I

The Threat to States

There was a desert wind blowing that night. It was one of those hot dry Santa Anas that come down through the mountain passes and curl your hair and make your nerves jump and your skin itch. On nights like that every booze party ends in a fight. Meek little wives feel the edge of the carving knife and study their husbands' necks.

—Raymond Chandler, *Red Wind*[1]

The Bloomsbury intellectual, with his highbrow snigger, is as out of date as the cavalry colonel. A modern nation cannot afford either of them. Patriotism and intelligence will have to come together again. It is the fact that we are fighting a war, and a very peculiar kind of war, that may make this possible.

—George Orwell, *The Lion and the Unicorn*[2]

WHEN IT COMES TO assessing the risks of climate change, we really ought to look in a mirror, because the risk is us. Of course, major uncertainties remain in the science of climate change, above all concerning the timing and speed of particular effects; but by far the greatest uncertainty concerning predictions comes from the open question of how much humanity will do, or not do, over the next decades. What happens is up to us, and above all to the six major economies (counting the European Union [EU] as one economy) which between them account for almost two thirds of emissions and (given the growth of the

Indian economy and the huge scale of emissions from China) are likely to continue to do so for a considerable time.[3]

There is simply no more serious debate among expert scientists as to the cause and nature of anthropogenic climate change, though speed and extent are not certain.[4] That is why in this book I have not bothered to set out yet again the basic science. As with the approach of all sensible people to such issues, I accept the overwhelming scientific consensus unless or until I see a strong movement of genuine experts emerge to challenge it—and there is none.[5]

An Existential Danger

This authoritative scientific consensus states that if we remain on our present course, the global climate will warm by more than 3 degrees by the end of this century, possibly rising to more than 5 degrees if emissions continue to increase.[6] Even the commitments made under the 2016 Paris Agreement would probably only limit the rise in temperatures by 2100 to an extremely dangerous 3.2 degrees—and as of 2018–19 no major country was meeting its commitments, and annual CO_2 emissions were the highest ever.[7] Some experts like William Nordhaus have warned that even 5 degrees is an underestimate of the "worst case" scenario if emissions continue to rise.[8]

A rise of 3.2 degrees would not only bring disastrous results in itself but would also involve an extremely high risk of creating tipping points—like the melting of the Greenland icecap or the release of vast amounts of methane from the Arctic permafrost—that would lead to positive feedback loops and trigger runaway climate change.[9] If this occurs, it will eventually rise to levels that will create an "extinction event" like those of previous aeons, leading to the elimination of most species on earth including by far the greater part of humanity.[10] Once a tipping point has been passed, it cannot be reversed by any means that are now available to us or are likely to be available to us in the future.[11] If in consequence temperatures rise by 5 degrees over a period of decades, civilization will collapse. If they rise by 6 degrees, most of the planet will become uninhabitable by human beings.

Even if these apocalyptic consequences could be avoided, a rise of over 3 degrees would make certain the melting of the Greenland ice cap sheet, raising sea levels (over an uncertain period of time) by approximately 6 meters (20 feet) and drowning the world's coastal cities. It is highly probable that the Antarctic ice sheets would follow. The last time the world was 4 degrees hotter than now, sea levels were 260 feet higher.[12] For that matter, even a 2-degree rise would return global temperatures to the level of three million years ago—when sea levels were around 25 meters higher than they are now; and even at 2 degrees, weather patterns will be severely disrupted, increasing hunger across large parts of the world; heat waves in northern countries will rise to levels presently seen only in the tropics, while parts of the tropics may become uninhabitable; hurricanes will increase greatly in number and intensity; and the ice sheets will begin to disintegrate.[13] So even if a rise of 3 degrees does not trigger runaway climate change, the probable damage to the world economy has been estimated to be in the hundreds of trillions of dollars.[14]

No existing political system could survive economic decline on that scale. The difference between developed and developing states would be erased. This is why the Intergovernmental Panel on Climate Change (IPCC) now sets a rise of 1.5 degrees as the margin of safety—though according to the Mercator Research Institute (Berlin), the world already passed the point when that was realistically possible through reducing emissions in September 2018.[15]

Unless or until rising temperatures create a catastrophic tipping point like the melting of the Greenland ice cap, however, the effects of climate change on societies in the developed world will be incremental and will feed into other problems, strains, and conflicts including migration and economic dislocation. Disasters like hurricanes, droughts, epidemics and wildfires will multiply, but in the West, for a few decades at least, their direct effects will not be such as to endanger the survival of states.

But this does not mean that the effects of climate change will be of secondary importance. Precisely because states and societies are already facing a growing set of challenges, they cannot afford to suffer severe effects of climate change as well. This is the crucial thing about climate change in the medium term. It will feed into and exacerbate most other existing social, economic, health, and political problems—just as it will also feed into all other ecological problems, from mass extinction through deforestation to the acidification of the oceans.

The effects will be particularly bad in the developing world. Indeed, as I shall argue below, the Indian economy may well begin to decline by mid-century, with severe knock-on effects for the rest of the world. The chances that international aid will prevent such a decline are zero. This is the answer to those like Bjorn Lomborg who argue that we would be better off just leaving climate change to future generations because they will be richer than we are.[16]

I was struck in this regard by the latest book by Ian Bremmer, *Us vs. Them*, which paints a deeply worrying picture of the effects on Western societies of globalization, automation, immigration, and growing inequality. Nonetheless, at the end, he manages to extract at least some hopeful possibilities for the future. But Bremmer's book mentions climate change only once. Factor in the effects of climate change as well, and Bremmer's grim scenarios become even grimmer, and his hopeful ones a great deal less hopeful. The same is true of Paul Collier's impressive work on the future of capitalism, which mentions climate change only three times in 231 pages, or Dani Rodrik's equally penetrating work on democracy and the future of the world economy, which devotes only two pages to it in a discussion of "global commons."[17]

Rather than Robert Kaplan's vision of a "bifurcated world"—a secure and stable West threatened by "anarchy" elsewhere—what we are confronting is a global set of challenges to *all* existing states, albeit with different gravity and speed in different areas.[18] Of these threats, the single greatest one is climate change. These crises in turn will make it less possible to create political consensus behind action to limit climate change. Eventually, these effects will become so obvious and damaging that everyone will recognize the need for action; but by then social and political disintegration may have reached a point where no democratically agreed on consensus is possible, and states weaken to the point that they are incapable of effective action.

A recognition of the extent of danger to states leads to a recognition of climate change as a national security issue and of the need for states to take the lead. Individual actions, austerities, and sacrifices by environmentalists are morally valid and help in a small way to change public attitudes to climate change, but in the end states will have to take the lead, both in terms of actions and of shaping public consciousness.[19]

This is also the chief ground of my disagreement with Roger Scruton and certain other members of the conservative environmentalist camp, who prioritize the role of markets and limit the state to a role in research, and possibly taxation.[20] Scruton and I are at one in the importance that we attach to nations, and to what he calls *oikophilia*, or love of home. Oikophiles are essentially the Greek for what David Goodhart calls the "Somewheres." George Orwell could well be described as a progressive oikophile. I also share Scruton's debt to Edmund Burke, but with certain differences. Like Scruton, I do not think that Burke would have had much sympathy for the materialist frenzy that dominates contemporary society; but I believe that he would have recognized the need for this frenzy to be limited by state action for the common good. As he warned,

> Society cannot exist unless a controlling power upon will and appetite be placed somewhere, and the less of it there be within the more there must be without.[21]

Burke also made one great exception to his opposition to state involvement in the economy and preference for the local and the "little platoon": national defense; and indeed, in Burke's time the Royal Navy was the biggest industry in Britain. Today, US military spending is really a sort of (horribly inefficient) state technological-industrial plan that dare not speak its name in the presence of Republicans. Contemporary authors who have combined a desire for urgent action against climate change with reliance on capitalism have generally put state leadership and action at the heart of their vision.[22]

Of course, the local voluntary initiatives that Scruton praises—the little platoons of environmentalism—have a very important part to play as building blocks of environmental action and conservation, including energy conservation; but relying on them to limit climate change is a bit like arguing that Britain should have fought the Second World War by relying on the Home Guard.

