

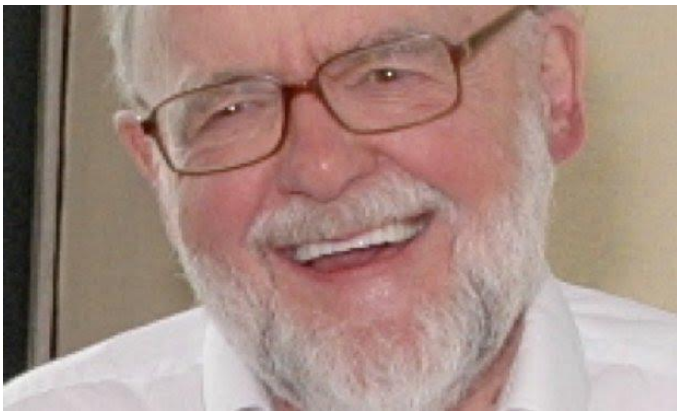


Science for Peace

# The Bulletin

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**Peter Nicholls**  
**1935 –2014**  
*by Metta Spencer*



Almost exactly twenty years ago Peter Nicholls became president of Science for Peace. Unlike most of his predecessors, he was not based at the University of Toronto, but was a professor of biology at Brock University in St. Catharines, near Niagara Falls. Nevertheless, so committed was he to nuclear disarmament that he was always among the most reliable participants in our organization.

Indeed, reliability and judiciousness were consistent aspects of Peter's character. He did not chit chat about ephemera or mention his personal life often, but at every new encounter would offer an astute update about the parlous state of the world. However sombre his analysis, his style was unflappably British—almost Churchillian. This came easily for the son of a businessman-politician; he had learned early to address public affairs volubly and pleasantly.

Peter was born in Southampton and remained a lifelong fan of its football team, the Saints. And even while studying biology at St. John's College, Cambridge, he became a nuclear disarmament activist, joining an early Aldermaston march. His interests turned toward biochemistry, and his first academic post was in the State University of New York in Buffalo, which during the Vietnam War was not a congenial setting for an anti-war activist, so he returned to Cambridge and then to a

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university in Denmark for a time.

Moving to Canada in 1975, Peter became a professor at Brock University, a specialist exploring the function of cytochrome oxidase, an enzyme in the mitochondrial or bacterial membrane that is responsible for oxygen uptake by the cell. He served as chairman of his department there.

During his tenure as president of Science for Peace, he was also vice-president of the Canadian Biophysical Society. He took early retirement and returned to England in 1998, becoming honorary professor at Essex University in Colchester. His wife Freda, also a biochemist, died in 2006.

His friendships with Science for Peace members flourished at a distance, for throughout the next sixteen years Peter continued participating in our work, occasionally timing his rare visits to Canada to join one of our meetings. He stayed with me on one such trip and, over cognac one late night, genially demolished some muddled scientific theory I had concocted (I forget what it was about, but do remember enjoying the conversation). I ran into him twice in Europe at International Peace Bureau meetings and both times we discussed the future of Trident submarines. He sent book reviews and reports to Peace Magazine, analyzing every significant disarmament event held in Britain, Brussels, or Geneva. As chair of the UK's Abolition 2000 movement, he seemed to attend all of them and could foresee their long-term implications.

And then, in October 2014, Peter died. He was 79, but had seemed indestructible. We first heard about it when his brother Stephen wrote us about his will: he had left a substantial bequest for Science for Peace. Until now, because of a change in editors, we have published no *Bulletin* in which to announce Peter's passing, so this announcement may come as a shock to several friends, who will surely recall him warmly as a generous, thoughtful, principled man. We are grateful to him for his sustained commitment to the well-being of our world.

When I reflected on Peter's presidency of Science for Peace, I realized that my memory had dimmed during the twenty-year interval. I recall the years 1996-97 through a rosy, soft filter quite unlike the sharp contrasts we experienced at the time. To correct my fuzzed-up perceptions, I decided to consult Google and reconstruct the period when Peter led our organization.

What was going on then? Jean Chrétien was Canada's prime minister; Bill Clinton was the US president; John Major was the British prime minister; and Boris Yeltsin was the president of Russia. Prince Charles and Diana had divorced. Mad Cow Disease was a source of panic in Britain. Dolly the first cloned sheep was born. Hong Kong was decorating its streets in preparation for being handed over to China.

The calmness of those years was therefore not entirely imaginary. The Cold War was over! The UN was authorizing the creation of the International Criminal Court!

On the other hand, there was nationalistic violence in the post-Soviet space and in Kosovo, and NATO was

expanding eastward, justifying the Russians' perception of the West as treacherous. Science for Peace, along with the rest of the post-Cold War peace movement, was dwindling. Peter viewed the global situation darkly. In a *Bulletin* essay he wrote presciently:

“Other things have deteriorated since the ending of the Cold War. Real ‘small’ wars, in which tens of thousands do die, have replaced the threat of world war in which tens of millions might have died. Yet local wars do not provoke a general concern, as did the perceived nuclear threat. Nuclear weapons are now (for example) only the most obvious and absurd component of a weapons business that for the UK and the US (I think unlike Canada) involves massive sales of ‘conventional’ arms to corrupt regions of several kinds, corroding domestic political dialogue for the sake of money....”

If on that point Peter excepted Canada (perhaps too optimistically) from his accusation, he did not give this country a pass a year later, when he complained:

“Canada did not demur from the December NATO announcement that nuclear weapons policies would be preserved unchanged. And in the UN we have voted against a ‘time-bound’ agreement for nuclear disarmament.”

Were he still with us, Peter would unquestionably repeat these charges. And yet I am sure that his complaints would not be uttered in a tone of despair, but rather in the amiable spirit of a reliable workman, getting on with the endless chore of repairing the world, and loving his job.

And so should we all. Thanks, Peter Nicholls.

*Metta Spencer is the President of Science for Peace and Professor Emerita of Sociology, University of Toronto.*

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## **Panglossing the Climate Emergency**

### **Connecting the Crises of Climate Change, Militarization, Extreme Poverty**

*by Judy Deutsch*

In his famous satire, Voltaire portrays Dr. Pangloss as the naïve mentor of Candide. Voltaire wrote *Candide* as a response to Enlightenment optimism even in the face of disasters like the 1755 Lisbon earthquake and tsunamis that killed at least 30,000 people. Voltaire saw that nature was unpredictable and at times powerfully destructive, and he saw that state power can ally with fanaticism and immorality, requiring an informed and active citizenry to counter demagoguery. But Pangloss sees none of this, and his refrain is simply that “this is the best of all possible worlds.”

Since its inception twenty-one years ago, the official climate meetings have been underreported in the media, although the 21st Conference of Parties (COP21 Paris) in December 2015 on climate change garnered much more attention than in the past. At COP 21, there was a self-congratulatory sense of relief that the negotiations did not fall apart and that the global warming target was lowered from 2C to 1.5C. However, absent was evidence that the negotiators really understood the climate science and the consequences of the targets that they set. Nor did there seem to be a genuine understanding of the plight of the majority of the world.

Three startling but largely neglected articles appeared at the time of the celebratory reactions to the climate agreement. Oxfam reported that the world's richest 10% produce half the world's greenhouse gas emissions [GHG] and that the richest 62 people own the same amount as 50% of the entire world population. South African academic and activist, Patrick Bond, exposed the "distraction gimmicks" of the UN Sustainable Development Goals, in which the "heartless World Bank economists" set the measure of poverty at \$1.25/day rather than the UN Conference on Trade and Development [UNCTAD] measure of \$5/day, which means that a full 60% of the world population is living in extreme poverty. And George Monbiot wrote about "the world looking away" from the eco-apocalypse of Indonesia's forest fires, where tropical forests are set ablaze to open up land to grow oil palm for biofuels. "[Fire is raging](#) across the 5,000km length of Indonesia.... It is hard to convey the scale of this inferno... A great tract of Earth is on fire. It looks as you might imagine hell to be... Children are being prepared for [evacuation in warships](#); already some have [choked to death](#). After the last great conflagration in 1997, there was a missing cohort in Indonesia of 15,000 children under the age of three, attributed to air pollution. This, it seems, is worse." <sup>1</sup>

The early 1990s was a critical historical turning point

<sup>1</sup> George Monbiot: <http://www.theguardian.com/commentisfree/2015/oct/30/indonesia-fires-disaster-21st-century-world-media>

Patrick Bond: <http://www.counterpunch.org/2015/09/25/un-millennium-development-goals-replaced-by-new-distraction-gimmicks/>

Oxfam: <https://www.oxfam.org/en/pressroom/pressreleases/2016-01-18/62-people-own-same-half-world-reveals-oxfam-da>

Oxfam: [https://www.oxfam.org/sites/www.oxfam.org/files/file\\_attachments/mb-extreme-carbon-inequality-021215-en.pdf](https://www.oxfam.org/sites/www.oxfam.org/files/file_attachments/mb-extreme-carbon-inequality-021215-en.pdf)

Also see John McMurtry:

<http://www.socialistproject.ca/bullet/1212.php>

with regard to climate change, nuclear weapons and militarization, and the distribution of wealth and power. Climate scientist James Hansen had testified before the U.S. Congress that climate change was definitely anthropogenic and that continued fossil fuel emissions portended a planetary emergency. The collapse of the Soviet Union signaled the possibility of eliminating nuclear weapons. At that time, it was arguably feasible to eliminate nuclear weapons and stem the rise of carbon dioxide emissions. Instead, the rate of greenhouse gas (GHG) emissions steadily increased. The development of more potent nuclear weapons than the Hiroshima and Nagasaki bombs and the advent of missile defense have made nuclear war more thinkable than during the Cold War. The break-up of superpower rivalry gave rise to the unprecedented concentration of wealth and power in the United States. Backed by international financial institutions, the United States projects austerity, militarization, and authoritarianism; not only power over people but over the physical basis of life: "...the United States enjoys command of the commons – command of the sea, space, and air." <sup>2</sup>

While each of these three crises cause tremendous loss of life, the climate emergency is unique in that the physical processes, unleashed by the greenhouse effect, impose an urgent time frame. There is a race against time to prevent runaway climate change, which could essentially make the earth uninhabitable. In the second part of this article, I will review what is now known in detail about the climate as a system. Citing temperature targets alone is misleading; in Naomi Oreskes' words, it is a strategy of distraction and delay.<sup>3</sup> In the first section, I will write about the militarization of climate change. The military is a huge source of GHG emissions and was made exempt under the Kyoto Protocol. Its connection with climate change is ignored by people across the political spectrum. I outline the wide range of ways that

<sup>2</sup> Posen, Barry 2003 "Command of the Commons" Itl Security Summer

[http://belfercenter.ksg.harvard.edu/files/posen\\_summer\\_2003.pdf](http://belfercenter.ksg.harvard.edu/files/posen_summer_2003.pdf)

Theodore Postol <http://www.thenation.com/article/how-obama-administration-learned-stop-worrying-and-love-bomb/>

<http://www.thenation.com/article/the-obama-administration-recklessly-escalates-confrontation-with-russia/>

<sup>3</sup> Oreskes, Naomi and Erik M. Conway, *Merchants of Doubt: How a handful of scientists obscured the truth on issues from tobacco smoke to global warming*. (New York: Bloomsbury Press, 2010). On the strategy of "distraction and delay", an exhibit at the N.Y. Museum of Natural History states that "carbon dioxide...stays in the atmosphere for only a few years." *The Economist* November 28, 2015, Joel Budd p. 5 and p. 16: "In fact it [climate change] is a colossal but slow-moving problem, spanning generations."

militarization intersects with climate change and discuss externalities and life-cycle analysis.

