were, as Chapter 1 will show, fundamental to their theorization of competition. But it is vital to recognize, as writers such as Keith Cowling have done, that this relationship does not assume a simplistic less-competition-means-more-profit form, isolated as it were from other contributory factors.23 Indeed, the book shows that excesses neither of competitive intensity nor of monopoly power support long-term stability of profit-making and accumulation.

Instead, it leans more toward the type of argument proffered by Gérard Duménil and Dominique Lévy, which is that the dynamics of profitability strongly influence the state’s attempts to regularize regimes of accumulation, and that stabilizing capitalism is thus in no small part a question, ultimately, of stabilizing profitability.24 Or, as David Gordon and coauthors have written, the reproduction of capitalism is “fundamentally conditioned by the level and stability of capitalist profitability. As profits go, in short, so goes the economy.”25 The book’s particular slant on such conceptions is to consider corporate profits more in relative than absolute terms—and relative to, especially, labor and wages. While a comparable focus has recently been adopted by Thomas Piketty in his much discussed Capital in the Twenty-First Century, the inspiration underlying the approach taken here lies much further back in time, in the work in particular of Michal Kalecki.26 For as Kalecki showed both historically and conceptually, the relation of capital with labor, and profit with wages, is centrally implicated in the monopoly-competition relation and the balance that capitalism requires of it. Kalecki, it is fair to say, would have had some very interesting things to say about the Apple wage-suppression antitrust lawsuit.

A second and related problem with the linear historical narrative of from-competition-to-monopoly is its positing of monopoly and competition not only as mutually exclusive alternatives, but as separable ones. Once more, we can turn to Marx for an effective disabusal of this figuring. Monopoly and competition, he argued, are much more closely related, and much more closely connected, than is typically recognized. “Monopoly produces competition, competition produces monopoly,” he maintained, somewhat aphoristically, in a letter he wrote to Pavel Annenkov in 1846.27 Capital not only requires both but is in fact the expression, inter alia, of their synthesis—a synthesis that Marx, in trademark dialectical fashion, described not as a “formula” but as a “movement,” specifically “the movement whereby a true balance is maintained between competition and monopoly.”28 Such movement comprises opposing but connected economic dynamics of centralization and decentralization. When one or the other dynamic becomes disproportionately powerful, Marx argues, the “counteracting tendency” kicks in to return capital to a balanced configuration of monopoly and competition.

This balanced organization of productive forces—always inherently unstable and always prone to knife-edge slippages—is very close to what Edward Chamberlin would later call “monopolistic competition.”29 Such monopolistic competition internalizes monopoly and competition in dialectical relation with one another and is the capitalist norm—and always has been. “The notion of a bygone ‘competitive’ stage of capitalism where firms were price-takers is,” as Duménil and Lévy insist, “a fiction derived from the neoclassical analytical apparatus.”30 Equally fictional, albeit a fiction usually emanating from a very different analytical source, is the notion of a contemporary “monopoly” stage of capitalism absent meaningful competition.31

The historical, U.S.- and U.K.-based narrative related in this book therefore turns on precisely this dialectical, restless synthesis of monopoly and competition, and its ever-evolving, historically and geographically specific forms. In recent years, it is Harvey who has provided the most provocative reading of this dialectic and of its centrality to capitalism. It is, Harvey argues, one of numerous “moving” contradictions that plague the capital form, and with which capital constantly wrestles as it enters into and out of crisis.32 Harvey repeats Marx’s observation that capital requires a balance of competitive and monopolistic forces. He then derives from this postulate the propositions that crisis occurs when such forces become imbalanced—although this is not the only cause of crisis—and that such crisis can only be “fixed” once balance is restored. The result is that capital historically “oscillates” between relative excesses of monopoly and competition, always finding balance hard to achieve, let alone sustain.33 Understanding capital and its historical development in this particular regard, Harvey insists, requires us to recognize “how successful capital has generally been in managing the contradictions between monopoly and competition” and that “it uses crises to do so.”34

Such success, and the role played by crises or by threats thereof, are two of this book’s central, recurring themes. However, Harvey’s framing raises two vital questions that he fails, in his admittedly brief account of monopoly and competition, to answer.

First, how has this success been achieved? “Capital,” Harvey writes, “has organically arrived at a way to balance and rebalance the tendencies towards a monopolistic centralisation and decentralised competition through the crises that arise out of its imbalances.”35 Again, there is no objection here, except to press: “organically,” how? This book fashions an answer. This answer rests on the role of the law. When capital has become sufficiently overcentralized and monopolistic to threaten its own successful, profitable reproduction, antitrust law has been called upon to help restore the necessary degree of balance. This balance will never be perfect and at rest; in a dialectical relation, such as that between monopoly and competition, it never can be. When the dangerous excess has been of competition, by contrast, IP law has come to the rescue. Such laws, needless to say, have not effected this work of rebalancing by themselves, and this book documents their interaction with other pertinent dynamics; but their role has been paramount.

The other problematic question raised by Harvey’s framing brings us directly to our third point of divergence with the Baran and Sweezy or Foster and McChesney reading of capitalist development. Consider here the agency behind the successful, crisis-based management and rebalancing of monopolistic and competitive forces envisioned by Harvey: “capital has been successful . . .”; “capital has arrived at . . .” But what, or who, is this capital, and has its form remained constant? For Harvey, clearly, capital is the capitalist class: those that own the means of production. Yet this singularization of responsibility for regulating and reregulating the core dynamics of the capitalist economy raises all manner of questions that Harvey fails to address. Is this capitalist class homogeneous? Does it share consistent objectives in terms of economic development and management? And even if it does (and of course, it does not), what is its relation with the state and with the different tools of economic regulation, the law among them, that the state uses to govern and shape economic conduct?

If Harvey’s stimulating propositions call for circumspection on account of their simplifying structural abstractions, the connection to the “monopoly capital” thesis is that it too tends to rely upon just such totalizing, even reified, concepts. “Monopoly capital” is itself one such. One of the consistent themes of the tradition renewed by The Endless Crisis—one extending back through Baran and Sweezy’s Monopoly Capital to Rudolf Hilferding’s Finance Capital (1910) and even Lenin’s Imperialism (1917)—is its tendency not only to associate potent monopoly powers with a new stage or phase of capitalism but to depict the latter in terms of a consciously regulated and (centrally) planned system in which market-based competition largely disappears from view.36 For Lenin, this system fused the interests of capital and state (state monopoly capitalism); for Hilferding the fusion was tripartite, with finance capital also integral. But Marx, for all the stereotypes to the contrary, never saw capitalism as such. It was a totality, to be sure, but one that needs to be continually reproduced and reconstituted. This process occurs in and through the disparate actions of government, workers, consumers, businesses, and so on; when such reconstitution occurs in ways that imperil accumulation, crisis looms.

The point of saying all this is not simply to oppugn a totalizing view of “monopoly capital,” but to contrast with it the approach taken in this book, particularly to the law and its mobilization. There is not, and has not been, a single hand on the tiller, for all the obvious importance of the state as the law’s formal originator; there is no single, homogeneous entity pulling the levers, so to speak, of political-economic regulation— no consistent regime of conscious, systematic control. As with other modalities of economic regulation or governance, the law, in practice, does not “work” like that.