Successful state action to limit carbon emissions requires not just determined state action but consistent action over a long period of time. This is something which for obvious reasons democracies find hard to achieve. The United States is the worst offender, with action

against climate change at the federal level being virtually halted by the Republican victories in the presidential elections of 2000 and 2016.

Europeans like to congratulate themselves on their greater commitment to action against climate change; but in fact, their record is only comparatively less miserable. In Britain, investment in alternative energy dropped by almost 70 percent in 2016–2017, to £10.3 billion (less than one third of the UK defense budget, at a time when no direct military threat to the UK or its neighbors exists or is likely to develop) as a result of the government's abandonment of subsidies and introduction of taxation for alternative energy. In France, mass protests in 2018 forced the Macron administration to abandon even the simple measure of an increase in the diesel tax.

Worst of all, the limited damage caused to the Fukushima nuclear plant by the 2011 Tohuku earthquake and tsunami led to the abandonment of nuclear power by Germany—a country that has never suffered an earthquake or tsunami. This ensured continued reliance on coal and brought to an end what had been impressive progress to meet Germany's target of reducing the 1990 level of carbon emissions by 40 percent by 2020—a figure that Germany has now missed by a wide margin. So Greens too suffer from a severe inability accurately to calculate relative risks.

Climate Change, National Security, and the Military

In modern history, one of the chief areas where an appropriate consensus has been maintained over time has been in relation to national security; and the extension of national security to include climate change is only a further extension of a process seen since the end of the Cold War, by which the concept of security has been expanded to take in a range of new areas.[23] In China, India and elsewhere, concerns about the security of energy imports are already an important motive for state-led shifts to renewable energy. This process of "securitization" has been described and analyzed by the "Copenhagen School" of international relations theory, led by Barry Buzan, Ole Waever, and Jaap de Wilde.

They describe a process whereby a "speech act" by a recognized and authoritative national leader, institution, or party designates a particular threat to a particular society as a security threat.[24] Examples are the

creation of the phrase "Cold War" in the late 1940s and the declaration of a "war on poverty" by President Lyndon Johnson. The creation of the phrase "climate emergency" is an attempt at such a speech act, but unfortunately by people who are not yet in a position to turn it into state action.

A speech act in the area of security requires the presentation of the danger concerned as an existential one and thereby removes it from the normal sphere of politics and policies. The threat is thereby placed in a special, exceptional category, backed by a national consensus and allowing the use of exceptional measures and the mobilization of national resources to meet it. That is why, as far as is realistically and constitutionally possible, the US military needs to throw its full weight behind the Green New Deal. In the words of a report by the Army War College "Army leadership must create a culture of environmental consciousness, stay ahead of societal demands for environmental stewardship and serve as a leader for the nation or it risks endangering the broad support it now enjoys. Cultural change is a senior leader responsibility."[25]

It is true that securitization has had negative effects in certain fields of policy: notably the way in which the United States turned the response to the terrorist attacks of 9/11/2001 into an all-engulfing "war on terror" and the even more inappropriate and damaging use of the word "war" in policies for crime and drugs. Liberal internationalists have condemned securitization out of their traditional hostility to national security and the nation state.[26] Many realists by contrast have argued essentially that real security threats remain those presented by states or by armed groups (most realists would now stretch a point to include terrorists) and that to extend the concept of security to other issues risks intellectual and policy confusion.

Nonetheless, in the case of climate change, securitization is appropriate and necessary: because this genuinely is an existential threat to all major states; because almost two generations after they began, efforts to tackle this issue through normal "politicization" and political mobilization (as advocated by most Green parties and movements) have failed; and because the mobilization of necessary resources and will does in fact have close analogies to the efforts required during war or at least acute armed competition.[27]

As Marc Levy has written,

> A threat to national security is an action or a sequence of events that (1) threatens drastically and over a relatively brief period of time to degrade the quality of life for the inhabitants of a state, or (2) threatens significantly to narrow the range of policy choices available to a state or to private, nongovernmental entities (persons, groups, corporations) within the state. . . . Taken all together, these effects [of climate change] would constitute a security risk if they threatened such a severe upheaval to the domestic economy that Americans would suffer greater hardship than we as a society consider tolerable.[28]

Climate change certainly threatens that. And after all, the point of any security policy, including a "classical" one, is the defense of an existing state and society and their institutions. Arguments over this are in the end nothing more than quibbling over words.[29]

It is striking in this regard that the two great developing countries that have been the most successful in developing renewable energy, China and India, both have strong and obvious security reasons for doing so. Both are heavily dependent on imported fossil fuels. Both therefore have reason to fear not just the effects on their economy of a surge in oil and gas prices due to instability in the Middle East, but also possible blockade of their maritime trade routes. This security motive does much to explain why India has done so much more to develop renewables than some much wealthier countries.[30]

As to the physical harm done by climate change to the lives of citizens (which is, or should be, at the core of legitimate definitions of national security, the direct effects of heat alone will kill far more people than all but the greatest wars – just as the pandemic of 2020 has done. Even before climate change really kicked in, the European heat wave of 2003 killed some 35,000 Europeans—more casualties than those of France in the Algerian war lasting eight years. The Russian heat wave of 2010 killed around 55,000 people—twice as many Russians as died during the 10-year-long Soviet intervention in Afghanistan.[31] The years 2018 and 2019 saw record-breaking heat waves in Europe, Australia, and Canada. Australia in 2019–20 experienced the most devastating forest fires in its history, with dozens of lives lost and thousands of homes destroyed. As such heat waves continue and

intensify, wealthy northern societies will have to introduce air conditioning on an enormous scale and at enormous expense. This will require considerably increased consumption of electricity, which—unless provided by renewables—will drive warming still further.

Moreover, through most of recorded history, security institutions have occupied themselves with a range of threats other than that of direct military attack by other states. These threats have included ideological threats to the ruling system and its political or religious ideology; and internal social disorder, whether political, ethnic, or criminal. Throughout the Cold War, the threat of the USSR and the West to each other was as much ideological, cultural, and economic as it was military, and the West eventually won not on the battlefield but on the field of ideology backed by economic success. Today, Western security elites are obsessed not with the threat of a direct military attack by Russia (whatever they may sometimes pretend in public for the sake of military budgets) but with the belief that Russia is subverting Western democratic processes in collusion with certain Western political forces.

As the next chapter will argue, if we continue on our present trajectory, then long before the direct physical effects of climate change become truly catastrophic, the indirect effects will combine with other social and economic strains to produce acute social and political disruption—almost certainly on a scale beyond the capacity of police forces to contain. Militaries will therefore be drawn inexorably into domestic crowd control and repression, which is a prospect that most soldiers view with absolute horror.

Even in Pakistan, where the military has so often taken power, the generals dread the prospect of using troops for this purpose in the regions from which the soldiers are themselves drawn—hence in part their long hesitation about confronting the Pakistani Taliban in the Pashtun areas of the country. If militaries are to avoid becoming turned into this hated role as armed police, they need to do everything they can to help prevent climate change and other developments that will make such a role inevitable.