### Part I - THE MILITARIZATION OF CLIMATE CHANGE

Fossil fuel addiction in the developed world is generally blamed on excessive consumption habits. This neglects the role of the military. Sociologists Brett Clark and Andrew K. Jorgenson researched 53 developed and less developed countries over a 25-year period. Their findings show that there is a “treadmill of production” and a “treadmill of destruction”. The production side propels the world economy toward constant expansion, demanding more and more resources. The treadmill of destruction, not just consumption, “helps create conditions where more developed countries and those with more powerful militaries are able to over-utilize global ‘environmental space.’” They argue that “militaries as social structures generate environmental degradation regardless of whether they are engaged in armed conflicts or not.” The military “facilitates the increased appropriation of resources” at home and abroad. Most significantly in terms of climate injustice and the issue of loss and damage, the military serves political power and geopolitical influence in the quest for resource expropriation from underdeveloped regions. In these regions, “Domestic levels of resource consumption [are] often well below globally sustainable thresholds.”<sup>4</sup> As is well documented, the increasingly impoverished countries are then forced to borrow at high interest rates from the World Bank and the International Monetary Fund on condition that they dismantle infrastructure and embrace austerity and endless debt. The treadmill of destruction is also highly productive: international transfers of major weapons was 16% higher in 2010-2014 than in 2005-2009. The bulk of sales are from highly industrialized countries to developing countries, increasing their impoverishment and debt.<sup>5</sup>

Sara Flounders’ 2009 article on the Copenhagen climate

<sup>4</sup> Andrew K. Jorgenson and Brett Clark, “Footprints: the division of nations and nature,” in Alf Hornborg, Brett Clark, and Kenneth Hermele, eds. *Ecology and Power: Struggles over land and material resources in the past, present, and future*. (London: Routledge, 2012), 155-167. On debt and the international financial institutions, see for example Damien Millet and Eric Toussaint, *Who Owes Who? 50 questions about world debt*. (New York: Zed Books, 2004). On debt and militarization, see David Graeber, *Debt: The first 5,000 years*. (Brooklyn: Melville House, 2012). On the military and austerity, see Greg Albo

<https://canadiandimension.com/articles/view/the-new-canadian-militarism>

<sup>5</sup> <http://books.sipri.org/files/FS/SIPRIFS1503.pdf>

meetings called attention to the astonishing silence about the military:

“In evaluating the U.N. Climate Change Conference in Copenhagen -- with more than 15,000 participants from 192 countries, including more than 100 heads of state, as well as 100,000 demonstrators in the streets -- it is important to ask: How is it possible that the worst polluter of carbon dioxide and other toxic emissions on the planet is not a focus of any conference discussion or proposed restrictions? By every measure, the Pentagon is the largest institutional user of petroleum products and energy in general. Yet the Pentagon has a blanket exemption in all international climate agreements.”

“The Pentagon wars in Iraq and Afghanistan; its secret operations in Pakistan; its equipment on more than 1,000 U.S. bases around the world; its 6,000 facilities in the U.S.; all NATO operations; its aircraft carriers, jet aircraft, weapons testing, training and sales will not be counted against U.S. greenhouse gas limits or included in any count.”

From Sara Flounders’ 2014 follow-up article: “Also excluded are its weapons testing and all multilateral operations such as the giant U.S. commanded NATO military alliance and AFRICOM, the U.S. military alliance now blanketing Africa. The provision also exempts U.S./UN-sanctioned activities of ‘peacekeeping’ and ‘humanitarian relief.’”<sup>6</sup> A life-cycle analysis of military emissions would include the extraction and transportation of materials for military equipment, the manufacturing process, the transportation of equipment, and disposal.

The military exemption was pushed through by then Vice-President Al Gore, arguing that the United States Congress would never ratify a treaty with provisions about the military. The exemption was allowed in the Kyoto Protocol, along with exemptions for international aviation and shipping. Though the United States still did not ratify the treaty, the exemptions remained in place.

Military emissions and the militarization of climate change are rarely part of discussion by negotiators, NGOs, or activists. It is not addressed by the 2010 Cochabamba declaration on the Rights of Mother Earth,

<sup>6</sup> Sara Flounders: <http://www.globalresearch.ca/the-pentagon-the-climate-elephant-2/5402505>

[http://www.iacenter.org/o/world/climatesummit\\_pentagon121809/](http://www.iacenter.org/o/world/climatesummit_pentagon121809/)

Also see <http://priceofoil.org/2008/03/01/a-climate-of-war/>

by the 2015 Leap Manifesto, or by 350.org. According to U.S. officials, the Paris agreement still “has no provisions covering military compliance one way or another, leaving decisions up to nation states as to which national sectors should make emissions cuts before 2030.”<sup>7</sup>

Barry Sanders’ book *The Green Zone: The Environmental Costs of Militarism* contains carefully researched details about fossil fuel use in US wars.<sup>8</sup> “On the evening of March 19 2003, 1700 aircraft flew roughly 1400 strike sorties and fired 504 cruise missiles directly into the heart of Baghdad, dropping up to 16,000 pounds of bombs.” (p 40) “The F-15 fighter jet uses 25 gallons/minute or 1580 gallons/hour. The F-16 uses 28 gallons/minute or 1680 gallons/hour. The B-52 Stratocruiser with 8 jet engines, uses roughly 3334 gallons/hour. The battleship USS Independence consumes 100,000 gallons of fuel/day. To make things worse, targeted bombing involves blowing up highly volatile and extremely strategic sites like fuel and weapons depots, power plants, fertilizer plants, and chemical plants, releasing much more toxic waste into the atmosphere...” (p. 70). Used to fuel aircraft carriers, “bunker oil contains a higher concentration of sulfur than other diesel fuels, leaving behind both CO2 but SO2 as well. The two gases in combination form a thick layer in the atmosphere and hold the sun’s heat in more tenaciously...” (p. 71)

The life-cycle emissions and externalities of the military include the widespread destruction of natural carbon sinks - the carbon dioxide absorption capacity of forests and soil. Massive amounts of defoliants were used in the carpet bombing of forests in North Korea, Vietnam, Cambodia, and Laos. Approximately 50% of Kuwait’s “land area has had its fragile soil surface destroyed by scores of tanks.” (Sanders, p. 48) As alluded to by Clark and Jorgenson, the military (and paramilitary) treadmill of destruction involves the exploitation of resources. The Alberta tar sands has permanently destroyed vast swaths of boreal forest. A high proportion of the end uses of Alberta tar sands bitumen is the U.S. military. These emissions then are presumably exempt.<sup>9</sup>

<sup>7</sup> 2010 Cochabamba declaration on the Rights of Mother Earth <https://pwccc.wordpress.com/2010/04/24/peoples-agreement/>, The Leap Manifesto: <https://leapmanifesto.org/en/the-leap-manifesto>. <http://www.theguardian.com/environment/2015/dec/14/pentagon-to-lose-emissions-exemption-under-paris-climate-deal>

<sup>8</sup> Barry Sanders, *The Green Zone The environmental costs of militarism*. (Oakland: AK Press, 2009).

<sup>9</sup> Dave Vasey, Nov. 11, 2015.

Life-cycle analysis of military GHG emissions includes the reconstruction of war-torn areas. The Halliburton and Bechtel corporations have a long involvement in private-public partnerships, such as the attempt to privatize water in Cochabamba (Bolivia) and no-bid contracts to reconstruct Iraq. Construction of war-ravaged cities involves massive amounts of cement, the most GHG intensive industrial product. Manufacturing cement from limestone requires large amounts of energy for heat, and in the heating process limestone’s stored carbon dioxide is released into the atmosphere. Sitting on the Haliburton and Bechtel corporate boards are the U.S. government, military, and business elite.<sup>10</sup>

NATO, the U.S. Navy, and the Pentagon have issued policy statements on the military’s role vis-à-vis climate change. The military defines climate change as a “threat multiplier”. In a presentation by former NATO Secretary General Anders Fogh Rasmussen, fifteen of the seventeen non-military issues that NATO is prepared to address are climate-related

The U.S. Navy also claims to have strategic interests in the Arctic. The race for global economic and military hegemony extends to the Arctic and Antarctic as warming opens up competition for sea lanes and resource extraction. In 2009, the U.S. Department of the Navy released a 36-page document called *Navy Arctic Roadmap*. “The United States has broad and fundamental national security interests in the Arctic region and is prepared to operate either independently or in conjunction with other states to safeguard these interests. ....What the practical implementation of this policy means is the expanded penetration of the Arctic Circle by the U.S. Navy’s submarine-launched ballistic missile (SLBM) third of the American nuclear triad...”