For one thing, there is an important difference between the written law and its interpretation. Two courts can interpret and apply the same law or laws in markedly different ways and with very different consequences. Perhaps the clearest example of this, at least in this book (Chapter 6), concerns U.S. antitrust law in the second half of the twentieth century: The nature and degree of enforcement of this law underwent a dramatic transformation in the late 1970s and early 1980s, but the law itself did not materially change. Intellectual training, social and political context, even judicial personality: These variables, and more, all matter to the law’s practical materialization. As such, we must remain constantly alive to the simple fact that, as Peter Carstensen has put it, “court doctrine is not the whole of the law in practice.”37 Relatedly, much of the enforcement of IP rights occurs at a significant remove from courts—specifically in, as argued by William T. Gallagher, the everyday practices of IP owners and their lawyers, whose “negotiations” with alleged infringers take place largely in the “shadow” of IP law.38

For another thing, just as the state never enacts new economic laws in total isolation from the influence and interests of capital, so both capital(s) and state—and indeed other economic agents—use the law to their own ends, and these ends are far from necessarily commensurate. Think, once again, about our two Apple cases. Who, in each case, instigated the legal action? Who put the law to work in their own interests? In the IP case it was Apple itself. In the class-action suit it was labor. But the latter suit was in fact itself based upon a prior government investigation launched by the Department of Justice’s Antitrust Division in 2010.39 Three legal cases, then, all driven by different actors with different motivations, but all revolving around the same political-economic locus: the knotty complex of profit generation and accumulation constituted by Apple Inc. And if the law, together with its agents, is so palpably nonsingular at the scale of the political economy of just one company, on what reasonable grounds could we ever envision it thus—as a vehicle of conscious, unified control—in relation to the political economy of capitalism more widely? The “great leveler” indicated in the book’s title, in short, is not some omnipotent regulator in charge of the law; it is the law per se.

How, then, might we more accurately characterize the human and institutional agency analyzed in the following pages in relation to the law, its mobilization, and its political-economic effects? At a general level, the conclusion reached by Paul David in his examination of the history of IP law fits particularly well: “The complex body of law, judicial interpretation, and administrative practice that one has to grapple with in this field was not created by some rational, consistent, social welfare-maximizing public agency. What one is faced with, instead, is a mixture of the intended and unintended consequences of an undirected historical process on which the varied interests of many parties, acting at different points (some widely separated in time and space), have left an enduring mark.”40 More specifically, however, we will see that although IP and competition laws have indeed performed their work under the influence of varied individuals and groups, the vast majority of the latter are ultimately committed to, and institutionally invested in, the reproduction, in as smooth a fashion as possible, of capitalism in more or less its existing form. And even more specifically, the “smoothness” here alluded to means the reproduction of capitalism especially without the kinds of problems—identified in Chapter 3—that tend to emerge when the necessary balance between monopoly and competition is substantially disrupted.

On all the above grounds, therefore, this book’s argument diverges from that which we find in the all-too-common narrative of competitive capitalism historically segueing into monopoly capitalism. Of course, none of this is to suggest that nothing has changed historically in the capitalist constellation of monopoly-competition structures and dynamics. Far from it. But the book’s fourth and final quarrel with the conventional narrative is that what has substantively, perhaps irrevocably, changed is not the relative levels of competitive intensity and monopoly power—as in, that era had more competition, this one has more monopoly—so much as the source of monopoly powers and the degree of defensibility thereof.

Capitalism, this argument runs, is always characterized by competitive undercurrents; were it not, it would not be capitalism. Meanwhile, and arising partly out of these competitive dynamics (the Marxian argument), there is an endemic drive to fashion monopoly powers. Yet the means of assembly of such powers do not remain constant, and neither does the ability of monopolistic capitalists to defend the powers thus amassed. Capitalists—and indeed the states committed to stabilizing capitalism, with the law one obvious apparatus at their disposal—must constantly find new ways of putting monopoly in place and keeping it there. “As monopoly privileges from one source diminish,” Harvey observes, “so we witness a variety of attempts to preserve and assemble them by other means.”41 Mindful, thus, of Marx’s dictum that the monopoly-versus-competition dualism is a red herring that confuses a dialectical relation for an oppositional one, this book focuses instead on the ways in which the unstable balance between the two forces is maintained—and it posits the law as the primary, necessarily mutable, instrument of such maintenance.

#### Capitalist imperialism enables hypermilitarization, dooms world economic prosperity to inevitable collapse, and plunges the human species into extinction.

Robinson et al 17 (Robinson, William I., et al. “Global Capitalist Crisis and Trump's War Drive.” Truthout, Truthout, 19 Apr. 2017, truthout.org/articles/global-capitalist-crisis-and-trump-s-war-drive/.)//LK [RCT] [Accessed 8/28/19]