It is vitally important to enlist national security establishments in the struggle against climate change for several reasons. Chief among them is the military's potential role as a bridge to those sections of the population that instinctively reject action against climate change on the basis of their political culture. Across most of the world, including

the Western democracies, the military is the single most important institution when it comes to mobilizing the forces of nationalism behind climate change action.

In recent decades, attitudes to the issue of climate change among Republican Party supporters have moved away from even a pretense of considering the evidence and toward rejection of the issue on instinctive grounds: a belief that such rejection is part of what supposedly distinguishes Republicans from supposedly metropolitan, atheistic, decadent, unpatriotic cultural liberals. Not "We are not *convinced* by the evidence of climate change" but "We aren't *the kind of people* who believe in climate change."[32] However, while the conservative sections of the US electorate deeply distrust "experts," they make an exception for the military in their role as experts on national security. Climate change activists have debated the merits of taking an optimistic or pessimistic line in campaigns to educate the public on climate change and what can be done about it, but in terms of effectiveness, this largely misses the point. Rather, "Communication that affirms the sense of self and basic worldviews held by the audience has been shown to create a greater openness to risk information."[33]

In the United States and India, where denial of climate change is rooted partly in religious superstition, the modernity of military thinking can play a helpful role. Modern military establishments are by their nature modern in a way that political establishments do not need to be. As a Pakistani Air Force officer once told me, "There will always be a limit on fundamentalism in my service because to run a modern air force, you have to accept modern science."

The Calculation of Risk

Another contribution of the military to thinking about climate change is their approach to the calculation of risk and the prioritization of risks. Climate change deniers like to call for absolute scientific certainty before they are prepared to take action—a guarantee that action will come far too late. People who accept the reality of anthropogenic climate change in principle but oppose radical action also cite a lack of certainty. Even most climate change models, and economic assessments

of the impact of climate change, omit the risk of catastrophic releases of methane from the Arctic permafrost and sea beds, because by their nature these releases cannot be quantified in advance.[34]

Yet this is generally recognized by experts as representing the greatest single possibility of triggering "runaway climate change" and further rises so high that civilization or even the existence of the human race itself would be threatened. The risk that the dying out of forests will contribute to climate change is also largely omitted from these models. The modeling of the economic consequences of climate change is even narrower, leading in some cases to absurd assumptions about modern civilization's capacity to survive increases in temperature to levels not seen for hundreds of millions of years.[35]

No soldier or military analyst thinks about threats in this way. The military operates on the basis not of certainties but of *risks*, the scale of risks and the balance between different risks, and there is a desperate need that they should extend this to the field of climate change:

> As abrupt changes and surprises do not lend themselves well to estimations of "most likely" probabilities (otherwise they would not be surprising), climate security assessments often therefore also focus more on what is possible than on what is probable. Military planning does take into account probable risks, but very often contingency planning is also made for events that are of unknown probability, yet entail severe consequences. . . . The emphasis is on responding to uncertainty, rather than on waiting for uncertainty to disappear.[36]

If the attitude to modeling of many economists and the attitude to risk of the climate change deniers were transposed to other areas of national security, then we would have to wait until there was a certainty that terrorists would acquire nuclear weapons before taking action to prevent them from doing so, or to wait till there was a certainty that Russia would invade the Baltic States before deploying forces to deter Moscow from doing so—by which time it would be much too late.

Awareness of the risks of climate change is now widespread in political and economic establishments. In 2019, the "Global Risks Report" of the World Economic Forum put environmental threats including climate change and extreme weather events (by now essentially the

same thing) in three of its top five risks for likelihood and four out of five for impact.[37]

The risks come in two categories. The first concern the effects of climate change that we can already observe and that we can expect with near certainty to worsen in the decades to come: heat waves, drought, floods, increased levels of disease. Here, the imperative for national security experts is to compare these certain or highly probable effects with the actual or probable damage done to state interests by rival states, and decide which is the threat to prioritize. The second category concerns future damage that is not certain but that would be so catastrophic—involving the destruction of the nations that militaries are sworn to defend—that even the possibility of them should be enough to mobilize militaries in response.

Militaries by their very nature have to plan for the possibility of worst-case scenarios. From my interaction with them over the years, I can attest that Western security establishments often lean too heavily in the direction of paranoia, especially as far as Russia is concerned. Thus the Swedish government's warnings to its population of a possible Russian invasion ignore the existence of a small intervening geographical feature called the Baltic Sea, quite apart from a small military one called the US Navy.[38] Equally, however, to ignore the Russian threat altogether and to disarm as a result would be criminally irresponsible.

Barring a full-scale nuclear exchange between the great powers, no security threat in the world today comes anywhere near to matching the threat posed by climate change to existing states; nor is the damage being done by most states to each other remotely comparable to the damage *already* being done by climate change. Does the Chinese occupation of barely habitable sandbanks in the South China Sea threaten to kill thousands of American civilians through heatstroke every year? Or Russian occupation of parts of a worthless coal-mining region in Eastern Ukraine threaten to kill millions of Americans by tropical diseases over the next century? Seriously?[39] Yet the United States and the other great powers spend enormous amounts of attention and treasure in confronting what by comparison with climate change are minor threats.

China's claims to the Spratly Islands are certainly a violation of international law and challenge the United States' aspirations for unilateral

hegemony in East Asia (which in any case Washington has never fully possessed). A glance at the map, however, should be enough to demonstrate that they are not a threat to international trade, on which China is even more dependent than the United States. Even a very much weaker US Navy, especially in alliance with India, would retain the ability to cut off China's maritime trade in response to any such Chinese move. And as noted, while the US military worries about the vulnerability of its own Pacific bases to rising sea levels, the Chinese should be far more worried.[40]

The central historical purpose of the militaries of the great powers has been to plan for a worst-case scenario—namely, a war between them—which has not happened since 1945. It is also in fact very unlikely to happen, given the balance of nuclear terror and other factors. At the same time, for militaries to ignore this risk in their planning would be insane, as long as the defense of their nations remains their core duty.

Planning for this worst-case scenario is of course also essential to deterring enemies and so making sure that such wars do not in fact occur. To defend these nations against the much greater and more real threat of climate change, it is necessary that states' understanding of risk be changed from that of their economists to that of their generals, and that the efforts that militaries currently expend to persuade elites and populations to pay much higher taxes for military defense be at least partially transferred to action against climate change.

The internal divisions in US society and politics concerning climate change are obviously serious barriers to the security establishment's playing a bigger role—as witnessed by the Trump administration's National Security Strategy of December 2017, which ignored climate change altogether.[41] However, the sheer scale of the threat to the security of the country means that the US military has an institutional and patriotic duty to instruct Americans concerning this threat, just as it has instructed them in the past on other threats falling within the military's sphere of competence.

Like other militaries, the US armed forces have frequently been involved in disaster relief operations at home and abroad. Unlike most other Western militaries, the US Army is also heavily invested in flood prevention and river management through the Corps of Engineers, which has always been the main US institution dealing with these areas.

As the effects of climate change increase, other militaries will have to imitate the US and Chinese examples and greatly increase their role in disaster prevention and relief, at the expense of other commitments.

The US Army Corps of Engineers will emerge in the future as the most important branch of the US armed forces; not a wholly new development, since historically an unusual proportion of American senior officers served for part of their careers in the Engineers (including Robert E. Lee, George Meade, George McLellan, and Douglas MacArthur). Since it was created in 1824, the Corps has been tasked with river management. In the course of the 20th century, and especially after the great Mississippi River floods of 1927 (causing damage which in today's terms would be well over one trillion dollars), it became responsible for the creation and maintenance of the world's largest system of levees and flood diversion canals. It is also responsible for controlling water pollution, restoring and protecting ecosystems including coastal wetlands, and maintaining the deepwater ports that handle more than two thirds of US imports—all of them tasks that are gravely endangered by climate change.[42] In the context of thinking about a Green New Deal, it is important to remember that the Corps was central to several of the original New Deal's key infrastructure projects, including the Tennessee Valley Authority.