The 2010 Pentagon Quadrennial Defense Review includes climate change as a military issue. In a memo made public on January 19th, 2016, the Pentagon

<https://canadiandimension.com/articles/view/lest-we-forget-tar-sands-and-war>

<sup>10</sup> For example, Dick Cheney, the two Bush presidents, Donald Rumsfeld, Caspar Weinberger, George Shultz are among the political figures with financial connections to the Bechtel and Haliburton corporations. Gen. [John J. Sheehan](#), USMC (ret.) is the former NATO Supreme Allied Commander, Atlantic and the former Special Advisor to Asia for the U.S. Defense Department and the former General Manager of the Petroleum and Chemical Business Unit for Europe/Africa/Middle East/South West Asia and was also a Bechtel Board member.

affirmed that “climate change will be a constant consideration in how the Department of Defense goes about its war mission, acquisition programs, readiness plans, construction projects and security judgements...[including] a larger presence in the Arctic, where more land and sea are exposed as the polar ice caps melt.”<sup>11</sup>

There are implicit assumptions in the military framing. It has become a truism that environmental threats cause violent conflict. But is this accurate, and what does this assumption imply? In her article “The Militarization of Climate Change,” Emily Gilbert writes: “Climate change has been identified as a top military concern. We should be worried.” In the military documents she cites, the “threat multiplier” effect and “failed state” scenario is directly linked to future acts of extremism and terrorism. She quotes documents that define the military’s role in resource protection and “climate change-related scenarios around humanitarian and disaster relief, and for protecting oil and gas resources in insecure areas.” (MoD, 2010) The U.K. Global Strategic Trends Programme 2007-2036 report issued from the Ministry of Defense (2006:65) even indicated that intervention in outer space might be required so as “to mitigate the effects of climate change or to harness climatological features in the support of military or strategic advantage”. Gilbert writes that the ‘failed state’ framing “perpetuates a model whereby the enemy to the nation is elsewhere, and that ‘environmental threats are something that foreigners do to Americans or to American territory,’ not as a result of domestic policies.” The military purports to ensure “stability within the global commons’ of air, sea, space and cyberspace” while in fact establishing hegemony, control and management over the commons. About the “greening” of the military, Gilbert writes that this sidesteps “whether there should indeed be a military at all.”<sup>12</sup>

<sup>11</sup> Pentagon:

<http://federalnewsradio.com/defense/2016/01/dod-climate-change-policy-heats-roles-dod->

NATO: <http://www.globalresearch.ca/global-nato-the-military-enforcement-wing-of-the-west-s-1/30222>

U.S. Navy: <https://rickrozoff.wordpress.com/2009/12/01/loose-cannon-and-nuclear-submarines-west-prepares-for-arctic-warfare/>

<sup>12</sup> Emily Gilbert. The Militarization of Climate Change.

[https://www.academia.edu/4997554/The\\_Militarization\\_of\\_Climate\\_Change](https://www.academia.edu/4997554/The_Militarization_of_Climate_Change)

MoD (2010) Adaptability and Partnership: Issues for Strategic Defence Review. UK Ministry of Defence;

[http://www.mod.uk/NR/rdonlyres/790C77EC-550B-4AE8-B22714DA412FC9BA/0/defence\\_green\\_paper\\_cm774.pdf](http://www.mod.uk/NR/rdonlyres/790C77EC-550B-4AE8-B22714DA412FC9BA/0/defence_green_paper_cm774.pdf)

MoD (2006) The DCDC Global Strategic Trends Programme 2007-2036 prepared by the Development, Concepts and Doctrine Centre, a Directorate General within the UK Ministry of Defence.

The Hobbesian view that impoverished and traumatized people react with violence and societal breakdown is held by people across the political spectrum. Again, we should be worried. Violence and chaos are the rationale for endless militarization, securitization, pacification, and austerity. As stated by Betsy Hartmann: “This buzz about climate conflict is essentially old wine in new bottles. It draws from models of environmental conflict, popular in the 1990s, that in turn draw from old colonial and neocolonial stereotypes about poor peasants and herders. What I call degradation narratives go something like this: population-pressure induced poverty makes Third World peasants degrade their environments by over-farming or over-grazing marginal lands...” The degradation narrative blames poverty on population pressure, it targets migration as an environmental and security threat, and “it justifies foreign interventions to put things straight.”<sup>13</sup>

In recent environmental disasters such as the Haiti earthquake and Hurricanes Sandy and Katrina, violence came from the military and police, while the severely impacted people initially organized themselves into communities of mutual help. Amy Goodman of Democracy Now provided eyewitness reports of how the military took over the Port-au-Prince airport in its ostensible humanitarian intervention, only to block incoming medical help; crates of water bottles on the tarmac were for soldiers, not for the earthquake victims. Subsequently, the UN peacekeepers brought cholera to Haiti, leading to thousands of deaths for which the UN still claims impunity. In its peacekeeping and humanitarian interventions, the U.S., Canada, the OAS, and UN did not follow the lead of the Haitian community and interfered with former President Aristide’s demilitarization of the police (Sprague p. 84-86). The Arab Spring and violence in Sudan are attributed to climate change-related drought causing social disruption, food shortages, high prices, and desperation. This leaves out the responsibility of the economic system. “According to an unpublished report by a senior World Bank economist, biofuels were responsible for a 75 percent increase in global food prices over the previous six years. This was in stark contrast to the U.S. government’s earlier claim that only 3 percent of recent food price rises

[http://www.cuttingthroughthematrix.com/articles/strat\\_trends\\_23jan07.pdf](http://www.cuttingthroughthematrix.com/articles/strat_trends_23jan07.pdf)

<sup>13</sup> Betsy Hartmann: Challenging the Militarization of Climate Change.

[http://www.betsyhartmann.com/pdf/Hartmann\\_Tufts\\_Climate\\_and\\_Militarism\\_Talk.pdf](http://www.betsyhartmann.com/pdf/Hartmann_Tufts_Climate_and_Militarism_Talk.pdf)

were attributable to the use of crops to produce plant-derived fuels.” (Tokar, p. 123) A further determinant of high food prices was the market. The Goldman Sachs Commodity Index listed food on the futures market.

Prices hikes were driven by biofuels and by gambling on future profits, not by food shortages due to drought.<sup>14</sup>

Only a small fraction of military emissions would be affected by a shift to renewable energy, by “greening” the military. The destruction of carbon sinks is irreversible in the time scale required to eliminate GHG emissions.

Yet proffered climate solutions continue to narrowly focus on replacing fossil fuels with renewables and neglect those areas of production and destruction that will rely on fossil fuels for decades to come.

## Part II - PANGLOSSING CLIMATE SCIENCE

This section reviews climate change science because of erroneous assumptions underlying the climate negotiations. What is the meaning of limiting warming to 1.5C, of drawing down GHG concentrations to 350ppm, and of a carbon budget allowing emissions of a cumulative 1000 gigatons of CO<sub>2</sub> until 2030? These are the goals of Paris COP 21. These targets do not take into account amplifying feedbacks, climate processes that are already irreversible, such as melting sea ice and disintegrating ice shelves, and the lag between cause and effect mainly due to the temporary storage of added heat and CO<sub>2</sub> in the ocean. These factors will be discussed below.

Evasion, omission, and ambiguity about climate challenge understanding. Focusing on predictions of what *could* happen often deflects attention from what *is* happening now and from evidence of what actually happened in the past. At some point recently, the climate goal shifted from *elimination* of greenhouse gases to *mitigation* and *adaptation*. According to the Oxford English Dictionary, mitigation means to render more gentle, milder, to appease, mollify, to lessen the stringency of an obligation.

The numbers are confusing. The timelines for capping fossil fuel emissions are evasive. Capping tar sands emissions at 100 megatonnes CO<sub>2</sub> by 2030 does not

mean stopping the tar sands entirely, but allowing 100 megatonnes each year after 2030. Proposed reduction schemes for GHG employ confusing and varied baselines: from below 1990, or 2005, 2006, or 2015 levels. Targets for peak emissions are all over the map -- 2020, or 2030, or 2050, or by the end of the 21st century. Two dates are used as a reference point for the 1C increase in temperature: 1780 and 1880.

“Transitioning” to a “green energy future” provides no time frame.

The treadmills of destruction and of production are essentially unregulated and are set-up to be permanent.

Climate solutions proffer alternative energy but demand no limits or regulation of production and destruction. Yet there are many indications that human survival depends on the immediate elimination of greenhouse gas emissions. 1.5C is twice the increase of the 0.8C temperature that has already caused unprecedented droughts, drought-related forest fires, floods, storms, changes in the jet stream and ocean circulation, rapid melting of Arctic ice sheets, and accelerated melting of Greenland glaciers and Antarctic ice shelves. Current effects observed on every continent and in every ocean are due to concentrations from several decades ago. Our current 400ppm commits us to much more extensive effects in the near future.

The common understanding of climate change does not take into account the non-linearity of climate processes.

Adding a specific quantity of greenhouse gas triggers much more heat trapping through feedbacks. Fossil fuels trap the sun’s energy in the Earth’s atmosphere.

The sun’s energy is transformed into heat as it meets the dark surfaces of land, ocean, and vegetation. Soil, ocean, and vegetation function as sinks as they absorb both heat and carbon dioxide, temporarily masking or moderating the full effects of CO<sub>2</sub> emissions. Due to a range of factors, these sinks can change from absorbing to emitting CO<sub>2</sub> and to releasing even more potent greenhouse gases, such as methane.

The current 1C rise and the target of 1.5C reflect *average* surface temperature over ocean and land. Much more significant for the climate system and for living conditions are the unprecedented variations in regional temperature and climate conditions. For example, warming in the Arctic is occurring at twice the rate of other regions in the world. Arctic temperature is 3C above the average and already has detrimental effects on living conditions and on ocean circulation. "At 1.5°C we would still see temperature extremes in the Arctic rise by 4.4°C and a 2.2°C warming of extremes around the

<sup>14</sup> Jeb Sprague, *Paramilitarism and the Assault on Democracy in Haiti*. (New York: Monthly Review Press, 2012)  
Brian Tokar. “Biofuels and the Global Food Crisis”. P 121, in Fred Magdoff Brian Tokar, (2010). *Agriculture and Food in Crisis: Conflict, Resistance, and Renewal*. (New York: Monthly Review Press, 2010).

<http://frederickkaufman.typepad.com/files/the-food-bubble-pdf.pdf>

Mediterranean basin." <sup>15</sup> Regional warming produces feedbacks that can have global effects. The most concerning would be a large release of methane from the melting permafrost. Regional extreme temperatures on land are much greater than changes in the global mean because the ocean surface warms much more slowly than the land and brings down the average. Regional variations have great impact on agriculture, such as by changing rainfall patterns and causing heat waves and drought. Extreme high temperatures [60C, 140F] in the Middle East and in other regions renders parts of these areas uninhabitable by human beings.