The recent US attack on Syria and mega-bombing of Afghanistan come at a time when the Trump regime is facing a mounting scandal over alleged Russian involvement in its 2016 electoral campaign, historically low approval ratings for an incoming presidency, and a growing mass grassroots resistance movement. US rulers have often launched military adventures abroad to deflect attention from political crises and problems of legitimacy at home.¶ Beyond Syria and Afghanistan, the Trump regime has quietly escalated military intervention throughout the Middle East and has proposed an increase of US$55 billion in the Pentagon budget. It has threatened military force in a number of hotspots around the world, including Syria, Iran, Southeast Asia, along NATO’s eastern flank and in the Korean Peninsula. As rival centers of power emerge in the international system any such military adventure could snowball into a global conflagration with devastating consequences for humanity.¶ Journalists and political observers have focused on geopolitical analysis in attempting to explain rising international tensions. While such analysis is important, there are deep structural dynamics in the global capitalist system that are pushing ruling groups towards war. The crisis of global capitalism is intensifying despite what we have heard from mainstream economists and elites giddy with recent growth spurts and the inflation of stock prices. In particular, the system is facing what appears to be an intractable structural crisis of overaccumulation and of legitimacy.¶ Cyclical crises, or recessions, occur about every 10 years in the capitalist system and typically last some 18 months. There were recessions in the early 1980s, the early 1990s, and the early 2000s. Structural crisis, so called because the only way out of crisis is to restructure the system, occur approximately every 40-50 years. A new wave of colonialism and imperialism resolved the first recorded structural crisis of the 1870s and 1880s. The next structural, the Great Depression of the 1930s, was resolved through a new type of redistributive capitalism, referred to as the “class compromise” of Fordism-Keynesianism, social democracy, New Deal capitalism, and so on.¶ Capital responded to the structural crisis of the 1970s by going global. The emerging transnational capitalist class, or TCC, promoted vast neoliberal restructuring, trade liberalization, and integration of the world economy. The global economy experienced a boom in the late 20th century as the former socialist countries entered the global market and as capital, liberated from nation-state constraints, unleashed a vast new round of accumulation worldwide. The TCC unloaded surpluses and resumed profit-making in the emerging globally integrated production and financial system through the acquisition of privatized assets, the extension of mining and agro-industrial investment on the heels of the displacement of hundreds of millions from the countryside, a new wave of industrial expansion assisted by the revolution in Computer and Information Technology (CIT).¶ Yet capitalist globalization has also resulted in unprecedented social polarization worldwide. According to the development agency Oxfam, just 1 percent of humanity owns over half of the world’s wealth and the top 20 percent own 94.5 of that wealth, while the remaining 80 percent must make due with just 4.5 percent.¶ Given such extreme polarization of income and wealth, the global market cannot absorb the output of the global economy. The global financial collapse of 2008 marked the onset of a new structural crisis of overaccumulation, which refers to accumulated capital that cannot find outlets for profitable reinvestment. Data from 2010 showed, for instance, that companies from the United States were sitting on $1.8 trillion in uninvested cash that year. Corporate profits have been at near record highs at the same time that corporate investment has declined.¶ As this uninvested capital accumulates, enormous pressures build up to find outlets for unloading the surplus. Capitalist groups, especially transnational finance capital, push states to create new opportunities for profit-making. Neoliberal states have turned to four mechanisms in recent years to help the TCC unload surplus and sustain accumulation in the face of stagnation.¶ One is the raiding and sacking of public budgets. Public finance has been reconfigured through austerity, bailouts, corporate subsidies, government debt and the global bond market as governments transfer wealth directly and indirectly from working people to the TCC.¶ A second is the expansion of credit to consumers and to governments, especially in the Global North, to sustain spending and consumption. In the United States, for instance, which has long been the “market of last resort” for the global economy, household debt is higher than it has been for almost all of postwar history. US households owed in 2016 nearly US$13 trillion in student loans, credit card debt, auto loans and mortgages. Meanwhile, the global bond market — an indicator of total government debt worldwide — had already reached US$100 trillion by 2011.¶ A third is frenzied financial speculation. The global economy has been one big casino for transnational finance capital, as the gap between the productive economy and “fictitious capital” grows ever wider. Gross world product, or the total value of goods and services produced worldwide, stood at some US$75 trillion in 2015, whereas currency speculation alone amounted to US$5.3 trillion a day that year and the global derivatives market was estimated at a mind-boggling US$1.2 quadrillion.¶ All three of these financial mechanisms may resolve the problem momentarily but in the long run they end up aggravating the crisis of overaccumulation. The transfer of wealth from workers to capital further constricts the market, while debt-financed consumption and speculation increase the gap between the productive economy and “fictitious capital.” The result is ever-greater underlying instability in the global economy. Many now see a new crash as inevitable.¶ There is another mechanism that has sustained the global economy: militarized accumulation. Here there is a convergence around the system’s political need for social control and its economic need to perpetuate accumulation. Unprecedented global inequalities can only be sustained by ever more repressive and ubiquitous systems of social control and repression. Yet quite apart from political considerations, the TCC has acquired a vested interest in war, conflict, and repression as a means of accumulation. CIT has revolutionized warfare and the modalities of state-organized militarized accumulation, including the military application of vast new technologies and the further fusion of private accumulation with state militarization.¶ As war and state-sponsored repression become increasingly privatized, the interests of a broad array of capitalist groups shift the political, social, and ideological climate toward generating and sustaining social conflict — such as in the Middle East — and in expanding systems of warfare, repression, surveillance and social control. The so-called wars on drugs, terrorism, and immigrants; the construction of border walls, immigrant detention centers, and ever-growing prisons; the installation of mass surveillance systems, and the spread of private security guard and mercenary companies, have all become major sources of profit-making.¶ The US state took advantage of the 9/11 attacks to militarize the global economy. US military spending skyrocketed into the trillions of dollars through the “war on terrorism” and the invasions and occupations of Iraq and Afghanistan. The “creative destruction” of war acted to throw fresh firewood on the smoldering embers of a stagnant global economy. The Pentagon budget increased 91 percent in real terms between 1998 and 2011, and even apart from special war appropriations, it increased by nearly 50 percent in real terms during this period. In the decade from 2001 to 2011 defense industry profits nearly quadrupled. Worldwide, total defense outlays (military, intelligence agencies, Homeland Security/Defense) grew by 50 percent from 2006 to 2015, from $1.4 trillion to $2.03 trillion.¶ The cutting edge of accumulation in the “real economy” worldwide shifted from CIT before the dot-com bust of 1999-2001 to a military-security-industrial-financial complex — itself integrated into the high-tech conglomerate – that has accrued enormous influence in the halls of power in Washington and other political centers around the world. An emergent power bloc bringing together the global financial complex with the military-security-industrial complex appeared to crystallize in the wake of the 2008 collapse. The class interests of the TCC, geo-politics, and economics come together around militarized accumulation. The more the global economy comes to depend on militarization and conflict the greater the drive to war and the higher the stakes for humanity.¶ The day after Donald Trump’s electoral victory, the stock price of Corrections Corporation of America, the largest for-profit immigrant detention and prison company in the United States, soared 40 percent, given Trump’s promise to deport millions of immigrants. Military contractors such as Raytheon and Lockheed Martin report spikes each time there is a new flare-up in the Middle East conflict. Within hours of the April 6 tomahawk missile bombardment of Syria Raytheon stock increased by $1 billion. Hundreds of private firms from around the world have put in bids to construct Trump’s infamous US-Mexico border wall.¶ Populist rhetoric aside, the Trump regime’s economic program constitutes neo-liberalism on steroids. Corporate tax cuts and deregulation will exacerbate overaccumulation and heighten the power bloc’s proclivity for military conflict. Politicized and increasingly autonomous generals and retired military officials that occupy numerous posts in the regime control the US war machine. The generals may play a key role in geopolitical conjunctures and in the timing and circumstances around which US intervention and war escalate. Yet behind the Trump regime and the Pentagon, the TCC seeks to sustain global accumulation through expanding militarization, conflict, and repression. This gives a built-in war drive to the current course of capitalist globalization. Only a worldwide push back from below, and ultimately a program to redistribute wealth and power downward, can counter the upward spiral of international conflagration.

#### The alternative is a dual power approach to communist strategy. We must build independent communist institutions capable of surviving and defending themselves against the capitalist world. Not only does the alt solve for material violence in the transition period, it also eliminates the material and ideological dependences on capital that prevent revolution.