In China, successful flood control and water management have been essential to the legitimacy of the state and have required conscription on a level equivalent to war. In the United States and other Western countries, the military has also been deployed whenever there has been a serious natural disaster; and in the future, governments and militaries will increasingly be judged above all by their competence in these areas.

In the States, this task also has an additional aspect: racial justice and the preservation of racial harmony. In the United States, floods have disproportionately affected the southern states; and the black population has both suffered disproportionately and been grossly discriminated against in the aftermath—something that remained true during the devastation of New Orleans by Hurricane Katrina in 2005. This has naturally contributed to the alienation of blacks from the US political system.

On the other hand, as Chapter 5 will argue, to make protection of minorities central to programs against climate change is a certain way

to make many whites vote for the Republicans and thereby make serious state action much more difficult. Since the 1950s, the US military has emerged as a genuine force for racial integration and harmony in the United States. In the future, this will also need to be part of its reaction to floods and other impacts of climate change—not by rhetoric but in its visibly impartial and effective actions on the ground.

National Security and the Dead Hand of Tradition

When it comes to anthropogenic climate change, as of 2019 some military establishments talk the talk, but none of them really walk the walk. Trapped by their inherited structures, attitudes, and interests, they have failed to examine the correct balance between the different threats facing their countries. These residual elites came into being as a product of one set of historical circumstances and in response to one set of challenges but are proving incapable of changing to meet new and different dangers.[43] The same is true, by the way, of the greater part of the economics profession.

All national security establishments were created to meet the classical security threats of external invasion and domestic rebellion. Western ones evolved during the Cold War to meet the combined military and ideological threat of Soviet communism. Very little in their experience and structures equips them to think seriously about a completely new threat like climate change—especially since its worse impacts will hit far beyond the timescale of the usual military scenarios. Sometimes they simply cannot even recognize the existence of these challenges, since to do so would be to risk admitting their own redundancy.

There are significant and honorable exceptions to this pattern, such as the American Security Project and the Center for Climate and Security, both of which have long lists of distinguished retired generals and admirals on their boards.[44] In March 2019, 37 retired US generals and admirals (including General Stanley McChrystal, former commander in chief in Afghanistan) joined other national security figures (including a few Republicans like Chuck Hagel) in signing a letter to President Trump protesting politically driven assessments of climate change by the National Security Council. They ended, "We spent our

careers pledged to protect the United States from all threats, including climate change."[45]

Unfortunately, such statements are invariably made by retired officers. Serving generals and admirals have been far more circumspect, even under Democratic administrations—while showing no such circumspection in talking up traditional security threats. The same has been true in the UK and Europe. In December 2018, the chief of the British armed forces, General Sir Nicholas Carter, included Russia, China, migration, and populist nationalism as "existential threats" to the United Kingdom—but he did not mention climate change. A simple Google search turns up statements by other serving and retired military chiefs including General Mark Carleton-Smith, Air Chief Marshal Peach, and Admiral Lord West warning of the Russian threat. A similar search finds no statements by these figures on climate change. Not surprisingly, therefore, the media in response highlights traditional security threats and not those of climate change.[46]

Even Western think tanks specializing in foreign and security policy, though they take climate change more seriously, generally place it in a separate box from security issues. They thereby ensure that most security experts will never read their reports. I have personally experienced again and again how experts on Pakistan who focus on short-term security threats to that country completely ignore the existential long-term threat posed by the combination of climate change, population growth, and the country's nightmarish water situation. Over the past generation, it has been entirely possible to conduct a prominent career in security studies and policy advice in the USA and Europe without mentioning climate change at all in your publications.

So it is not that national security establishments of the great powers have completely ignored the threat of climate change. All have publicly recognized its existence.[47] In the United States, the Pentagon dedicated part of its Quadrennial Review of 2010 to the subject and has continued mentioning it even as the Trump administration denied its existence. The US Defense Authorization Act for 2018–19 submitted to Congress by the Pentagon read in part,

> As global temperatures rise, droughts and famines can lead to more failed states, which are breeding grounds of extremist and terrorist organizations. . . . A three-foot rise in sea levels will threaten the operations of more than 128 United States military sites, and it is possible that many of these at-risk bases could be submerged in the coming years.[48]

The problem is one of balance, publicity, and influence. Compared to "classical" security threats (among which terrorism must now be included, since 9/11 provided the incontestable event that made earlier disregard for the topic's seriousness obsolete), the subject of climate change occupies only a small part of military statements and attention, or the influence that the military brings to bear on Congress, the media, and public opinion. Climate change had almost no presence in the Quadrennial Defense Review (QDR) of 2018, which declared instead that "the central challenge to U.S. prosperity and security is the re-emergence of long-term, strategic competition by what the National Security Strategy classifies as revisionist powers." In recent years, the vast majority of statements about risks to the country made by senior US military figures have been concerned in the first place with traditional great power threats, followed by terrorism.[49] As Chad Michael Briggs of the US Air Force University warns, "Use of the term 'climate change' in policy documents does not mean that associated risk assessments have been mainstreamed into [US] military planning."[50]

Or as the Rand Corporation stated concerning the North Atlantic Treaty Organization (NATO),

> In the case of nuclear weapons, terrorism, and cyber issues, each offers more uncertainty than climate change. However, vast amounts of resources are dedicated to the sponsoring of research, understanding the threat, and the preparations for potential consequences. The contrary is true for the potential security impact of climate change. . . . The lack of engagement at NATO headquarters on this point is more appropriate for the management of a tolerable or acceptable risk, while the literature suggests that climate change presents risks that likely won't be tolerable or acceptable.[51]

The 2008 National Security Strategy of the United Kingdom declared roundly that "climate change is potentially the greatest challenge to global stability and security, and therefore to national security."[52]

The previous year, British foreign secretary Margaret Beckett had declared that "achieving climate security must be at the core of foreign policy."[53] In the decade since then, however, British governments have not come close to the kinds of actions that they would have taken if they had truly assimilated the idea of climate change as a principal challenge to national security (though to their credit they have commissioned some of the most important research into climate change, including the Stern Report).

Instead, the security agenda and the attention and expenditure associated with it were frittered away on "traditional challenges": a war in Afghanistan which by 2008 was already effectively lost and in which Britain achieved nothing; hysteria over minor post-imperial squabbles over disputed territories in the former USSR that had never been of the slightest interest to Britain; and panics whenever a Russian warship sailed past Britain, assiduously stoked by British admirals desperate to preserve their shrinking budgets. The attention paid by the British media to these issues usually dwarfed that given to climate change. Even when it comes to the warming of the Arctic, Western security experts concentrate on the minor threat of increased Russian and Chinese presence there and not the existential threat of methane release and ice cap melting.[54]

The same has been true of the UK budget. In these years the UK spent £8 billion ($10.3 billion) on the war in Iraq, £21 billion ($27 billion) on the war in Afghanistan, £6 billion, or $7.2 billion (not counting planes) on the new British aircraft carriers, and planned to allocate £31 billion ($40 billion) for Britain's new nuclear deterrent. By contrast, in 2016–17 spending on alternative energy dropped by almost two thirds to around £7.5 billion ($9.7 billion).[55] In November 2020, even as the pandemic raged, the British government announced that it was increasing military spending by $21 billion over the next four years, to the highest level since the end of the cold war. This represents a completely false set of priorities concerning the vital interests of the United Kingdom.