James Anderson, Harvard professor of atmospheric chemistry, identifies three central processes regarding Earth's climate: 1) climate is a global system; 2) critical to the entire structure is the temperature difference between the polar and tropical regions; and 3) the ancient paleoclimate record shows various factors carrying the earth in and out of glacial periods, but all the variables are overwhelmed by increasing or decreasing CO<sub>2</sub> in the atmosphere. He criticizes the wording "global warming" because climate is a structure and global warming connotes slow change as if there's time to think things over. Rather, there are irreversible jolts impacting the sensitive climate system.<sup>16</sup>

On November 30, 2015, at the outset of the COP21 climate meetings, the *Scientific American* published an article, "The Most Important Number in Climate Change: Just how sensitive is Earth's climate to increasing concentrations of carbon dioxide?" <sup>17</sup> The article referred to climate sensitivity. As originally calculated by Jule Charney in 1979, equilibrium climate sensitivity is the increase of earth's surface temperature, if the concentration of carbon dioxide in the air was doubled over pre-industrial levels of 280 parts per million (ppm).

The prediction for only the effects of CO<sub>2</sub> is a temperature rise between 1.5C and 4C. In a sense the number has become politicized. The lower figure permits more time for allowing fossil fuel emissions to

<sup>15</sup> Interview with Dr. Andrew J. Pitman on article: "[Allowable CO2 emissions based on regional and impact-related climate targets](#)". The lead author is Professor [Sonia Seneviratne](#) and appears in *Nature* 529, 477–483 (28 January 2016)

[http://www.ecoshock.info/2016/02/climate-misunderstood-impacts.html?utm\\_source=feedburner&utm\\_medium=feed](http://www.ecoshock.info/2016/02/climate-misunderstood-impacts.html?utm_source=feedburner&utm_medium=feed)

<sup>16</sup> James Anderson.

<https://www.youtube.com/watch?v=Y12P76EYQJ8>

<sup>17</sup> On climate sensitivity, see David Biello

<http://www.scientificamerican.com/article/the-most-important-number-in-climate-change/>

remain high. Yet predictions about the future must undergo revisions: there is additional information based on current observations that are more precise because of improved instruments and accumulated data, and there is more information from ocean sediments and ice cores that tell of past climate change. In general, predictions by the Intergovernmental Panel on Climate Change have been conservative, and many of the worst case projections about sea level rise, land and sea-based ice, and global average surface temperature have already been surpassed.

David Wasdell's calculations of climate sensitivity add to Charney's by including sea ice loss, clouds, other potent greenhouse gases that are unleashed by increased temperature, and feedbacks from terrestrial and ocean changes. These additional factors, occurring at different points and with varying contributions, make the processes non-linear. A graph of a non-linear process shows an upward curve rather than a straight line. There are also abrupt shifts and sudden accelerations. For example, the "rate of sea level rise can be rapid once ice sheets begin to disintegrate. About 14,000 years ago, sea level increased 4 to 5 meters per century for several consecutive centuries – an average rate of 1 meter every 20 or 25 years." The linear model used in climate negotiations underestimates the rate of change by using the lower estimate of climate sensitivity. Wasdell's estimate of climate sensitivity, taking feedbacks into account, is at least 7.8C for a doubling of CO<sub>2</sub> over pre-industrial levels.<sup>18</sup> His calculations are consistent with current predictions by the Hadley Centre, the UN Environment Programme, and the International Energy Agency [see Dahr Jamail, footnote 24].

James Hansen's observations on the extent of sea ice melt, evidence of past shifts between glacial and interglacial periods, and ancient paleoclimate evidence of rapid sea level rise, led him to the target of 350ppm. He estimates that "[with] doubling or tripling the preindustrial carbon dioxide level, Earth will surely head toward the ice-free condition, with sea level 75 meters higher than today." (Hansen, p. 160)<sup>19</sup> Even a 1-meter rise in sea level would be a disaster for billions of people.

The idea of a carbon budget comes from political

<sup>18</sup> David Wasdell <http://www.apollo-gaia.org/IPCC%205AR%20SPM10%20Crit.pdf>

<sup>19</sup> James Hansen, *Storms of My Grandchildren: The truth about the coming climate catastrophe and our last chance to save humanity*. (New York: Bloomsbury, 2009).



interests in maximizing fossil fuel production, not from scientific information about the climate system. The COP21 “budget” would allow 270b tonnes more of CO<sub>2</sub> emissions into the atmosphere, but this ignores feedbacks, the time lag, and the irreversible processes already set in motion. The concentration of greenhouse gases is currently far above the 350ppm that portends the shift from a glaciated to an ice-free planet. Wasdell’s estimated 7.8C rise implies that the budget was spent decades ago.

Hansen explains how feedbacks determine the magnitude of climate change. CO<sub>2</sub> traps heat which causes water evaporation. Heat will eventually cause large-scale melting of permafrost and the release of large stores of methane. Recent research found that in the past, the tipping point for thawing of Siberian permafrost was as low as 1.5C increase in average global surface temperature. Water vapour and methane are greenhouse gases and both trap much more heat than CO<sub>2</sub>. Water vapour and methane are amplifying feedbacks as they increase the trapping of heat, and they generate other feedbacks. Increased water vapour in the atmosphere causes powerful storms and the additional feedback of washing away soil and vegetation which are important carbon sinks. Amplifying feedbacks can be difficult to predict in modelling. For example, warmer winter temperatures led to a huge proliferation of pine beetles in western Canada as more larvae survived the winter. This led to the infestation and death of 18.1 million hectares of forests. This meant loss of a large carbon sink.<sup>20</sup> Dying forests are also more susceptible to forest fires, and fires turn forests into emitters of the stored CO<sub>2</sub>. Northern forest fires produce black soot, which covers snow, causing absorption of more heat.

The Arctic is warming at a much faster rate than the tropics; the diminished temperature difference between the North pole and equator is already affecting both atmospheric and ocean circulation. The tilt of the Earth, the Earth’s spinning, and temperature differences between the poles and tropical areas all interact to produce the Earth’s circulating air and ocean currents.

With less temperature differences between hot and cold areas, there is less pushing and pulling against each other of large air or water masses. The atmospheric jet streams and ocean currents are changing and contribute to idiosyncratic weather patterns emerging all over the Earth.

The iconic image of the polar bear alone on an ice floe represents only the proverbial tip of the climate

emergency iceberg. Scientists are very concerned about ice conditions in the Arctic and in West and East Antarctica. Ice shelves and sea ice are situated over water and do not contribute to sea level rise, while ice sheets and glaciers are situated over land. Ice shelves are contiguous with land ice and act as a buttress against glaciers and ice sheets. Ice shelves in West Antarctica and on Ellesmere Island have disintegrated much more rapidly than in the past. The breaking up of ice shelves is thought to be a result of warmer air temperature, of warmer ocean water, which melts ice shelves from below, and to decreasing sea ice, which had protected ice shelves from ocean waves and storms. When ice shelves disintegrate, melting glaciers and ice sheets can flow and add cold fresh water to the sea. Scientists were particularly surprised by the speed of the collapse of West Antarctic Larsen A ice shelf. The melting of all Greenland’s ice sheets would raise sea level by 7.2 meters. Most of Antarctica’s ice is in East Antarctica which is much more stable, though scientists have recently discovered vulnerability to warming by ocean water from below. Melting the totality of Antarctica’s ice sheets would raise sea level by 61.1 meters.<sup>21</sup>

Sea level rise is largely due to thermal expansion (warm water expands) and to the infusion of fresh water from glaciers and ice sheets. Global ocean warming has doubled in recent decades. Sea level rise is uneven, rising higher in some areas than others.<sup>22</sup> Small island states are most vulnerable and most likely will need to be evacuated. Many coastline cities and much of Bangladesh will be uninhabitable by the end of the

<sup>21</sup> Ocean Melting Greenland [OMG]. "A lot of the major uncertainty in future sea level rise is in the Greenland Ice Sheet," said OMG principal investigator Josh Willis, a scientist at NASA's Jet Propulsion Laboratory, Pasadena, California.

Greenland: [https://www.arcus.org/files/presentations/arctic-observing-open-science-meeting/19-november-2015/7\\_schodlok.pdf](https://www.arcus.org/files/presentations/arctic-observing-open-science-meeting/19-november-2015/7_schodlok.pdf)  
<http://www.jpl.nasa.gov/news/news.php?feature=4698>

West and East Antarctic ice sheet:

<http://www.antarcticglaciers.org/antarctica/east-antarctic-ice-sheet/>

<sup>22</sup> Global ocean warming has doubled in recent decades, scientists find” January 19, 2016  
<https://www.sciencedaily.com/releases/2016/01/160119151246.htm>  
2013 Contribution to 5th IPCC Assessment Report: Due to thermal expansion, glacial and ice sheet melt, and change in liquid water storage on land,” It is very likely that sea level will rise in more than about 95% of the ocean area. It is very likely that there will be a significant increase in the occurrence of future sea level extremes. It is virtually certain that global mean sea level rise will continue for many centuries beyond 2100, with the amount of rise dependent on future emissions.  
[https://www.ipcc.ch/pdf/unfccc/cop19/3\\_gregory13sbsta.pdf](https://www.ipcc.ch/pdf/unfccc/cop19/3_gregory13sbsta.pdf)

<sup>20</sup> [https://www.for.gov.bc.ca/hfp/mountain\\_pine\\_beetle/facts.htm](https://www.for.gov.bc.ca/hfp/mountain_pine_beetle/facts.htm)

century. Salinization of soil due to sea level rise already affects major food growing areas, such as the Mekong and Nile deltas.<sup>23</sup>

Again, images of melting sea ice and calving ice shelves do not convey their extensive effects on the climate system. The influx of fresh water changes the stratification of cold and warm layers in the ocean. In addition to the horizontal circulation of ocean currents over long distances, there is vertical circulation.

Infusions of fresh water from melting ice sheets and glaciers slows down or stops vertical circulation because the fresh water layer is less dense than salt water and does not sink. In warmer areas of the ocean, vertical circulation decreases because warming surface water is less dense than cold water and does not sink. Nutrients from lower layers are not able to reach the higher layers.

In addition to absorbing heat, the ocean takes in CO<sub>2</sub> from the atmosphere. When combined with water, CO<sub>2</sub> forms carbonic acid which contributes to ocean acidification. Like the way carbon bubbles are released from a warming carbonated drink, warming oceans emit CO<sub>2</sub> back into the atmosphere. It is not known whether, or when, a saturation point would cause the ocean to emit large amounts of stored CO<sub>2</sub>. The greatest danger would be the release of stored methane from sediments on the seafloor of the Arctic Ocean. Hansen believes that this is what caused the end-Permian extinction when 90% of terrestrial and marine species became extinct (Hansen, p. 149).