Escalante 19 [Alyson Escalante is a Marxist-Leninist, Materialist Feminist and Anti-Imperialist activist. "Communism and Climate Change: A Dual Power Approach" in Regeneration. March 26, 2019. [https://regenerationmag.org/communism-and-climate-change-a-dual-power-approach/] KZaidi](https://regenerationmag.org/communism-and-climate-change-a-dual-power-approach/%5d%20KZaidi) //LK [RCT 12/10/19]

Much has been written over the last few years about a dual power approach to communist strategy. I have written extensively about it at The Forge News, and discussed in video format in my YouTube video, Climate Change, Imperialism, and The End of The World. I will not be using this article to give a comprehensive recap on what dual power strategy is, so I suggest checking out those two links. In short: dual power strategy is an approach to communist revolution which seeks to build independent socialist institutions which exist in parallel to the currently existing capitalist state, in order to serve the masses. The goal of a dual power strategy is not to compete with capitalism or reform it out of existence, but rather to radicalize the masses through meeting their needs, to recognize and politicize capitalist crisis as it occurs, and to have a real infrastructure in place for a revolutionary movement to self-sustain at the point that it must inevitably combat the capitalist state. This strategy focuses on building counter-institutions like tenants’ unions, agricultural cooperatives, radical labor unions, and Serve the People programs that not only demonstrate on-the-ground worker power but can provide for the needs of the masses without an appeal to reforming the currently existing capitalist state. I previously argued that a crucial advantage to dual power strategy is that it gives the masses an infrastructure of socialist institutions which can directly provide for material needs in times of capitalist crisis. Socialist agricultural and food distribution programs can take ground that the capitalist state cedes by simultaneously meeting the needs of the masses while proving that socialist self-management and political institutions can function independently of capitalism. This approach is not only capable of literally saving lives in the case of crisis, but of demonstrating the possibility of a revolutionary project which seeks to destroy rather than reform capitalism. One of the most pressing of the various crises which humanity faces today is climate change. Capitalist production has devastated the planet, and everyday we discover that the small window of time for avoiding its most disastrous effects is shorter than previously understood. The Intergovernmental Panel on Climate Change predicts that we have twelve years to limit (not even prevent) the more catastrophic effects of climate change. The simple, and horrific, fact that we all must face is that climate change has reached a point where many of its effects are inevitable, and we are now in a post-brink world, where damage control is the primary concern. The question is not whether we can escape a future of climate change, but whether we can survive it. Socialist strategy must adapt accordingly. In the face of this crisis, the democratic socialists and social democrats in the United States have largely settled on market-based reforms. The Green New Deal, championed by Representative Alexandria Ocasio-Cortez and the left-wing of the Democratic Party, remains a thoroughly capitalist solution to a capitalist problem. The proposal does nothing to challenge capitalism itself but rather seeks to subsidize market solutions to reorient the US energy infrastructure towards renewable energy production, to develop less energy consuming transportation, and the development of public investment towards these ends. The plan does nothing to call into question the profit incentives and endless resource consumption of capitalism which led us to this point. Rather, it seeks to reorient the relentless market forces of capitalism towards slightly less destructive technological developments. While the plan would lead to a massive investment in the manufacturing and deployment of solar energy infrastructure, National Geographic reports that “Fabricating [solar] panels requires caustic chemicals such as sodium hydroxide and hydrofluoric acid, and the process uses water as well as electricity, the production of which emits greenhouse gases.” Technology alone cannot sufficiently combat this crisis, as the production of such technology through capitalist manufacturing infrastructure only perpetuates environmental harm. Furthermore, subsidizing and incentivizing renewable energy stops far short of actually combating the fossil fuel industry driving the current climate crisis. The technocratic market solutions offered in the Green New Deal fail to adequately combat the driving factors of climate change. What is worse, they rely on a violent imperialist global system in order to produce their technological solutions. The development of high-tech energy infrastructure and the development of low or zero emission transportation requires the import of raw material and rare earth minerals which the US can only access because of the imperial division of the Global South. This imperial division of the world requires constant militarism from the imperial core nations, and as Lenin demonstrates in Imperialism: The Highest Stage of Capitalism, facilitates constant warfare as imperial states compete for spheres of influence in order to facilitate cheap resource extraction. The US military, one of many imperialist forces, is the single largest user of petroleum, and one of its main functions is to ensure oil access for the US. Without challenging this imperialist division of the world and the role of the US military in upholding it, the Green New Deal fails even further to challenge the underlying causes of climate change. Even with the failed promises of the Green New Deal itself, it is unlikely that this tepid market proposal will pass at all. Nancy Pelosi and other lead Democrats have largely condemned it and consider it “impractical” and “unfeasible.” This dismissal is crucial because it reveals the total inability of capitalism to resolve this crisis. If the center-left party in the heart of the imperial core sees even milquetoast capitalist reforms as a step too far, we ought to have very little hope that a reformist solution will present itself within the ever-shrinking twelve-year time frame. There are times for delicacy and there are times for bluntness, and we are in the latter. To put things bluntly: the capitalists are not going to save us, and if we don’t find a way to save ourselves, the collapse of human civilization is a real possibility. The pressing question we now face is: how are we going to save ourselves? Revolution and Dual Power If capitalism will not be able to resolve the current encroaching climate crisis, we must find a way to organize outside the confines of capitalist institutions, towards the end of overthrowing capitalism. If the Democratic Socialists of America-backed candidates cannot offer real anti-capitalist solutions through the capitalist state, we should be skeptical of the possibility for any socialist organization doing so. The DSA is far larger and far more well-funded than any of the other socialist organizations in the US, and they have failed to produce anything more revolutionary than the Green New Deal. We have to abandon the idea that electoral strategy will be sufficient to resolve the underlying causes of this crisis within twelve years. While many radicals call for revolution instead of reform, the reformists often raise the same response: revolution is well and good, but what are you going to do in the meantime? In many ways this question is fair. The socialist left in the US today is not ready for revolutionary action, and a mass base does not exist to back the various organizations which might undertake such a struggle. Revolutionaries must concede that we have much work to be done before a revolutionary strategy can be enacted. This is a harsh truth, but it is true. Much of the left has sought to ignore this truth by embracing adventurism and violent protest theatrics, in the vain hope of sparking revolutionary momentum which does not currently exist. If this is the core strategy of the socialist left, we will accomplish nothing in the next twelve years. Such approaches are as useless as the opportunist reforms pushed by the social democrats. Our task in these twelve years is not simply to arm ourselves and hope that magically the masses will wake up prepared for revolution and willing to put their trust in our small ideological cadres. We must instead, build a movement, and with it we must build infrastructure which can survive revolution and provide a framework for socialist development. Dual power is tooled towards this project best. The Marxist Center network has done an impressive amount of work developing socialist institutions across the US, largely through tenants organizing and serve the people programs. The left wing factions within the DSA itself have also begun to develop mutual aid programs that could be useful for dual power strategy. At the same time, mutual aid is not enough. We cannot simply build these institutions as a reform to make capitalism more survivable. Rather, we must make these institutions part of a broader revolutionary movement and they ought to function as a