If the scientific predictions concerning climate change and its impact are correct, then a hundred years from now, most of the preoccupations of today's security and economic establishments are going to seem not just irresponsible but senseless. As noted in the preface, the military bases that China is building on reefs and sandbanks in the South China Sea are a particularly striking case in point. Immense Chinese efforts are going into the creation of these bases and their accompanying claims to

sovereignty over the sea, and these actions have raised regional tensions and cost China badly in diplomatic terms.

Meanwhile, the United States has deployed considerable military forces to the region in response to these moves and is running considerable risks—even potentially of war—in resisting China's claims. Yet if they had truly assimilated this recognition into their strategy as a whole, they ought to be encouraging China to pour concrete, sand, and money into bases that will either be under water 100 years from now, or will at the very least be repeatedly rendered militarily useless and have to be rebuilt often after typhoons. And of course, the Chinese state, which on balance takes climate change much more seriously as a threat than does the United States, can be blamed even more for this dangerous and pointless effort.

Robert James Woolsey, former head of the Central Intelligence Agency (CIA) between 1993 and 1995 is one of the few leading members of the US security establishment to have talked about climate change as a major security threat not just to the United States itself but to American leadership in the world. As he has written,

> In a world that sees two metre sea level rise, with continued flooding ahead, it will take extraordinary effort for the United States, or indeed any country, to look beyond its own salvation. All of the ways in which countries have dealt with natural disasters in the past . . . could come together in one conflagration: rage at government's inability to deal with the abrupt and unpredictable crises; religious fervour, perhaps even a rise in millennial end-of-days cults; hostility and violence towards migrants and minority groups, at a time of demographic change and increased global migration; and intra- and interstate conflict over resources, especially food and fresh water.[56]

Yet in the twelve years since he wrote this, rather than continuing to drum home this message at every public opportunity, he has instead reverted to previous preoccupations and dwelt obsessively on the supposed threats to the United States from China and Russia.

Mr. Woolsey and other US establishment advocates of a new Cold War with Russia and China constantly use old Cold War language of an ideological struggle between Western democracy and authoritarianism

to support their positions; but the issue of climate change significantly blurs the moral distinction between democratic and authoritarian systems—or at least, that is likely to be the view of future historians. Relative to their per capita incomes, authoritarian China can be classed with liberal democracies like Denmark when it comes to current determined action to reduce carbon emissions.[57]

Among the democracies, not just the United States but Canada too can be classed with semi-authoritarian Russia as the greatest offenders against climate change action—not on ideological grounds but simply out of a desire for economic gain from the exploitation of fossil fuels. Worst of all (in terms of the relationship between per capita income, per capita contribution to CO_2 emissions, unused opportunities for alternative energy, and already obvious severe damage) has been democratic Australia. In February 2019, its Liberal-National government called emergency talks to discuss a combination of devastating floods, heat waves, drought, and forest fires—while still not discussing climate change because of a refusal to move away from dependence on coal and coal exports—and was re-elected in May 2019![58] The Australian right is also obsessed with the threat of Asian migration, which climate change can only drastically worsen.

In opposing implementation of the 2016 Paris Agreement, the US Trump administration, Russia, Canada, and Australia were on one side, and China and the European Union on the other—which means that the most important issue facing humanity cuts clear across the supposed "new Cold War" alignments. Truly, one can echo the words of the great theologian and Christian Realist thinker Reinhold Niebuhr: "There is only one empirically provable element in Christian theology, namely, that 'All have sinned and fallen short of the glory of God.' "[59]

The Impact of Climate Change on the Global North

If the catastrophic scenarios of a 5 or 6 percent rise in temperatures come to pass, then all existing states will be overwhelmed and by far the greater part of the human race will be doomed. When it comes to the scenario of a rise in the 2- to 3- degree range, however, the direct effects on the major states will differ very considerably.[60] For most of the developed states of the world, the direct physical consequences of a rise

in temperatures of up to 3 degrees over the next century are likely to be exceptionally unpleasant by the Western standards of the past 70 years but just about manageable in purely physical terms. Thus the HSBC report of 2018 on vulnerability to climate change puts Russia in 66th place, the United States at 39th, and European countries stretching from the 30s to the 60s.[61]

The greater risk to them will be indirect, above all from increased migration as the century progresses (see Chapter 2). Among the neighbors of the United States, Mexico stands eighth in the world on HSBC's vulnerability index, and Colombia seventh.[62] Almost half the population of Central America lives below the poverty line, water shortages already affect large areas, and hurricanes have demonstrated a capacity to knock back economic development by years or even decades.[63] Moreover, as we have seen repeatedly over the past two centuries, the malign racial, socioeconomic, and political legacies of Spanish colonial rule combine to make the region exceptionally violent, oppressive, and politically unstable.

Over the past generation, US administrations replaced the military interventions of the past with indifference toward their southern neighbors, inadequately veiled by the false promise that the North America Free Trade Agreement (NAFTA) would transform the region economically. The failure of NAFTA to do so has led to the continued flow of illegal migration to the United States, which has done so much to infuriate sections of the white population and to elect Donald Trump.[64]

US military officers, security analysts, and sympathetic journalists worry incessantly whether the failure to intervene militarily in Syria or "stay the course" in Afghanistan will damage US "credibility." Nothing has so damaged US credibility in the world as the decay of its domestic political system. The poverty and despair of America's southern neighbors contribute greatly to that decay; and climate change will contribute enormously to their suffering.[65] As Elizabeth Warren has proposed, one important part of a Green New Deal in the United States should therefore be increased aid to develop Central America and strengthen its resilience in the face of climate change—something that can be justified to recalcitrant voters and their representatives by the need to limit migration.

The direct damage to the West will also be bad enough. Deaths as a result of heat waves will soar, possibly reaching the tens of thousands annually and vastly outpacing the casualties of the largest ones in the past. Incidents like the Chicago heat wave of 1995, which killed 739 people in five days, will become a regular occurrence. Tropical diseases will spread northward (tick-borne Lyme disease has spread enormously in the United States over the past 20 years, apparently as a result of rising temperatures).[66]

In the USA, a disproportionate number of the greatest cities, including New York, Los Angeles, Miami, and Seattle, are in low-lying coastal areas in acute danger from a rise in sea levels and from worsening storms.[67] It is important to remember that long before places disappear permanently under water, repeated flooding will make them uninhabitable. Thus, it is estimated that by 2045, some 300,000 US homes with a total current value of around $117 billion will be uninhabitable due to flooding, while by the end of the century homes and businesses currently worth more than $1 trillion (not including infrastructure) are likely to be at risk.[68]

The great breadbasket of the Midwest is highly susceptible to drought and consequent increased soil erosion;[69] large areas of the country are vulnerable to the kinds of wildfires that hit California for three years running; and the naturally arid or semi-arid Southwest (including the huge population center of Southern California) is heavily dependent on water supplies from endangered snowmelt in the Rocky Mountains.

Given the radical decline in the great underground aquifers of the western United States, states and communities are going to have to make some politically and socially wrenching choices between the needs of cities and the needs of agriculture. Los Angeles, San Diego, and the Bay Area in California will have to raise vast sums to pay for the desalination of seawater. Increasingly severe limits on consumption will have to be put in place, putting an end to the lawn, swimming pool, and golf club culture that has attracted so many middle-class people to the region in the first place—even as these are also scorched by increasingly murderous heat waves. In fact, we are likely to see a reversal of the migration of the past decades to the Southwest from the rust belt of the Midwest, bringing an end after only a few decades to the huge urban developments in the region. One US study by Dr. Jesse Keenan of the Harvard School of Design has suggested that Duluth, Minnesota, will be the ideal US destination city in the future—not a thought that would have occurred to anyone 20 years ago.[70]

In Europe, the most dramatic direct effects of 2 to 3 degrees of global warming will be seen in the Mediterranean, where the summer is predicted to last for an additional month, heat waves (with temperatures over 35 degrees) to be extended by more than a month, and rainfall to decrease by up to 20 percent. The result will be severe damage to existing agriculture, the radical transformation of ecosystems toward semi-arid conditions of the type now common in countries such as Pakistan and Australia, a steep decline in tourism, and greatly increased wildfires. Runaway climate change would lead to the complete desertification of the region.