Climate change is not a subject that can be understood through brief communications, pictures, sound bites, or numbers. The generally accepted number for temperature is 1C increase since 1880, but this number alone does not convey the rapidly increasing rise in temperature. The World Meteorological Organization reports that the average land and ocean-surface temperature for the decade 2001-2010 was estimated to be 0.47C above the 1961-1990 global average but a full +0.21C above the previous decade 1991-2000 global average. That is 0.21 in one decade. The estimated global average temperature in 2010 was 0.8C above 1880 or pre-industrial levels, and by 2015 the figure was 1C.

This means that in only five years the temperature has

increased by 0.2C, double the rate of 2000-2010.<sup>24</sup>

## CONCLUSION

I have used the term Pangloss to refer to the general blindness to the climate system itself. The belief that 1.5C is safe, the lack of any time frame for reducing (not eliminating!) greenhouse gases, and the assumption that the atmosphere can still hold hundreds more gigatonnes of CO<sub>2</sub> is a dangerous fiction. There is blindness to the connections between climate change, the military, and the political economic system. A 2005 Worldwatch paper critiqued a 2004 UN High-Level Panel report and a 2004 leaked Pentagon report. Both endorsed the “environment-security linkage”. “Normal” climate change was seen as a long range problem causing floods, droughts, epidemics, species loss, famine, and more, but “abrupt” climate change could lead to a halting of the ocean currents and widespread accelerations of other catastrophic effects and to a “world of warring states” requiring military intervention and securitization. There is a threat of abrupt and catastrophic effects, but it is coupled with almost complete disregard for the welfare of the majority of the world. There is blindness to the human world when people speak as if there have not yet been significant impacts, that it is okay to wait and that climate change is secondary to other social justice issues.

Worldwatch estimated that by the 1990s, natural disasters that could be linked to and exacerbated by climate change already caused hundreds of thousands of deaths and average annual economic losses on the order of \$660bn. A meager \$100bn/year for developing countries was pledged at the Cancun climate meeting six years ago, but by Oxfam’s estimates, “just \$2.5bn to \$4.5bn of current climate finance is going towards relief.

By some estimates, there is less than \$20bn a year in public finance making its way to developing countries for climate action – or less than a fifth of the \$100bn target”.<sup>25</sup> With double-bookkeeping, some developed countries count climate adaptation funds as part of their overall development aid.

<sup>24</sup> <https://www.wmo.int/media/content/global-temperatures-continue-climb>

Also see Dahr Jamail compiled predictions about average global surface temperature from the major climate sites, showing that the forecasts are for increasingly high temperatures earlier this century. [http://www.tomdispatch.com/post/175785/tomgram%3A\\_dahr\\_jamail\\_the\\_climate\\_change\\_scorecard/](http://www.tomdispatch.com/post/175785/tomgram%3A_dahr_jamail_the_climate_change_scorecard/)

<sup>25</sup> “A New Paradigm for Human Security.”

<http://www.worldwatch.org/node/569> published in *World Watch Magazine*, January/February 2005, Volume 18, No. 1.

Oxfam: <http://www.theguardian.com/environment/2015/jun/29/rich-countries-100bn-promise-fight-climate-change-not-delivered>

<sup>23</sup> <http://www.theguardian.com/environment/2011/aug/21/vietnam-rice-bowl-threatened-rising-seas>  
<http://www.theguardian.com/environment/2009/aug/21/climate-change-nile-flooding-farming>

There is already an enormous human toll, estimated by Oxfam and by the Global Humanitarian Forum in 2009 to be 300,000 deaths/year.<sup>26</sup> In 2011 Nnimmo Bassey of Nigeria told the Durban COP climate delegates that their inaction was “A death sentence for Africa”. In 2013 Philippine delegate Yeb Sano entreated with the uncomprehending negotiators to “stop this madness”. Every delay in eliminating greenhouse gas emissions means more lives lost.

Amartya Sen observed two approaches to social change: aspiring to set up an ideal society, or stopping a known wrong, such as in the work of Karl Marx, Mary Wollstonecraft, and the abolitionists.<sup>27</sup> Following the path of stopping a known wrong, radical solutions to the climate crisis must include challenging “whether there should indeed be a military at all.” There are alternatives that could replace the military and that have historical antecedents, such as establishing a Civilian Conservation Corps, a Civilian First Responders Corps, and a Community Service Corps. There is also the antecedent of thinking “it can’t happen here.” But fortunately there are historical precedents for rapid action that show that many people do know how to see and act. People always ask “what can we do?” Work hard to end the military/security/industrial complex.

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## The President's Corner: Controversy and Conversation

*By Metta Spencer*

What is Science for Peace? A club? A social change action group? A scholarly association? Your answer may reveal your hopes for Science for Peace—especially how much conflict to expect and how to handle disputes. The different models entail different, even incompatible, standards of conduct, which we must somehow balance, since we actually combine all three types of organization. However, our compromises are not always easy. Here I'll explore the dilemmas that sometimes arise and propose discursive standards that may enable us to surmount these contradictions.

### Science for Peace as a Club

Clubs are organizations for interacting enjoyably with compatible others. Some clubs have an over-riding purpose beyond sociability. The Club of Rome, for example, describes itself as “a group of world citizens, sharing a common concern for the future of humanity.” Most clubs, however, exist mainly for the personal pleasure of such interactions, as playing cards or comparing stamp collections.

The point of clubs is to bring people together who like each other and who try to avoid serious conflicts. When the disputes outnumber the agreements, some members will quit, so the attraction of the group depends on the warmth of their friendships. Hence the membership of a private club is usually homogeneous, selective, and sometimes discriminatory. An applicant can be “black-balled” for any number of reasons—from dressing unfashionably to expressing outlandish opinions. Selectivity helps sustain the cohesion of the group, though often at the cost of limiting its members’ worldviews. And freedom of association is a democratic right that legitimizes choosiness about whom to admit to private clubs.

The discourse among a club's members will always include instrumental matters, but invariably there is also informal talk involving personal matters. Everyone attempts to maintain a friendly tone.

Science for Peace is not just a club. Indeed, most us disdain selective, particularistic relationships. As civic-spirited citizens, we prefer inclusive social groupings that promote the wider public interest.

Nevertheless, we should not regard clubs as a low type of organization solely because they are not open to all strangers. Civil society properly includes intimate relationships in which people are not all treated alike. If I

<sup>26</sup> “The Anatomy of a Silent Crisis.” <http://www.ghf-ge.org/human-impact-report.pdf>

<sup>27</sup> Amartya Sen, *The Idea of Justice*. (Cambridge, Massachusetts: The Belknap Press, 2009).

bake a birthday cake for you, I am not (thank heavens!) obliged to do the same for all my Facebook acquaintances.

Civil society empowers people to oppose authoritarian rule. You can spot an aspiring dictator every time by watching him attempt to control private clubs and associations. Moreover, anyone trying to oust a dictator must begin by organizing voluntary groups, such as clubs, which are not controlled from above. But Science for Peace does not face such a problem, since (so far) it remains a free association. We have only to protect that freedom.

We are forming working groups now in Science for Peace, and their new members sometimes ask what they are expected to do. My answer: Do almost anything your group wants to do. Clear your plans with the executive committee before you take a major public action, but if your members just want to play cards together, that is fine. Clubs are the bulwarks of democracy. Enjoy your freedom of association.

But, of course, our members do not just play cards. People join Science for Peace because we care about certain public policies that we want to promote with like-minded colleagues. All of us want to work effectively to influence public opinion and policymakers—hence we can think of our organization in terms of the second model: a social change agent.

### Science for Peace as a Social Change Agent

Science for Peace originated as a social change education organization within the Canadian peace movement—one whose members shared strong policies about nuclear disarmament. Although we have widened the range of our issues, we may still imagine that our consensus remains just as solid about all these new topics. That is probably not the case, though it is normal for social change groups to expect—or even demand—that their members be of like minds.

Social psychologists say that cohesive groups almost always develop increasingly similar opinions over time—a tendency that Irving Janis called “groupthink.” And recently, researchers have found that the shared views of such groups also tend to become *more extreme* as they talk together. As Cass Sunstein has noted, “members of a deliberating group usually end up at a more extreme position in the same general direction as their inclinations before deliberation began. This is the phenomenon known as group polarization.”<sup>28</sup>

<sup>28</sup> Cass R. Sunstein, *Going to Extremes: How Like Minds United and Divide* (NY: Oxford University Press, 2009), p. 3

Insofar as Science for Peace is a social change group, it will attract members whose opinions are compatible. As a result, our opinions will not only converge, but will almost certainly shift further toward the same pole toward which we originally leaned. Little dissent will be expressed or even tolerated in our zealous conversations. This is a predictable tendency that can, at times, be beneficial. As Sunstein argues,

“Sometimes extreme movements are good, even great. When people shift from indifference to intense concern with local problems, such as poverty and crime, group polarization is an achievement, not a problem.”<sup>29</sup>

Still, this tendency worries social scientists about their own associations, so they discourage advocacy and activism in their scholarly communities. Sociologists and political scientists generally make a point of demonstrating their objectivity and capacity for mutual criticism, and this norm is justifiable. Diversity and impartiality are valuable and can be jeopardized by political advocacy.

On the other hand, there can still be intellectual diversity overall if a domain consists of multiple distinct groups, each of which lacks much *internal* diversity. This is “second-order diversity”—the kind of intellectual pluralism that occurs, not within, but across groups. It can partially compensate for the narrowness of perspective within groups.

Still, political polarization and extremism are increasing around the world today, reducing the possibility of compromise over policies. The result—increasing political gridlock—is reducing cooperation between different parties and factions. This polarization needs to be reduced, which would require an increase in “cross-cutting cleavages.” In other words, members of the polarized groups need to be brought into regular contact with members of opposing groups. People in such situations learn to listen and compromise.

Alternatively, if a political advocacy group wants to avoid the dangers of its internal polarization, it can deliberately recruit a diversity of members or regularly invite speakers with whom most members disagree. This latter approach should be easy for Science for Peace, since we are not only social change agents but, crucially, also scientists. For us, openness is a requirement.

### Science for Peace as a Scientific Community

<sup>29</sup> Sunstein, p. 148.

Almost uniquely among the organizations that campaign for peace, justice, and the environment, Science for Peace members are mostly employed professionally in the discovery of truth. Scientists and other scholars are expected to add to humankind's storehouse of knowledge. A portion of that work is the routine investigation and application of known phenomena, as for example engineers do when inventing a new gadget. However, genuine scientific advances involve the elimination of false theories.