material prefiguration to a socialist society and economy. The institutions we build as dual power outside the capitalist state today ought to be structured towards revolutionary ends, such that they will someday function as the early institutions of a revolutionary socialist society. To accomplish this goal, we cannot simply declare these institutions to be revolutionary. Rather they have to be linked together through an actual revolutionary movement working towards revolutionary ends. This means that dual power institutions cannot exist as ends in and of themselves, nor can abstract notions of mutual aid cannot be conceptualized as an end in itself. The explicit purpose of these institutions has to be to radicalize the masses through meeting their needs, and providing an infrastructure for a socialist movement to meet the needs of its members and the communities in which it operates. Revolutionary institutions that can provide food, housing, and other needs for a revolutionary movement will be crucial for building a base among the masses and for constructing the beginnings of a socialist infrastructure for when we eventually engage in revolutionary struggle. What I want to suggest here is that the production of food through dual power institutions should be a central project for this revolutionary movement. There are several reasons why I think this is the case. First, food production allows us to meet the most immanent needs of the masses. The US is plagued by food deserts which deprive huge portions of the population access to fresh food. Poverty exacerbates this further, and the devastating effects of lack of access of healthy food due to poverty are well documented. This is an urgent need that socialists can meet in order to demonstrate to the masses that it is socialists who can serve them where the capitalist state has failed. Second, food production is a major contributor to climate change. Large-scale meat production produces massive amounts of greenhouse gas, and the transportation of food from rule agricultural areas to urban populations centers is a major contributor as well. Urban agricultural projects and the development of sustainable permaculture are not sufficient to fix these problems, as they are not able to overthrow the capitalist system of agricultural production. However, paired with a broader revolutionary movement, these projects allow us to undertake scientific experimentation with meeting food needs, in order to test and demonstrate the effectiveness of alternative food production methods that can eventually replace the current unsustainable capitalist model. After all, if our revolution cannot replace unsustainable production models, we will not be able to resolve climate change any better than the capitalists. Given these considerations, I think it is crucial that the revolutionary socialist movement begin to investigate and develop food production strategies that are part of a broader dual power project. If we hold that revolution is the only way to resolve climate crisis within the next twelve years, we need to have tested, demonstrably superior methods of food production ready to go. A revolutionary movement which cannot demonstrate an ability to meet the needs of the masses does not deserve their support, and food production is a crucial need. I am incapable of providing a comprehensive strategy here, I want to look at the ongoing organopónicos in Cuba, in order to demonstrate that the successes of Cuban urban agriculture can be of great a source of insight and strategy for our dual power projects. Learning from Cuba: Organopónicos Thankfully, we do not have to start from scratch when developing food production strategies. The development of urban agriculture in Cuba provides some important insights that can inform our own projects. In the 1990s, the collapse of the Soviet Union had a devastating effect on Cuba. The loss of a major trade partner paired with an ongoing imperialist embargo forced the Cuban state to pursue experimental solutions to food shortages. The loss of trade not only produced a food shortage but also ended import of agricultural machinery and pesticides needed for large-scale industrial farming. Access to gasoline also diminished, forcing the Cuban state to prioritize urban agriculture which did not need to be transported long distances. This crisis led to Cuba, almost incidentally, developing a sustainable and ecologically-oriented project of urban agriculture. Over the course of many years, this led to a system of civilian controlled organopónicos. This system of urban gardens, run by community members, has since grown to significant proportions. By 2003, Havana produced 90% of the fresh produce within the city because of the success of the organopónicos, largely without pesticides and with minimal fossil fuel expenditure for transportation. That same year, the Cuban Ministry of Agriculture reported a 50% decrease in fossil fuel usage. The system is made up of a variety of institutions, from state owned and operated plots, to cooperatively purchased and maintained gardens. In total, 87,000 acres of land are now being used for urban agriculture in Havana. Although the organopónicos are largely run by communities themselves, they receive support and funding from the Cuban state. For an incredibly in-depth analysis of the organopónico system, I highly recommend this impressively thorough report from Monthly Review. We must now ask: how might the development of the organopónico system inform dual power projects today? First, it is worth noting that the system cannot be directly copied and pasted into urban centers within the US. Subsidies from the Cuban state are crucial to maintaining the system at such a large-scale. Any projects undertaken in a dual power context will necessarily be smaller, due purely to funding for land acquisition. One other complication is that the population of US urban centers is largely unfamiliar with agriculture, a problem that was not so serious in Cuba. As such, application of lessons learned from the organopónico system will require socialist organizations in the US to develop agricultural education alongside actual food production. Despite these differences, the organopónico system proves that socialist approaches to food production are viable, and more importantly, environmentally sustainable. Not only has the socialist Cuban state found a way for its urban centers to collectively produce much of their food, it has done so without using environmentally destructive pesticides, and while driving down fuel consumption by a huge margin. There is more learning and experimenting to be done, as organopónicos do not yet provide complete self-sustenance for the cities in which they exist, but they demonstrate that socialist solutions can move us in that direction. For socialists in the US who are invested in dual power, the organopónico system ought to inspire us to begin our own collective production of food. For those who can acquire access to land in urban areas, it is possible to begin to develop small-scale projects integrating the lessons learned from the organopónico system. This not only allows us to combat the effects of food deserts by producing fresh produce within those deserts themselves but allows us to begin to further investigate and experiment with agricultural models that can be scaled up in a revolutionary socialist society to meet the needs of the populace. For those who cannot access sizable plots of land, small-scale permaculture can still be developed in yards, with windowsill gardens, and with public gardening spaces. The development of permaculture skills should be prioritized even if it can only occur at a small-scale. We must take a scientific, not a utopian, approach to socialism, and that means beginning to experiment and develop socialist infrastructure here and now. A climate catastrophe is on the horizon now. Even if we manage to achieve the revolutionary overthrow of capitalism within the twelve-year window, we will still see many devastating effects of climate change. Unfortunately, it is likely that global capitalism will survive much longer than twelve more years, so learning how to meet needs in a state of crisis will be crucial for socialist projects of the future. We will be forced to begin developing socialist projects in less than ideal conditions. As such, the lessons learned from organopónicos are of extra importance. Cuba’s urban agriculture is a product of crisis and demonstrates that even under conditions of intense crisis, socialist states can create solutions to meet the needs of the masses. I have not offered a particularly thorough investigation into the organopónico system in this article. For that, I really do recommend the Monthly Review piece linked above. Regardless, I hope that I have demonstrated that climate change poses a serious challenge for socialist organizing. It creates an intense urgency and requires us to develop strategies which can respond to horrific instances of crisis. I truly believe that dual power remains the best strategy for responding climate change, but it must be scientifically informed, and capable of actually providing sustainable socialist alternatives. We should be grateful for the Cuba’s experiments with organopónicos, and should commit to investigation and study of their experiments in order to inform our own projects. We are running out of time to act, and the stakes have never been higher.