The start of these effects is already here, as demonstrated by the repeated heat waves of recent years and the unprecedented forest fires of 2018 in Greece and Portugal and of 2019 in Siberia. Even with 2 to 3 degrees of warming, they are bound to get much worse. Moreover, these countries of southern Europe are also those that will be asked to accommodate the largest number of migrants from the even worse-affected countries on the southern shores of the Mediterranean. Does Russia's limited intervention in Ukraine threaten to turn Italy and Spain into an extension of the Sahel? Seriously?

Northern Europe will be less affected but will find that the "extreme" summer temperatures of 2015–18 are now the norm, with periodic heat waves vastly in excess of that, leading to more mass casualties like those experienced by France during the heat wave of 2003 and more wildfires like those affecting Sweden in 2018. Coastal areas in northern Europe will experience increased flooding. Cherished landscapes will be radically altered as vegetation dies or migrates northward and is replaced by new plants from farther south. Tropical diseases like dengue fever and malaria will spread to northern Europe.

In Russia (the fourth largest emitter of carbon gases), 2020 saw recognition by President Putin and other senior officials of the threat of anthropogenic climate change, in part because of a series of record-breaking temperatures in Siberia, contributing to massive forest fires. However, despite belated signature of the Paris Agreement in 2019, action continued to lag very badly. Because Russia treats

1990 as its baseline for emissions, when the Soviet industrial economy and its emissions were far larger, it has been able to get away with plans that would actually see an *increase* from present emissions up to the year 2050. Russian coal production increased by 30 percent from 2010 to 2020. The basic reason for this Russian state behavior, as elsewhere, lies in the prioritization of economic development and calculations of basic national advantage and disadvantage: the cost and difficulty of the shift to alternative energy coupled (as in Australia and Canada) with the colossal benefits to the Russian economy of the production, exploitation, and export of fossil fuels. These priorities are shared by much of the population as well as the elites. In an opinion survey of 2019, 59 percent of respondents continued to deny that climate change is a threat.[71] The government is deeply afraid of popular unrest resulting from lower growth, and is therefore highly resistant to anything that would further reduce growth.[72]

The difference in the case of Russia (as in Canada) is the widespread belief that climate change will on balance actually *benefit* the country. At bottom, this is due to the very human reason that in a country with Russia's traditional climate, people do not instinctively see greater warmth as a bad thing. However, they may also be right in purely physical and economic terms, as long as the rise in temperatures does not exceed 3 to 4 degrees Celsius.[73]

Like Canada, but very unlike Australia, Russia's northerly position and mostly distant and unpopulated coastal areas mean that in the short to medium term the negative effects of climate change will be limited. Of Russia's major cities, only St. Petersburg and Vladivostok are seriously menaced by rising sea levels in the medium term. Natural disasters like heat waves, forest fires, droughts, and storms, together with the spread of tropical diseases, will—or so it is believed—be accepted and absorbed by the famous toughness and resilience of the Russian people.

In addition, and most important, Russia's large agricultural production and small population relative to territory (factors it shares with Canada) means that it has a cushion against agricultural crises that is largely lacking in the EU, China, and Japan, and wholly lacking in South Asia. There is also a widespread assumption—both popular and official—that any negative effects on agriculture will be more than balanced by the warming of northern areas. Climate change has already brought about the opening of the Arctic seaway to commercial traffic, and Russians hope that it will allow the massive future extraction of gas and oil reserves from beneath the Arctic Ocean.[74]

Meanwhile, the drastic deterioration of relations with the United States and the European Union since the Ukraine crisis of 2014 have made the Russian elites even less willing to listen to lectures from the West on international responsibility. In these circumstances, the only way to appeal to the Russian establishment and population to take action against climate change is by an appeal to their nationalism and to the long-term national interests of Russia.

The threat of limited climate change in this regard stems from increased international disorder and international migration. As a great Eurasian state, Russia will be just as threatened as the EU and India by the collapse of other Asian states. Russia has run considerable risks and deployed considerable military power to save the Syrian state from collapse, fearing—quite rightly—the spread of Islamist extremism and terrorism that would result from a lawless state. Even limited climate change, however, is likely to encourage a long sequence of new Syrian civil wars to Russia's south. And of course, if global warming accelerates toward 5 or 6 degrees Celsius, then Russia itself will face the same existential threats as every state around the world.

China's Historical Experience

China is much more endangered than Russia because of the far greater size of its population, the concentration of that population along endangered seacoasts, the more precarious state of its agriculture and water supplies, the threat of drought, and the long-term threat to its great rivers from the melting of the Himalayan glaciers. The extraction of too much water from China's great rivers, coupled with the rise in sea levels, risks salt water creeping farther and farther inland, gradually crippling some of China's most fertile agricultural areas. The building of giant hydroelectric projects helps limit carbon emissions but does still further damage to water supplies downstream.[75]

Chinese water use for agriculture is efficient only compared to South Asia and Africa, its industry even less so. Water abundance in the south and scarcity in the north may create regional tensions between different regional factions of the Communist Party. In 2005, China's minister of water resources reportedly declared, "Fight for every drop of water or die. That is the challenge facing China."[76]

As climate change worsens, increases in wheat production in northern China as a result of increased temperatures risk being canceled out by drought, in a country where water shortages are already becoming a serious problem. In the south, rising temperatures threaten to reduce China's staple crop of rice. Should the Himalayan snowpack significantly diminish, China will face a critical agricultural crisis. Not only will its own exports cease, but it is probable that the enormous financial reserves of the Chinese state will allow it to suck in food from much of the developing world, increasing prices around the world and contributing to global shortages and unrest elsewhere.

The Chinese drought of 2010 led China to buy huge amounts of wheat on world markets. Coupled with droughts in Syria, Russia, Ukraine, and Argentina and torrential rains in Canada's wheat belt, this drove up bread prices and thereby contributed to the discontent of Middle Eastern populations that led to the "Arab Spring" the following year. This in turn has had vast and ongoing consequences for regional and global security, for the growth of Islamist militancy, and for US relations with Iran, Turkey, and Russia.[77]

In China in recent decades, poverty in the agricultural provinces of the interior has been greatly ameliorated by migration to the booming cities of the east and southeast coast. As sea levels rise and storms intensify, these areas will, however, themselves be increasingly menaced by flooding. China risks being caught in a giant demographic pincer, whereby tens of millions of people fleeing the drying interior run up against tens of millions of others fleeing the flooded coast.

A severe shortage of water for drinking, cooking, and bathing (like electricity cuts in South Asia in summer) radically diminishes the quality of life, irrespective of how many designer handbags or iPads people have been able to buy. I vividly remember as a journalist in Afghanistan the miseries of a lack of water: the lines of women trudging

for miles in 40-degree heat with buckets of water precariously balanced on their shoulders and heads; the need to ration every cupful of water when on the march with the guerrillas, and the torments of thirst when the last cupful was gone. In both India and China, a radical increase in such shortages will negate the social benefits of economic growth and threaten political stability—even before they bring economic growth itself to an end.[78]

If the current rulers of China have taken climate change far more seriously as a threat than have their American or Russian equivalents (or the Europeans, for that matter, proportionate to incomes per capita), it is above all because of historical experience. Past natural disasters in China have been on a vastly larger scale than those in the United States, Russia, or western Europe and have had a far greater capacity to undermine the legitimacy of the state. The costliest ever natural disaster in US history in terms of lives lost was the hurricane of 1900 that overwhelmed Galveston, Texas, killing between 6,000 and 12,000 people. The most damaging European floods in modern history, those of 1953, killed 2,142 people in four countries.