Karl Popper was one of the leading philosophers of the twentieth century. I was lucky enough to study with him and absorb some of his understanding of the scientific method.<sup>30</sup> He pointed out that scientists are always solving problems and testing theories, and that this often brings us into opposition against other researchers. Science is an arena of conflict.

A scientist gets closer to the truth by eliminating false theories—and this is true not only of the natural sciences but also other learned fields, including history, political science, philosophy, sociology, and economics. Every scientifically useful theory must be falsifiable. (Theology evidently does not belong on the list. It too is an effort to understand how the world works and, although its doctrines may usefully inspire believers, they are not susceptible to disproof.)

A scientist compares all the plausible theories for a given phenomenon. If he or she can disprove some of them, it will strengthen the case for the remaining theories, but it will not prove that even one of them is correct. There remains some possibility that another scientist will later falsify it too. Hence progress is not the process of proving, but of successively disproving theories. At best, we get closer to the truth without reaching it.

A good scientist may spend her life addressing a problem but only manage to reformulate it, thereby improving it for her successors. Excellent, well-shaped problems are rare and wonderful. A genius, said Popper, is someone with a great nose for problems.

Whenever a real advance in scientific discovery seems imminent, several scientists are usually defending their pet theories by trying to disprove the theories of their colleagues. These scientific competitions and debates sometimes become intense, as researchers line up to defend one theory or another with real emotion. Such battles are essential for the progress of science for without testing a theory thoroughly and vigorously, we can never be sure whether or not it was truly disproved.

<sup>30</sup> Karl Popper, *The Logic of Scientific Discovery*, (Routledge Classics, Kindle Edition: 2005).

But to have one's own pet theory falsified can be painful. Stubborn theorists hate to concede defeat, but keep revising their theories to make them bend instead of break.

Nevertheless, there is one norm that scholars do not violate. Honest academics rigorously observe the obligation to admit all plausible perspectives into the conversation. No competent scholar may be excluded from speaking and bringing his evidence and arguments into the debate. The deliberate suppression of relevant knowledge is as serious an intellectual crime as cheating or lying. One must always allow one's competent opponent a chance to state her case.

This principle, to which most members of Science for Peace adhere in their professional lives, is incompatible with the groupthink that is normal for a social change group campaigning in a movement. As a result, there are sometimes disputes between members of our organization as to whom to invite to speak in a forum. I am committed to pluralism and will never exclude competent speakers with whom I disagree. An academic forum is not a political rally. It is not always necessary or desirable to present ideas as a debate, but if tenable theories are overlooked in one event or lecture, it is a good idea to present them on another occasion.

The three types of organizations—clubs, social change groups, and scientific communities—have different criteria for membership, but they all have some standards. Clubs want members who are socially compatible and who avoid conflict. Social change agents want members who work together congenially to promote a shared policy regarding a controversial issue. Scholarly associations want members who are competent to judge conflicting evidence and arguments fairly so as to get closer to the truth.

Since Science for Peace combines all three types of organization, we must fulfill all three objectives and we can do so if we bear in mind what they all three have in common. They are all communities of discourse. We talk.

### **Edifying Discourse**

We have neither abolished nuclear weapons nor put an end to the military industrial complex. However, we have kept a conversation going that needs to be shared widely by all of humankind. By reading, writing, and talking, we are contributing. We talk to each other and we talk to our friends, our families, and strangers. And there is ample room for improving the quality of our conversations. As Michael Oakeshott eloquently noted,

“As civilized human beings, we are the inheritors, neither of an inquiry about ourselves and the world, nor of an accumulating body of information, but of a conversation, begun in the primeval forests and extended and made more articulate in the course of centuries. It is a conversation which goes on both in public and within each of ourselves.”<sup>31</sup>

Likewise, Jürgen Habermas offers his “theory of communicative action.”<sup>32</sup> He considers the human mind to be precisely that conversation taking place “both in public and within each of ourselves.” We learn to do it well through participating in what he calls the “public sphere.”

Habermas noted that a reasoning public emerged in Europe during the 18th century in coffee houses, clubs, and salons. Participation was voluntary and fairly independent of the economic and political structures, giving rise to a shared culture and a conception of the common good. This civil society gradually became able to resist unrepresentative government and demand change. However, such contacts have gradually declined, so that today public opinion can be manipulated through the mass media. Habermas’s project is to revive the public sphere and restore widespread public debate.<sup>33</sup> That is our task too, but it is not easy.

The sociologist Robert Putnam has also shown that participation in voluntary associations has diminished during recent decades—in response, he supposed, to the popularity of television.<sup>34</sup> We might attribute it today more to the Internet. However, the Internet does let the audience offer ideas, as well as receive them, which was not the case with television or other “broadcast” media. Overall, the Internet benefits public discourse, though individuals can choose only messages that fit their preconceptions. This can sustain ideological narrow-mindedness, unless people discipline themselves never to filter out messages that they dislike.

In that respect, Science for Peace must be more than a

<sup>31</sup> Michael Oakeshott, “[The Voice of Poetry in the Conversation of Mankind](#),” *Rationalism in Politics and Other Essays*. (London: Methuen, 1962) pp. 196-98.

<sup>32</sup> Jürgen Habermas, *Structural Transformation of the Public Sphere: An Inquiry into a Category of Bourgeois Society*, tr. T. Burger and F. Lawrence (Cambridge, Mass: MIT Press, 1989 [1962]).

<sup>33</sup> Jürgen Habermas, *The Theory of Communicative Action*, tr. Thomas McCarthy, vol. 1 (Cambridge: Polity Press, 1984 [1981]).

<sup>34</sup> Robert Putnam and Lewis Feldstein, *Better Together: Restoring the American Community*, Toronto: Simon and Schuster Canada. <http://www.caj.ca/principles-for-ethical-journalism/>

club, for clubs avoid controversy, whereas we must court it. We are both a social change group and a scientific community, so we are certain to have more conflicts than would a friendly club. That presents problems, since we think of ourselves as a peace group—which supposedly means that we should not have conflicts.

Nonsense! Peace is not the absence of conflict; it's the absence of violence and verbal abuse. As scholars and activists, we need to fight effectively but fairly, seeking in our conflicts to illumine instead of obscure the truth. I will leave it to others to teach warmth and kindness; I will be satisfied to promote basic civility between people who disagree fervently.

We are a club, yes, and also an agent of social change and a scientific community. To function in all three ways, we must uphold certain discursive standards. Conflicts are not always fun, but they are our specific responsibility as scientists and peace workers. We just need to fight fairly, so as to enhance our controversial conversations. Fortunately, the basic principles are unambiguous, so let me offer a few peremptory reminders here.

There are legal differences between defamatory statements that are spoken (which may be *slandorous*) and printed (which may be *libelous*). There are also differences between the mere expression of opinion and the allegation of facts. For example, I may freely call someone a “clueless, sexually unattractive jerk,” for that is only my personal opinion, but if I call him a liar, a thief, or a terrorist, I had better have strong evidence of his misconduct, for I may be sued for libel.

More leeway is allowed for speculating publicly about the behavior of “public figures” than of ordinary citizens. Nevertheless, when giving a public speech, it may be less persuasive for a scientist to howl vituperative accusations against the prime minister than to offer a reasoned analysis of his bad decisions.

Let’s all improve our verbal skills, if only for the sake of our own souls, for this was the third recommendation that the Buddha prescribed as the “Noble Eightfold Path”—right vision or understanding; right emotion; right speech; right action; right livelihood; right effort; and right mindfulness. I myself have a sharp tongue and more often get into trouble for telling the truth (bluntly) than for lying; maybe I should improve my skill with the white lie for the sake of politeness.

Fortunately, as the editor of *Peace Magazine*, I am more conscious of the ethics of written discourse. Journalists must pay attention to the rules that determine whether a statement is fit to print, for it is their role to expose

wrongdoing to public scrutiny, and that is a risky responsibility. One wrong news report can mislead world leaders and cause a war. Another unverified story can ruin the reputations of innocent persons. Libel laws properly afford redress for some victims, but others, including myself, ignore abuse rather than resort to lawsuits that they could win.

Anyway, legal precedents and professional journalists have elaborated some basic standards, which not only journalists and editors, but everyone who writes for publication or for the Internet, should emulate. Here are a few of the main principles from the long guidelines by the Canadian Association of Journalists.

- We are disciplined in our efforts to verify all facts.
- We make every effort to verify the identities and backgrounds of our sources.
- We seek documentation to support the reliability of those sources and their stories, and we are careful to distinguish between assertions and fact.
- When we make a mistake, we correct it promptly and in a transparent manner.
- We give people, companies, or organizations that are publicly accused or criticized opportunity to respond before we publish those criticisms or accusations. We make a genuine effort to contact them, and if they decline to comment, we say so.
- We independently corroborate facts if we get them from a source we do not name.
- We do not allow anonymous sources to take cheap shots at individuals or organizations.
- We encourage our organizations to make room for the interests of all minorities and majorities, those with power and those without it, holders of disparate and conflicting views.
- We clearly identify news and opinion so that the audience knows which is which.

### **A Pledge**

As academics, most Science for Peace members are already well versed in the norm requiring us to cite sources and evidence for our conclusions. Speaking and writing have consequences, and we understand our responsibilities. We have all submitted articles for publication that have been rejected. We have also

critiqued the work of others and (probably even more often) have suffered upon reading a negative review of our own article. That is the life we have chosen. It is a privileged life and, if we are lucky, it enables us to add knowledge and even wisdom to humankind's storehouse. I thank Karl Popper, Jürgen Habermas, Cass Sunstein, and Robert Putnam for reminding me to be faithful to this high calling. And in turn, I will always remind other scholars that fair, honest, truthful, courageous, serious discourse is the only thing we have to offer in payment for our privileged lives. Whether we aspire to become Buddhas or not, let us all cultivate "Right Speech."

*Metta Spencer is the President of Science for Peace and Professor Emerita of Sociology at the University of Toronto.*

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## **Report of the Working Group on Freedom of Research**

*By Chandler Davis*

There are several sides to scientific freedom: freedom to conduct research, access to the physical tools and contact with other researchers, and freedom to publish and otherwise communicate with the scientific and general public. All of these have been threatened in recent years.