## 3

#### Practical reason constrains everything:

#### [1] Postulation – reason is a prior question to evaluation of ethics since anything else collapses, we can infinitely question our foundations

#### [2] Epistemology – rational deliberation of educational concepts is necessary to interpret other argument

#### Freedom follows:

#### We could not hold agents responsible for their actions if assume them to have the freedom to control their actions.

#### Moral law follows – it stems from reason a) morality based on desires would be imposed on us from the outside and we could not be free b) anything else is non-binding and arbitrary since empiricism is always subject to change

#### Thus, the standard is consistency with the categorical imperative.

#### Now negate-

#### The aff violates the categorical imperative, governments have a obligation to protect creations

**Van Dyke 18** Raymond Van Dyke, 7-17-2018, "The Categorical Imperative for Innovation and Patenting," IPWatchdog, <https://www.ipwatchdog.com/2018/07/17/categorical-imperative-innovation-patenting/id=99178/> SJ//DA recut SJKS

As we shall see, applying **Kantian logic entails first acknowledging some basic principles; that the people have a right to express themselves, that that expression (the fruits of their labor) has value and is theirs (unless consent is given otherwise), and that government is obligated to protect people and their property. Thus, an inventor or creator has a right in their own creation, which cannot be taken from them without their consent.** So, employing this canon, **a proposed Categorical Imperative (CI) is the following Statement: creators should be protected against the unlawful taking of their creation by others. Applying this Statement to everyone, i.e., does the Statement hold water if everyone does this, leads to a yes determination. Whether a child, a book or a prototype, creations of all sorts should be protected, and this CI stands.** This result also dovetails with the purpose of government: to protect the people and their possessions by providing laws to that effect, whether for the protection of tangible or intangible things. **However, a contrary proposal can be postulated: everyone should be able to use the creations of another without charge. Can this Statement rise to the level of a CI? This proposal, upon analysis would also lead to chaos. Hollywood, for example, unable to protect their films, television shows or any content, would either be out of business or have robust encryption and other trade secret protections, which would seriously undermine content distribution and consumer enjoyment.** Likewise, inventors, unable to license or sell their innovations or make any money to cover R&D, would not bother to invent or also resort to strong trade secret. Why even create? This approach thus undermines and greatly hinders the distribution of ideas in a free society, which is contrary to the paradigm of the U.S. patent and copyright systems, which promotes dissemination. By allowing freeriding, innovation and creativity would be thwarted (or at least not encouraged) and trade secret protection would become the mainstay for society with the heightened distrust.

## 4

#### Innovation high– postdates your ev and we have stats

Ezell 20. Stephen Ezell, July 2020, “Ensuring U.S. Biopharmaceutical Competitiveness,” Information Technology and Innovation Foundation, <http://www2.itif.org/2020-biopharma-competitiveness.pdf> sean!

Medicines are critical to health. Since 2000, the FDA has approved more than 500 new medicines. 2 As of 2020, biopharmaceutical companies in the United States have more than 3,400 drugs under clinical development, accounting for almost half of the estimated 8,000 medicines under development globally (1,100 of which are being developed to treat various forms of cancers).3 And while some have asserted that biotechnology companies focus too often on “me-too” drugs that compete with other treatments already on the market, the reality is that most of the drugs currently under development seek to tackle some of the world’s most intractable diseases, including Alzheimer’s, cancer, and communicable diseases. This includes 130 coronavirus vaccines under development globally as well as 144 active trials of coronavirus therapeutic agents, and another 457 development programs for new therapeutic agents, which the FDA is tracking through its Coronavirus Treatment Acceleration Program.4 Moreover, such arguments miss that many of the drugs developed in recent years have in fact been first of their kind. For instance, in 2014, the FDA’s Center for Drug Evaluation and Research (CDER) approved 41 new medicines (the most since 1996 at that point), many of which were first-in-class medicines, meaning they represent a possible new pharmacological class for treating a medical condition.5 In that year, 28 of the 41 drugs approved were considered biologic or specialty agents, and 41 percent of medicines approved were intended to treat rare diseases. In 2018, CDER approved a record 59 novel drugs, and in 2019, 48 novel drugs, making 2019 the third-largest approval class in the past 25 years.6 As of 2020, 74 percent of medicines in clinical development in the United States are potentially first-in-class medicines, including 86 percent for Alzheimer’s, 70 percent for various forms of cancer, and 73 percent for cardiovascular diseases

#### IP protections motivate innovators to take risks – that means long term development and prolif

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With the belief that medicines should be “public goods,” there is literally no support in some quarters for the application of the WTO TRIPS Agreement to IP rights in medicines. Any protection of the IP rights in such goods is viewed as a violation of human rights and of the overall public interest. This view, though, does not reflect the practical reality of a world in which many medicines would simply not exist if it were not for the existence of IP rights and the protections they are afforded. Technically, IP rights are exceptions to free trade. A long‐​standing general discussion in the WTO has been about when these exceptions to free trade should be allowed and how far they should be extended. The continuing debate over IP rights in medicines is only the most emotional part of this overall conversation. Because developed countries have, historically, been the principal sources of IP rights, this lengthy WTO dispute has largely been between developed countries trying to uphold IP rights and developing countries trying to limit them. The debate over the discovery and the distribution of vaccines for COVID-19 is but the latest global occasion for this ongoing discussion. The primary justification for granting and protecting IP rights is that they are incentives for innovation, which is the main source for long‐​term economic growth and enhancements in the quality of human life. IP rights spark innovation by “enabling innovators to capture enough of the benefits of their own innovative activity to justify taking considerable risks.”18 The knowledge from innovations inspired by IP rights spills over to inspire other innovations. The protection of IP rights promotes the diffusion, domestically and internationally, of innovative technologies and new know‐​how. Historically, the principal factors of production have been land, labor, and capital. In the new pandemic world, perhaps an even more vital factor is the creation of knowledge, which adds enormously to “the wealth of nations.” Digital and other economic growth in the 21st century is increasingly ideas‐​based and knowledge intensive. Without IP rights as incentives, there would be less new knowledge and thus less innovation. In the short term, undermining private IP rights may accelerate distribution of goods and services—where the novel knowledge that went into making them already exists. But in the long term, undermining private IP rights would eliminate the incentives that inspire innovation, thus preventing the discovery and development of knowledge for new goods and services that the world needs. This widespread dismissal of the link between private IP rights and innovation is perhaps best reflected in the fact that although the United Nations Sustainable Development Goals for 2030 aspire to “foster innovation,” they make no mention of IP rights.19

#### Innovation is k2 stopping bioterror

Marjanovic and Fejiao ‘20 Marjanovic, Sonja, and Carolina Feijao. Sonja Marjanovic, Ph.D., Judge Business School, University of Cambridge. Carolina Feijao, Ph.D. in biochemistry, University of Cambridge; M.Sc. in quantitive biology, Imperial College London; B.Sc. in biology, University of Lisbon. "Pharmaceutical Innovation for Infectious Disease Management: From Troubleshooting to Sustainable Models of Engagement." https://www.rand.org/pubs/perspectives/PEA407-1.html (2020). [Quality Control]