The 1931 floods in China killed up to four *million* people (mostly indirectly, through malnutrition and disease) and displaced 14 million; and they were only one of six Chinese floods in the 20th century that killed more than 100,000 people.[79] There has never been a famine in US history, and those in Europe and Russia over the past century have been caused by war and state action. In the course of the 20th century, half a dozen Chinese famines due to natural causes resulted in an estimated 35 million dead. So the Chinese know what they have to fear.

According to one of the most ancient Chinese legends (but with clear origins in fact), following the Great Flood of Gun Yu, the greatest achievement of Emperor Yu the Great (ca. 2123–2025 BCE) was to create systems of dikes and canals to control the rivers and irrigate the surrounding lands. For 4,000 years since then, floods, droughts, and famines have been taken as a sign that the ruling dynasty had lost the "Mandate of Heaven"—in other words, its political legitimacy. And insofar as a failure by the state to mobilize enough people to repair the dikes and irrigation canals helped gravely worsen the effects of natural disasters, there was indeed a relationship to state weakness and incompetence.

Famines in turn led to outbreaks of peasant rebellion and the appearance of bandit armies, thereby undermining the state still further.[80] The Chinese famine of the late 870s CE led to a rebellion that helped destroy the T'ang Dynasty. The famine of 1630–31 is supposed to have done the same for the Ming; and the successive famines of the later 19th and early 20th centuries helped to fatally weaken the Manchus, as did the great flood of 1855 when the Yellow River changed its course by hundreds of miles, with dreadful human consequences.[81] This is a pattern that climate change threatens to replicate across much of the world.

Due to this historical awareness, the case of China illustrates how nationalism, state interest, and elite interest can provide the basis for a determined effort to combat climate change. The greater Chinese state efforts in this regard are certainly not due to altruism directed at humanity in general. The rulers of China do, however, have an exceptionally strong sense of having inherited an ancient state, which they are determined to pass on to their descendants; and it helps when trying to look 200 years into the future if you can look 4,000 years into the past.[82]

But while China is taking strong action against climate change proportionate to its wealth per capita, the sheer size and growth of its economy have meant that emissions have continued to rise regardless, albeit more slowly.[83] China has only promised to start reducing its total emissions as of 2030. Whether it can do so rapidly enough after that depends in part on alternative energy, into which it is pouring money at a far higher rate than the United States, especially given China's very heavy dependence on coal for electricity generation. China is the world's largest consumer of coal by far, and its continued increase (4.5 percent in 2018) contributes greatly to China's failure to meet its commitments under the Paris Agreement.[84] Coal burning accounts for more than 70 percent of China's CO_2 emissions and in 2020 China continued to open new coal-fired power stations. Whether the Chinese can really reduce its emissions quickly enough on the basis of present policies seems highly questionable.

The greatest contribution to date that the Chinese state has made to reducing climate change emissions and environmental impact was its "One Child" policy, the ruthless limits on births imposed between 1979 and 2015, which the government estimates led to a population that was around 300 million (22 percent) lower than it would otherwise have been. Another truly radical development that the Chinese are already engaged in is the plan to make 50 percent of vehicles electric by 2025, and 100 percent by the 2030s, through a mixture of subsidies and sanctions. If they manage this (and there are enormous obstacles in the way), it would be a very important contribution to limiting carbon gas emissions and also a very convincing testimony to the ruthless efficiency of the Chinese system.[85] If, however, they fail radically to reduce their emissions by mid-century, then after India, they will be the worst sufferers among the major powers, to a degree that may bring down the Chinese state in the second half of this century, long before the direct global physical effects of climate change become truly apocalyptic.[86]

India and South Asia

The vast majority of reporting and analysis of security issues in South Asia and the Persian Gulf in recent years has related to traditional security threats: the war in Afghanistan, the threat of terrorism, the Kashmir dispute between India and Pakistan and the danger of nuclear war between them, US and Israeli threats to Iran, the geopolitical and religious rivalry between Saudi Arabia and Iran, the Saudi-led boycott of Qatar, and so on. Indian and Pakistani public opinion and the media have also focused overwhelmingly on security issues in South Asia, including the tensions between them over Kashmir and terrorism, rather than on climate change.[87]

Almost unnoticed by security institutions—including those in the South Asian countries themselves—have been two reports on the dangers of climate change by scientists of the Massachusetts Institute of Technology (MIT). These reports present evidence that across large areas of South Asia and the Gulf, by the last quarter of this century, climate change leading to extreme heat waves is likely to make it impossible for human beings to work in the open for much of the year. Barring enormous and enormously costly adaptation, agriculture across much of the region will also be severely damaged.[88]

A 2018 report by HSBC puts India first among large countries vulnerable to climate change, followed by Pakistan in second place and Bangladesh in fourth place. Pakistan also scored third from the bottom when it came to potential to respond to climate risks (Bangladesh was eighth from the bottom and India 10th).[89] In South Asia, the truly

disastrous consequences of climate change will therefore begin to kick in at much lower levels of global warming than in most of the rest of the world.

The threat to human life from heat waves in South Asia comes from a combination of extreme heat with humidity, measured by a reading called the "wet bulb temperature," which measures the ability of moisture (including sweat) to evaporate. Humidity, which blocks this evaporation, means that even a relatively small rise in South Asian temperatures will be fatal. Thus a wet bulb temperature of only 35 degrees Celsius means death after a few hours because the human body cannot cool itself enough to survive.

According to the MIT study, if present trends continue, the proportion of the population exposed to wet bulb temperatures of 32 degrees Celsius—very close to the survivability threshold and extremely hazardous to health—will increase from 2 percent of the South Asian population at present to 70 percent. At these temperatures, sustained work outdoors will be impossible.

At sustained temperatures of over 40 degrees Celsius, rice cultivation becomes impossible. At present, these temperatures last only a few weeks. With climate change, they could last for months on end, wiping out the staple crop of much of the region. A foretaste was given by the collapse of the Sri Lankan rice harvest in 2017 due to drought.[90] The IPCC report of 2018 estimated that a further rise in temperatures of only 0.5 degree Celsius would reduce India's grain harvest per hectare by more than one sixth.[91]

So while the other great powers may be able to survive global warming if it remains within the 2- to 4-degree range, this is not true of India. Even at 1.5 degrees, the effects of climate change will be enough to endanger the stability of the countries of South Asia, which is home to almost a quarter of humanity, and also a quarter of the world's malnourished.[92]

The World Bank predicts that if we continue emissions at the rate of recent years, by 2050, in South Asia alone some 800 million people (around 35 percent of the probable population at that date) will see their living standards decline sharply as a result of climate change.[93] Think about this a bit. In 2050, Indian teenagers alive today will only be middle aged. It is not a distant prospect affecting generations yet to be born. At present, Indian governments worry deeply about whether Indian growth will be high enough to provide enough jobs for the millions of new people entering the job market each year, and the social and political consequences if it is not. Think what de-growth would mean. Admittedly, de-growth would bring down Indian carbon gas emissions—but at what a human cost!