Prior to the recent federal election, many policies of the federal government were of concern: the muzzling of scientists in government programs, closing of some federal labs, and so on. This Working Group, then chaired by Margrit Eichler, was active in exposing the problems. In order to be free of constraints on advocacy, some of the efforts were transferred to a new organization, Our Right to Know, which unlike Science for Peace does not have and does not seek charitable status, hence it is free to devote as large a portion of its effort as desired to public advocacy. Margrit heads the new organization, but she remains an officer of Science for Peace and an active member of this Working Group. Many of the activities of both organizations have been in cooperation with Jim Turk, first in his role as Executive Director of the Canadian Association of University Teachers, and since 2015 as head of the Centre for Free Expression, an activity of Ryerson University. Jim is also active in this Working Group.

We need to still keep watch on federal policy for while the Liberal campaign promises were encouraging, it is by no means assured that: scientists will be free to publish results, earlier cuts in funding will be made good, or the emphases in federal funding on science will be guided by

the public good rather than by large corporations. (We recall that NSERC under the previous Liberal governments vaunted joint projects with business.)

Science today is largely distorted by the influence of corporations, whether in the research they directly subsidize or by setting the agenda of universities and of regulatory bodies. Several of us have been working on penetrating the fog of misinformation. In particular, some of us have tried to get more credible appraisals of the health risks from genetic "engineering", where Philip Regal of our group and others have found regulatory agencies using inadequate methodology to approve release of new strains. Some of us, especially Elia Abi-Jaoude and Harriet Rosenberg, are promoting RIAT, Restoring Invisible and Abandoned Trials, the philosophy of preserving the information obtained in unsuccessful pharmacological research. In particular, Elia co-authored with David Healy and others a painstaking re-evaluation of the original (unpublished) data from a large clinical trial (published, prominently) of an anti-depressant, Paxil. A great deal can be learned from the way in which the original article gave over-optimistic evaluation of both the effectiveness and the safety of the drug, and from the reactions to the Healy team's critical article.

Such cases illustrate some of the problems which interfere with scientific communication today in such lucrative fields. The individual scientist is under severe financial pressure to bring in, or claim to bring in confirmation of results favouring profitable products; the scientist's impartiality in examining evidence is compromised by conflicts of interest, in particular in the case of peer review for regulatory bodies or professional journals; journal articles may be written by anonymous employees, so that confidence in them, based on the nominal authors' qualifications, is misplaced. Perhaps most fundamentally, the selection of the topic of costly large-scale research is biased from the start in favour of the kinds of measures (whether therapies, crops, power sources, or something else) which could be commercialized. Even if the world research effort gave only correct answers to questions, this bias would keep it from serving the world justly, for lack of asking the proper questions.

There is much to learn. Our group welcomes new members, whether people, who are already working on these subjects (there are many more than we are in touch with), or students, or non-specialists.

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## Report of the Working Group on Drones

*By Michel Duguay*

### Debating armed drones

Drones have become ubiquitous and low-cost. They can be as small as birds, carry high resolution cameras, and be remotely piloted with great accuracy. Drones are mostly used for surveillance, but the Canadian Royal Air Force is now requesting that the Trudeau government authorizes the purchase and the development of armed drones.

This raises the question, what the armed drones will be used for and in which theaters. Given the levels of integration between Canadian and American armed forces, will the targeted killings of individuals or groups in other lands during peacetime be authorized, as the U.S. government now does, despite the fact that unintended casualties occur among civilians. Or, will the use of armed drones be limited to Canadian soldiers, under command engaged in direct combat? Given the increasing precision of drones, could self-defense of Canadian soldiers be carried out by using drone-mounted nonlethal arms? International Law does not authorize governments to do targeted killings abroad in peacetime. The U.S. has been enormously stretching the right to self-defense in its use of armed drones.

In March 2016, the London Review of Books published a review of Scott Shane's 2015 book on drones. This review, authored by philosophy professor and author, Thomas Nagel, debated the question of whether targeted killings have an ethical and legal basis. Referring to Obama, Nagel wrote: "The president as killer is a chilling new face of the role of commander-in-chief. I suspect that it is the personal, individualised nature of drone warfare that many people find so repellent."

Armed drones will profoundly alter the conduct of war. Many people think that an open public debate is necessary before the Canadian government authorizes armed drones. Many people think that lethally armed drones should be banned.

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## Report of the Working Group on Community Sustainability

By Lloyd Helferty

Starting in June 2015 with the task of defining what each of the fifteen of us thought “sustainability” meant, our very diverse group of activists and scholars has amassed a wealth of understanding and determination to meet these global issues at the local level. With Lloyd Helferty’s indefatigable leadership, this working group has been very active since its inception in August 2015.

At the outset, we expressed a wish to establish an online discussion forum, using social media as well as monthly meetings, with a focus on urban food production that would link food, water, shelter, ecosystem health, and education. We should also facilitate an inclusive, grassroots understanding of justice, engagement, and involvement?. One potential strategy would be to align with other groups with similar ideals, each lending its strengths for the other’s weaknesses. To that effect we have established connections with the Climate Smart Agriculture Youth Network (CSAYN),<sup>35</sup> which is a member organization and on the Steering Committee of the United Nations **Global Alliance for Climate Smart Agriculture**, the Science for Peace working group on Environment Education, the Foundation for Building Sustainable Communities (FBSC), and the Rouge National Urban Park (RNUP).

The unifying principle for community sustainability, without which nothing else will be effective is “*Human Energy*” i.e. **FOOD**<sup>36</sup>. While a formal mandate is still “under construction”, three subgroups have formed:

1. A “Musical Biofilter” project that is being spearheaded by Dr. Brad Bass. This would

<sup>35</sup> Formerly ‘hosted’ by **Trent University’s** Sustainable Agriculture and Food Systems Program in Peterborough. See: <http://www.trentu.ca/agriculture/overview.php>

<sup>36</sup> The one [1] kind of energy that *cannot* be produced using geothermal, hydro, ocean energy, solar, wind or even Nuclear energy sources, and cannot be ‘substituted’ by anything else is FOOD. Food is and has always been absolutely *essential* (vital) for the maintenance of *all* societies and civilizations throughout all of history, and will remain so *long into the future* (i.e. essentially forever). Note: Humans remain “*biological beings*” that are forever tied to *this planet* and the *ecosystems on this planet*. Our “challenge” is to improve upon the Canadian Pugwash Group Global Issues Project *roundtable on food and population*. Our underlying issue: “What types of **social, political, economic and technological** systems will *most likely* provide the *Greatest Benefit* to society, but also with the *least* environmental, social, and other ‘external’ costs?”

consist of a practical, low-budget Green Wall to clean water, which would also be a sculptural installation that can play music, while also growing food and cleaning up algae blooms in the instrument (through removal of nutrients from the water). This is not just a musical instrument, but a practical project with a fun element.

2. “Rouge National Urban Park Proposal” (RNUP/RPP), which is an evolution of the CURRENTS project, seeks to incorporate issues of food security, energy co-production and conservation, and new technologies. The group plans to produce a “White Paper” (an overarching ‘Vision Proposal’ for community outreach and education programs that might eventually be developed in the RNUP). It is being spearheaded by Harry Ha and includes two sub-projects:
  - a. A (private) Biomass Thermal Energy Continuous Pyrolysis Reactor Technology (BTECPRT) sub-Project with some of the members of CoSWoG who aim to develop it. This is also being led by Harry Ha and is being incorporated into the overall “vision document” that has been prepared by Harry.
  - b. The RNUP “Climate Smart Victory Gardens” [and *Climate Smart Kitchens*] sub-Project that is being led by Joan Kerr from [The Foundation for Building Sustainable Communities](#) (FBSC), and which sees a vision for the development of some Youth Education, Training and [Citizen] outreach programs in the RNUP (possibly in conjunction with CSAYN-Canada at their [proposed / new] Headquarters in the RNUP).
3. A high level Roundtable to look at Ontario’s Future in 30+ years to be set up by the Premier of Ontario proposed by Derek Paul. All members of the CoSWoG Group, who may have an interest in Medium-Term Sustainability in Ontario, should contact Derek.

*Lloyd Helferty is an engineering technologist with more than 10 years of experience working for various multinational corporations in Canada and around the world. He is acknowledged to be one of Canada’s pioneer leaders in the development of the Biochar industry. He can be reached at: [LHelferty@biochar.ca](mailto:LHelferty@biochar.ca).*

## Report of the Working Group on Good Global Governance

By Helmut Burkhardt

### Members:

Helmut Burkhardt, coordinator  
 Norman Dyson  
 Rose Dyson  
 Brydon Gombay  
 Julia Morton-Marr  
 Tom Simunovic  
 Peter Venton  
 Adnan Zuberi

It makes sense to regulate international affairs by the rule of global law instead of military might. Most people agree with this statement. It is safer, more economic, and more ecological than the chaotic violence that we observe in traditional global politics. However, many say proposing such a good world order is unrealistic, it will never happen because nations won't give up their sovereignty. Also, some are afraid that the concentration of power of a global government is dangerous. The mandate of our working group is education. Politicians and the general public need to become aware that:

- Unlikely events, if they make sense, sometimes happen unexpectedly.
- The mandate of a global government is to solve global problems, preventing climate change and wars. An individual will hardly notice that another level of government has been added.

### Will Nations never give up Sovereignty?

On December 12, 2015, in Paris all the UN member nations did just that. It is a historic event, when all the heads of state signed the global climate change agreement, which required giving up some of their sovereignty and subordinating their national interest to the common good of preventing global climate change. The absolute sovereignty of nation states was weakened at the Paris Global Climate Conference (COP21). In order to build on this momentum, the Science for Peace Working Group on Good Global Governance has written an open letter to all the heads of state that proposed a follow-up global agreement on replacing war with international law. Here is the text of the open letter:

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#### *Open Letter to 195 Heads of State*

*The undersigned congratulate all heads of state on the successful Climate Change Agreement on December 12, 2015 in Paris. This is a historic event because national sovereignty was subordinated to global rules (?) of climate change for the sake of the survival of human*

*civilization.*

*The undersigned propose to all heads of state a follow-up global agreement on the elimination of war. Weapons of mass destruction make the elimination of war by the rule of law necessary for the common good of humankind.*

*Respectfully, On behalf of the Science for Peace Working Group*

*on Good Global Governance for a Just and Sustainable World*

*Professor Helmut Burkhardt, Dipl. Phys., Dr. Rer. Nat., Coordinator*

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*[www.goodglobalgovernance.org](http://www.goodglobalgovernance.org)*

*All other signatories, individuals and institutions, are listed on our website.*

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The open Letter has so far been sent to the leaders of the most powerful nations and it is published on our website at: <http://goodglobalgovernance.org/open-letter-to-195-heads-of-state/>. Individuals and institutions can add their signature there. In order to get political traction, we need millions of signatures. We ask all Science for Peace members to sign the open letter. We also have asked Science for Peace to sign the Open Letter, as an organization.