As key actors in the healthcare innovation landscape, pharmaceutical and life sci-ences companies have been called on to develop medicines, vaccines and diagnostics for pressing public health challenges. The COVID-19 crisis is one such challenge, but there are many others. For example, MERS, SARS, Ebola, Zika and avian and swine flu are also infectious diseases that represent public health threats. Infectious agents such as anthrax, smallpox and tularemia could present threats in a bioterrorism context.1 The general threat to public health that is posed by antimicrobial resistance is also well recognized as an area in need of pharmaceutical innovation. Innovating in response to these challenges does not always align well with pharmaceutical industry commercial models, shareholder expectations and compe-tition within the industry. However, the expertise, networks and infrastructure that industry has within its reach, as well as public expectations and the moral imperative, make pharmaceutical companies and the wider life sciences sector an indispensable partner in the search for solutions that save lives. This perspective argues for the need to establish more sustainable and scalable ways of incentivising pharmaceu-tical innovation in response to infectious disease threats to public health. It considers both past and current examples of efforts to mobilise pharmaceutical innovation in high commercial risk areas, including in the context of current efforts to respond to the COVID-19 pandemic. In global pandemic crises like COVID-19, the urgency and scale of the crisis – as well as the spotlight placed on pharmaceutical companies – mean that contributing to the search for effective medicines, vaccines or diagnostics is essential for socially responsible companies in the sec-tor.2 It is therefore unsurprising that we are seeing indus-try-wide efforts unfold at unprecedented scale and pace. Whereas there is always scope for more activity, industry is currently contributing in a variety of ways. Examples include pharmaceutical companies donating existing com-pounds to assess their utility in the fight against COVID-19; screening existing compound libraries in-house or with partners to see if they can be repurposed; accelerating tri-als for potentially effective medicine or vaccine candidates; and in some cases rapidly accelerating in-house research and development to discover new treatments or vaccine agents and develop diagnostics tests.3,4 Pharmaceutical companies are collaborating with each other in some of these efforts and participating in global R&D partnerships (such as the Innovative Medicines Initiative effort to accel-erate the development of potential therapies for COVID-19) and supporting national efforts to expand diagnosis and testing capacity and ensure affordable and ready access to potential solutions.3,5,6 The primary purpose of such innovation is to benefit patients and wider population health. Although there are also reputational benefits from involvement that can be realised across the industry, there are likely to be rela-tively few companies that are ‘commercial’ winners. Those who might gain substantial revenues will be under pres-sure not to be seen as profiting from the pandemic. In the United Kingdom for example, GSK has stated that it does not expect to profit from its COVID-19 related activities and that any gains will be invested in supporting research and long-term pandemic preparedness, as well as in developing products that would be affordable in the world’s poorest countries.7 Similarly, in the United States AbbVie has waived intellectual property rights for an existing com-bination product that is being tested for therapeutic poten-tial against COVID-19, which would support affordability and allow for a supply of generics.8,9 Johnson & Johnson has stated that its potential vaccine – which is expected to begin trials – will be available on a not-for-profit basis during the pandemic.10 Pharma is mobilising substantial efforts to rise to the COVID-19 challenge at hand. However, we need to consider how pharmaceutical innovation for responding to emerging infectious diseases can best be enabled beyond the current crisis. Many public health threats (including those associated with other infectious diseases, bioterror-ism agents and antimicrobial resistance) are urgently in need of pharmaceutical innovation, even if their impacts are not as visible to society as COVID-19 is in the imme-diate term. The pharmaceutical industry has responded to previous public health emergencies associated with infec-tious disease in recent times – for example those associated with Ebola and Zika outbreaks.11 However, it has done so to a lesser scale than for COVID-19 and with contribu-tions from fewer companies. Similarly, levels of activity in response to the threat of antimicrobial resistance are still low.12 There are important policy questions as to whether – and how – industry could engage with such public health threats to an even greater extent under improved innova-tion conditions.

#### Bioterror is the largest medical threat—it o/w’s pandemics on probability

Bakerlee ‘21 Chris Bakerlee is a Ph.D. candidate studying evolutionary genetics at Harvard University and a fellow in the Council on Strategic Risks’s Fellowship for Ending Bioweapons Programs. "Mother Nature is not 'the ultimate bioterrorist' - STAT." STAT, 8 Jan. 2021, www.statnews.com/2021/01/08/mother-nature-is-not-the-ultimate-bioterrorist. [Quality Control]

Taken together, these examples show that this meme no longer serves us well. It is undoubtedly a mistake to underestimate the threats from natural pathogens. At the same time, it is equally unwise to wield this 19-year-old expression like a magic wand, intending to briskly banish concerns about people causing harm with biology. We can’t afford to blind ourselves or others to the uncomfortable truth that, with each passing day, humans grow more capable of outdoing nature and harnessing biotechnology to cause harm on a staggering scale, by either cruelty or carelessness. Nature has no interests, motives, or political goals. To the extent it can be said to “want” anything, it is to perpetually enhance populations’ differential reproductive success, which only rarely aligns with causing greater harm to humans. Notably, the trillions of bacteria living in the average human’s colon appear to have adapted toward a peaceful and often mutually beneficial coexistence with their host. And even deadly pathogens may theoretically evolve toward making humans less sick if doing so opens up more opportunities for transmission between hosts. The process of natural selection, for all its power, is highly constrained in its ability to generate “superbugs” possessing a diabolical suite of traits. Like human bioengineers, natural selection must work around stubborn physiological trade-offs between traits, such as genome replication rate and mutation rate. But natural selection is also handicapped by near-sightedness, driving improvements in traits that enhance a population’s fitness in its current environment with no attention to maintaining or improving traits that enhance fitness in other environments. If creating an especially deadly pathogen were like winning a soccer match against a formidable opponent, natural selection would be competing with all the cunning of an especially persistent horde of 5-year-olds, glued to the ball and only ever capable of playing offense, defense, or goalie at any one time. By contrast, modern biologists are gaining the ability to see the whole field, develop an intuition about where the ball will be next, and play multiple positions simultaneously. Through a combination of rational design, directed evolution, breeding, and brute force trial and error, they can increasingly engineer organisms that excel in multiple desired functions at once, such as the ability to grow quickly in a massive industrial fermenter while churning out commercially valuable biomolecules. This growing capability promises tremendous benefits for agriculture, industry, and human health, but its potential application to the creation of pathogens poses serious concerns. It is worth emphasizing that trained biologists — let alone terrorists — still have difficulty one-upping natural selection’s creative output. Our understanding of biology is very much in its infancy. Yet our knowledge and capabilities are maturing rapidly, as evidenced by Twist’s prolific gene synthesis capabilities, along with recent feats in predicting protein structure, gene editing, and genome assembly. We are much closer to this exciting but frightening horizon today than we were in 2001, and this trend will likely persist. It’s also worth noting that, when it comes to weapons-grade biotechnology, states likely pose a greater risk than non-state terrorists. States have vastly more resources to support the development of biological weapons, and about 23 are known or suspected to have maintained biological weapons programs in the 20th century. Some programs, like North Korea’s, likely persist to this day. As countries jockey for advantage, state biological weapons programs remain an ever-present danger, despite the treaties and export controls designed to rein them in. Covid-19, which has exposed countries’ vulnerability to biological threats, has done little to mitigate this danger. Accidental releases pose an additional source of anthropogenic biorisk. Thanks to the U.S. government’s monitoring program, we know that dozens of agents and toxins with the potential to pose a severe threat to public health and agriculture are reported accidentally lost or released from U.S. labs every year. We also know that accidental releases around the world have already caused significant harm. Such risks increase as biotechnology expands across the world and gains in strength. Biotechnology, with all its promise and peril, is moving fast. It’s irresponsible of us to shrug off current and emerging biotechnological threats by reciting “Nature is the ultimate bioterrorist” like some article of faith. As with global warming, the cost of willful ignorance and inaction is high — and increasing. Our health security requires that we engage cautiously but honestly with the full spectrum of evolving biological risks, striving toward solutions with open eyes and moral courage