This prediction makes nonsense of the argument that India needs to go on expanding its fossil fuel consumption in order to power economic growth. If we continue on the present path, Indians alive today will see economic growth go into reverse, with incalculable social and political consequences. The dream of "India Shining" would be over. The Indian elites have invested immense emotional commitment in the hope of India becoming a superpower on a par with the United States and China. On present climate trajectories, many of them will live to see that hope irretrievably collapse. If in addition the resulting suffering is very unequally distributed among Indian states and leads to mass migration within South Asia, it is hard to see how Indian democracy and the Indian Union itself will be able to survive.

According to an Indian government report, by 2030 India will have only half the water it needs to sustain existing levels of consumption, let alone higher ones due to economic growth. India's water consumption is predicted to be 1.2 billion cubic meters by 2030, 50 percent higher than the figure for 2012. That would be an extremely difficult level to sustain even without the effects of climate change.[94] In both India and Pakistan, water shortages are causing friction between upriver and downriver provinces. Should the water crisis become truly disastrous, these tensions have the capacity to spur both separatist movements wanting to secure water supplies and violent state reactions against them.

Moreover, even if economic development allows India to deal adequately with the direct effects of climate change, the country is likely to be overwhelmed by the collapse of the even more endangered neighboring states of Pakistan and Bangladesh.

Even a 2-meter rise in sea level by the end of this century has been estimated to displace up to 200 million people—and 2 meters is beginning to look like a conservative estimate. As Chapter 2 will argue, the resulting waves of migration from South Asia and other regions will in

turn be the most dangerous indirect effect of 3 degrees or so of climate change on Russia and the West. In the succinct words of the headman of a south Indian village, "There is no water. Why should people stay here?"[95]

Many parts of South Asia are already experiencing severe water stress, and since 2000, drought in north India and Pakistan has largely wiped out the expected further gains from agricultural development. Drought, coupled with the commercialization of agriculture, is causing despair among India's smaller farmers (leading to a surge in rural suicides over the past two decades) and is fueling support for the Naxalite communist rebellion in central India.[96]

Even below 2 degrees of warming, climate change significantly increase the variability of the monsoon, leading to an increase in both floods and droughts.[97] A 2018 report by the official NITI Aayog institute in India stated that 600 million people (almost half the population) already suffer high to extreme water stress.[98]

As in Pakistan, these water shortages are not necessarily absolute. A very large element in the growing crisis is created by wastage and poor infrastructure. Indian farmers use twice as much water per ton of wheat as their equivalents in China and the United States, and Pakistani rates are even worse. Since irrigation for agriculture accounts for around 80 percent of Indian water use, the damage is colossal.[99] The problem could be greatly ameliorated by water-saving approaches (especially the use of micro-irrigation in agriculture), better repair and maintenance of canals and water supply systems, and better rainwater harvesting.

The performance of Indian states differs considerably in this regard, but unfortunately, almost half of Indian states fail to reach 50 percent of the possible score when it comes to water management, and more than half of the population lives in the worst performing states. As of 2018, only about 10 percent of India's irrigated land was watered with drip or sprinkler methods, compared to around 70 percent of China's. It has been estimated that in India's cities, 40 percent or more of piped water is lost through leaks. Figures for Pakistan are comparable or even worse.

So far, the radical drop in the water table in many areas as a result of over-use of tube wells has had very little effect in this regard (something which is also true in the southwestern United States). Across India, 21 major cities are expected to run out of groundwater altogether within

the next few years. These include Bangalore, the heart of India's IT industry and a supposed showcase of Indian modernization.[100]

In Israel, the country that leads the world in water conservation, the most important contribution to this has been water pricing to push the population not to waste water. According to former Israeli water commissioner Shimon Tal, "For the few years before the price mechanism was used, we were in the middle of a terrible regional drought. . . . Then we used price as an incentive. Almost overnight, consumers found ways to save nearly *double* the amount of water they had saved because of our years-long education campaign. It turned out that price was the most effective incentive of all."[101]

Across the wider region, however, I have been told that the introduction of water pricing for agriculture is simply politically impossible—even as in cities, the breakdown of state water supplies has reduced many of the poor to buying their water from tankers or simply stealing water by breaking into the pipe system. The much stronger and more authoritarian Chinese state has also shied away from water pricing or taxation. For such painful measures to be introduced without increasing hostility to the state requires a strong sense in the population (not just the ruling elites) of common national danger and collective national will.[102]

Much of the literature on climate change and conflict has focused on the possibility of interstate wars over rivers, including between India, Pakistan, and China as increased water shortages and the melting of glaciers lead to worsening disputes over the sharing of the Indus and Brahmaputra Rivers. Though by no means absent, this threat may have been somewhat exaggerated. Precisely because these rivers are so vital, serious interference with them would be regarded as an existential threat. Pakistan has stated that serious Indian reductions in the flow of the Indus would be regarded as the equivalent of war; and presumably China, as Pakistan's ally, would respond in kind by reducing the flow of the Brahmaputra River to eastern India.

However, if water shortages become so severe that the choice for upstream states is water diversion or state collapse, then all bets would be off. It seems likely, though, that by the time this point is reached, a combination of internal stress and mass migration would already have brought the states concerned down in ruins.

Three out of India's four largest cities lie on the sea or estuaries, including Mumbai, the largest. This is also true for Karachi, Pakistan's largest city, and for Dhaka, the capital of Bangladesh. Even with greatly enhanced flood defenses, a sea-level rise of 1.5 meters (now widely predicted even if the rise in temperatures is kept to 2 degrees) would threaten as much as 40 percent of Mumbai and the homes of around 12 million people.[103] And this is on the assumption that climate change can be kept within these limits. Should a significant part of the Arctic and Antarctic ice sheets melt, Mumbai and the other coastal cities of South Asia will simply disappear.

In Bangladesh, it has been estimated that a rise in sea levels of 1 meter would render 17.5 percent of the country uninhabitable, while a rise of 10 meters would essentially destroy the country. By the end of the century, Bangladesh is predicted to have a population of 250 million at the absolute minimum (from 160 million at present). This means that even with a 1-meter rise, tens of millions of people will have to move. In addition, a rise of 1 meter in sea levels would almost entirely submerge the Sundarban mangrove swamps and coastal islands that provide a limited barrier against cyclones blowing in from the Bay of Bengal. The result will be greatly intensified storm surges, inflicting still greater damage on the country and displacing still more people.[104]

In 2010, the US director of national intelligence Admiral Dennis Blair reported to Congress that "for India, our research indicates that the practical effects of climate change will be manageable by New Delhi through 2030. Beyond 2030, India's ability to cope will be reduced by declining agricultural productivity, decreasing water supplies, and increasing pressure from cross-border migration into the country."[105]

The year Director Blair predicted, 2030, is now only nine years away. To repeat: short of nuclear war, nothing that the great powers can do to each other remotely compares to what climate change threatens to do to us all even in the medium term.

2

A Perfect Storm: Climate Change, Migration, Automation

The fruits of successful nationhood are what attract migrants.[1]

—Paul Collier

The free institutions which sustain the life of a free and united people, sustain also the hatreds of a divided people.

—Lord Salisbury

UNTIL GLOBAL TEMPERATURES RISE to a point that the direct effects of climate change start to become catastrophic, the single most important threat posed by climate change to the security of the Western states and Russia is likely to be an indirect one: further increases in migration, with consequent increases in political radicalization, polarization, and state paralysis in Western democracies.[2] As noted in Chapter 1, in South Asia, where states are much more vulnerable to the direct effects of climate change, large-scale migration will come much sooner.[3]

The number of additional potential migrants as a result of climate change is impossible to calculate, because in most cases climate change alone is unlikely to be responsible for their displacement. The causes of mass migration include climate change and environmental factors together with poverty, oppression, over-population, and conflict. It does