# Case

## spark

#### Tropical islands survive nuclear winter scenarios

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

#### Post nuke war industrialization is impossible

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

#### Nuke winter solves warming

Sorin Adam Matei 12. Ph.D., Associate Dean of Research and Professor of Communication, College of Liberal Arts and Brian Lamb School of Communication, Purdue University. 3-26-2012. "A modest proposal for solving global warming: nuclear war – Sorin Adam Matei." Matei. <https://matei.org/ithink/2012/03/26/a-modest-proposal-for-solving-global-warming-nuclear-war/>

We finally have a solution for global warming. A discussion on the board [The Straight Dope](http://boards.straightdope.com/sdmb/showthread.php?t=646285) about the likely effect of a nuclear war brought up the hypothesis that a nuclear war on a large scale could produce a mini-nuclear winter. Why? Well, the dust and debris sent into the atmosphere by the conflagrations, plus the smoke produced by the fires started by the explosions would cover the sun for a period long enough to lower the temperature by as much as 40 degrees Celsius for a few months and by up to 2-6 degree Celsius for a few years. One on top of the other, according to this [Weather Wunderground contributor](http://www.wunderground.com/blog/JeffMasters/comment.html?entrynum=1208), who cites a[bona fide research paper on nuclear winter](http://www.atmos-chem-phys.org/7/2003/2007/acp-7-2003-2007.pdf), after everything would settle down we would be back to 1970s temperatures. Add to this the decline in industrial production and global oil consumption due to industrial denuding of most large nations and global warming simply goes away. I wonder what [Jonathan Swift would have thought about this proposal?](http://www.gutenberg.org/files/1080/1080-h/1080-h.htm)

#### Move to geoengineering now kills biodiversity – makes it impossible for species to adapt.

Stephen Fleischfresser 18. a lecturer at the University of Melbourne's Trinity College and holds a PhD in the History and Philosophy of Science. "Geoengineering could cause more harm than climate change," Cosmos Magazine, <https://cosmosmagazine.com/technology/neering-could-cause-more-harm-than-climate-change> //reem

New research published in Nature Ecology & Evolution has come to the counterintuitive conclusion that attempts to fight climate change using technological remedies may well inflict greater damage to global biodiversity than global warming itself. As anybody who has been watching recent American politics will know, political decision-making is often bewilderingly inconsistent, and this is true of all governments over a longer time scale. What seems like a good idea one day may become politically toxic the next, which means that the futures of all long-term projects are far from assured. They can be started or stopped rapidly or gradually, depending on political whim. This could seriously affect international, large-scale, long-term projects to manipulate the Earth's natural system to fight global warming, a process called "geoengineering". Geoengineering comes in two basic forms. The first attempts to remove human-made greenhouse gases, such as carbon dioxide, from the atmosphere and safely dispose of or store them out of harm's way. The second is "solar radiation management", which attempts to regulate the amount of the sun's energy reaching the surface. The most likely method of implementing this second form of geoengineering, called stratospheric aerosol injection (SAI), involves the release of aerosols, mixtures of fine particles or liquids, in the very upper atmosphere in an attempt to reflect some of the sun's rays and thus help cool the planet. A team of researchers led by Christopher Trisos of the National Socio-Environmental Synthesis Centre at the University of Maryland, US, has now modelled the effects of abrupt changes in potential long-term SAI geoengineering projects. The scientists imagine a scenario in which SAI projects continue to 2070 and then are quickly halted due, most likely, to mercurial politics. Using a geoengineering climate model simulation called the Geoengineering Model Intercomparison Project, or GeoMIP, they found that such a quick change would reduce global biodiversity more than global warming itself would. The reason for this is to do with the rate of climate change. "As climate changes, the appropriate conditions necessary for the persistence of a species move across the Earth, driving species' geographic range movements in response to climate change," write the authors. "Indeed, species that fail to track moving climates may go extinct, despite suitable climate conditions being present elsewhere." As long as climate change is gradual enough, then, species will have a chance to adapt. The measure of the rate at which species-appropriate conditions move across the planet is dubbed "climate velocity". The GeoMIP model has predicted that these velocities are much higher in anthropogenic SAI projects than those projected for global warming, which means that species have much less time to adapt and will face higher rates of extinction because of it. Interestingly, the team found that the effect of rapidly ending a long-term SAI project would be more calamitous than starting one, as climate velocities "at termination are most extreme in tropical oceans, the biodiversity-rich Amazon Basin, Africa, Eurasia and polar region". Thus, while technology may have landed us in this predicament, it may not be able to get us out of it with biodiversity intact.

#### Loss of biodiversity causes extinction.

Rajendra Madhavrao Shende 13. an alumnus of Indian Institute of Technology (IIT) and former Director in United Nations Environment Programme (UNEP), is currently serving as the Chairman of TERRE Policy Centre which is a not-for-profit organization engaged in the evidence-based policy development and project based advocacy on the sustainable development, “Importance of Biodiversity Why should we care?”; October, 2013; NEWSLETERRE, Volume 11, Issue 1 //reem

Biodiversity or biological diversity is the variety or richness of ecosystems, species composition therein, and their genetic diversity too. Professor Edward O. Wilson, Harvard visionary of biodiversity, observes that the current rate of biodiversity loss is perhaps the highest since the loss of dinosaurs about 65 million years ago during the Mesozoic era, when humans had not appeared. He regrets that if such indiscriminate annihilation of all biodiversity from the face of the earth happens for anthropogenic reasons, as has been seen now, it is sure to force humanity into an emotional shock and trauma of loneliness and helplessness on this planet. He believes that the current wave of biodiversity loss is sure to lead us into an age that may be appropriately called the “Eremozoic Era, the Age of Loneliness.” Loss of biodiversity is a much greater threat to human survival than even climate change. Both could act, synergistically too, to escalate human extinction faster. Biodiversity is so indispensable for human survival that the United Nations General Assembly has designated the decade 2011-2020 as the 'Biodiversity Decade' with the chief objective of enabling humans to live peaceably or harmoniously with nature and its biodiversity. We should be happy that during October 1-19, 2012, XI Conference of Parties (CoP-11), a global mega event on biodiversity, is taking place in Hyderabad, when PAGE 2 Beware the loss of biodiversity - Prof. Sanjeevan Raj delegates from 193 party countries are expected to meet. They will review the Convention on Biological Diversity (CBD), which was originally introduced at the Earth Summit or the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro in 1992. The Ministry of Environment and Forests (MoEF) is the nodal agency for CoP-11. Today, India is one of the 17 mega-diverse (richest biodiversity) countries. Biodiversity provides all basic needs for our healthy survival oxygen, food, medicines

, fibre, fuel, energy, fertilizers, fodder and waste-disposal, etc. Fast vanishing honeybees, dragonflies, bats, frogs, house e sparrows, filter (suspension)-feeder oysters and all keystone species are causing great economic loss as well as posing an imminent threat to human peace and survival. The three-fold biodiversity mission before us is to inventorise the existing biodiversity, conserve it, and, above all, equitably share the sustainable benefits out of it.