### Is Good Global Government dangerous?

Many are afraid that the concentration of power within a global government is dangerous. However, governments at the local, provincial, national, and global levels are necessary to prevent chaos in these complex human systems. Governments are social tools, which may be applied for good or bad ends. A government at any level can be beneficial or dangerous, depending what its mandate is.

The mandate of a good global government is to focus on issues of global scope only that are outside of the jurisdiction of national governments. A good global government must regulate a) the interaction of nations, and b) the use of the global commons, i.e. the oceans, the polar regions, the atmosphere, and outer space. An individual interacts mainly with local and national governments and would hardly notice the addition of a government at the global level. There is no danger in a well-designed global government. However, political actors must be on guard to avoid the danger of corruption in all levels government.

### Other Activities of the Working Group

We have created the website

[www.goodglobalgovernance.com](http://www.goodglobalgovernance.com). Please visit the website to see other ideas that we have discussed via online dialogue and during the face to face meetings.

*Helmut Burkhardt Dipl.Phys., Dr. rer. nat.*  
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## **Report of the Working Group on Oceans Ocean Frontiers: the pragmatic search for peace**

*By Venilla Rajaguru*

### **Introduction**

The Ocean, our global commons has long been divided by territorial conflicts and competitive claims over marine and seabed resources. Zealously guarded and patrolled by naval vessels and surveillance aircraft, nationalized seas and transnational waterways of the Arctic, Indian, Atlantic, and the Pacific are not just utilized as natural resources of food, transport and trade but also as a militarized medium for asserting national and transnational power. Human history has not just been about medicinal science and technological advancement of weaponry, nor just about the evolution of global trade contracts. Human civilizational progress, migration, territorial conquests, and trade has predominantly been about the strategic use of oceanic realms as sites of inter-state naval battles, risky places of piracy and plunder of trade goods, and common passages of human and weapons trafficking. In the new millennium, oceanic realms are also feared to be spaces of terrorism by non-state actors, and therefore nationalized seas and transnational waterways have rather responsively evolved from being treated as just earth's planetary resource to national and multilateral maritime defense spaces against both terrorist networks and inter-state rivalry. Furthermore, the testing of nuclear weapons and drones at sea, undersea nuclear submarine activity, undersea leakage of spent nuclear fuel callously deployed in flawed submarines, undersea deployment of sea mines and construction of artificial islands to function as militarized outposts at sea have now emerged as part and parcel of military infrastructure building processes for various nation-states. Some of the most controversial instances of militarized infrastructure building that has turned peaceful waterways and islets therein into strategic frontiers of missile defense, endangered human security and violence are Diego Garcia in the Indian Ocean, the Spratly archipelago in the South China Sea region of the Western Pacific, the Barents Sea and the Northwest Passage in the Arctic.

### **Predominant Issues of Ocean Frontiers**

Ocean frontiers fall into two broad categories: 1) strategic sea passages with militarized islets for maritime defense, and 2) industrialized ocean spaces that are

protected militarily as national security areas and as nationalized exclusive economic zones for harvesting marine resources and extracting minerals as well as energy sources from the seabed. The global commons of oceans space has recognizably devolved from its ideal vantage as the common heritage of mankind into divisive areas of continental shelf regions, nationalized territorial seas and state-owned industrial economic zones in maritime passages. In the territorially divided ocean spaces, there are two fundamental issues undermining peace:

- i) The first issue is territorial boundary disputes at sea, which emerge from multiple claims of coastal states over the same resource rich waterways in strategic maritime and mercantile parts of the sea, in order to build and expand transnational maritime defense, nationalize and own marine and seabed resources while claiming the airspace above them to assert national air defense zones. Widely reported cases in public news on these types of territorial boundary disputes are those between the Arctic nation-states in the Canadian North, and the South China Sea disputes between China and the Southeast Asian coastal states.

Maritime boundaries in the Post-WWII period are predominantly established by the geodetic science of surveying distances seawards from land, and dividing water boundaries of two adjacent coastal states by measuring the meridian and equidistant lines between them. However, there are uncertainties in the way measurements are done, i.e. how and where the points of measurement of a coastal terrain is chosen for seaward measurement, especially when the coastal terrain is uneven with numerous protruding coastal ridges above and below water. Asserting the certainties of watery geographical boundaries can be challenging as writing on water, and unlike borders that can be drawn on terra firma. Measuring the maritime zones and territorial boundaries of an archipelagic nation with numerous islets is even more tricky, but not impossible. Yet, national territorial claims of sea passages also do not strictly abide by scientific measurements of boundary divisions, and tend to be based on historical claims of pre-world war occupation of the region by former dynasties, and civilizational stake in the region such as China's historical claims in the South China Sea, alienating other coastal states in that region.

- ii) The second issue is extra-territorial assertion of transnational power by maritime states in high seas and also within the maritime boundaries of another nation-state. The freedom of the seas has come to be accepted as a customary principle of

navigation by maritime states since the Dutch philosopher Hugo Grotius published *Mare Liberum (Free Sea)* in 1609; and the freedom of navigation is now a codified tenet of international law since the 1982 UN Convention on the Law of the Sea (UNCLOS III) – Yet, when the freedom of navigation of one maritime nation-state is being used for surveillance, conducting military exercises, testing of military equipment, particularly testing of nuclear powered submarines within another country's maritime boundary or close to another country's coastline, it alerts and provokes the defense of that country close to which the transnational military prowess of the maritime nation is being demonstrated. Such cases reported in public news include disputes of Russian activities near Norway and Denmark boundaries, and the U.S activities in and near China's claims of a maritime frontier in the South China Sea.

Each ocean frontier issue, though local to a country or continental shelf region, is essentially transnational in scope, involving bilateral power struggle and/or multilateral claimant states. The impact of ocean geopolitics is international in impact due to the weaponization of waterways and militarization of outposts at sea. The peace threatened by militarization of oceanic realms is not just at the political level of nation-states, but also involves endangered human security of civilian communities that live close to disputed boundaries and travel across conflict regions at sea such as fishermen, civilians employed as maritime militia, tourists and travelers by sea and air travel. Civilian aircraft disasters above disputed and militarized maritime space is another indicator of an alarming lack of human security. The predominant question in favor of armed defense has however been on the line of skepticism, querying if disarmament can ensure national security and protection to citizenry – in short, what security can nations have without military power of defense? Military security can however be argued as human insecurity! The pertinent question, in contradistinction, that needs to be asked globally is what can science and technology do to ensure human security and international peace? If nuclear missile stockpiling at sea, for the purpose of regional maritime boundary disputes, can threaten the world at large with its mass destruction capabilities, what antidote can science and technology invent, develop and nurture to ensure international peace through complete disarmament? As opposed to blind idealism, these questions are about a tangible and pragmatic search for scientific, cultural and technological developments that would help root out conflicts through cyberspace and through innovative socio-technical programs without involving devastating explosive weaponry. A world of

complete disarmament would also mean a world of cooperation based on legally binding agreements for mutual and international peace, of multilateral institutional governance of standards of cooperation and accountability, joint development of natural resources and regulation of science and technology for peaceful purposes.

### **The Call for Peaceful Science & Technology**

What scientific advancement, as opposed to weaponry, will ensure peace in the embattled and perilous zones of Ocean Frontiers? What regulatory governance of science and technology can ensure peace in conflict ridden maritime frontiers? These questions are not only futuristic, calling for national and international investment in strategic peace R&D, but are also central to the research of the Ocean Affairs Working Group. Though non-traditional security such as rising sea levels endangering small island-states are of interest to this working group, the main preoccupations are two-fold: i) science and technology for peace; and ii) conflict and peace studies of perilous ocean frontiers. Constituted as a research and educational group in 2015, this working group is guided by the following mandate:

*This working group will share research knowledge on the scientific and technological practices that affect the stewardship of ocean ecology, maritime security and international peace, in order to facilitate and promote knowledge production on emerging issues in ocean space and resource governance.*

*This mandate stems from the recognition that the global commons of the Ocean is, today, not only a major source of oxygen and food for the human race, but also a critical space for enforcing national security, transnational maritime cooperation and international peace.*

*Working group methodology will include expert roundtables, educational workshops and scholarly publications. This research group welcomes inter-disciplinary studies that engage with a range of critical approaches, including policy level research, epistemological and legal inquiry, geospatial analysis, political and environmental issue-based studies.*

Integral to this mandatory guidelines for research and education on ocean frontiers studies, is the vision to promote inquiries into S & T research for peace, and S&T regulatory governance for establishing peace. The most important and overarching point of course is how we understand, construct and practice peace. The final frontier questions that cannot be evaded are these: What do we mean by peace? When do we reject military dominance and deterrence? Whose version of peace gets enforced or rejected? What are the necessary steps to the governance of peace and human security in our divided global commons of the ocean?

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## Report of the Working Group on Nuclear Weapons

Despite the well documented and well publicized catastrophic consequences from any use of nuclear weapons, over fifteen thousand remain as an existential threat to both human civilization and the entire ecosystem of our planet. They are the only weapons of mass destruction not yet prohibited under international law; and there are currently no negotiations underway for nuclear disarmament. Our world is under increasing risk of nuclear terrorism and proliferation because of the refusal of possessor states to negotiate on the elimination of these weapons.

The doctrine of nuclear deterrence stipulates that nuclear weapons, by virtue of their extreme destructive power, deter adversaries from attacking; and it is held by not only the nine nuclear weapons possessor states, but also dozens of countries, including Canada, which trust in the ‘protection’ of nuclear weapons through military alliances, such as NATO. However, this irrational doctrine, rather than providing security, has the potential to destroy everything.

The Science for Peace Nuclear Weapons Working Group exists to inform citizens and political leaders about this critical issue and to influence our government toward a nuclear weapons-free world. As part of the Canadian Network to Abolish Nuclear Weapons, we work with other organizations to stay abreast of international developments and initiatives in this field and provide input and recommendations for achieving a legal ban on nuclear weapons leading to a [Nuclear Weapons Convention](#), which would prohibit the development,

testing, production, stockpiling, transfer, use, and threat of use of nuclear weapons.

This is a formidable task, and one which some of our group members have been involved in all of their lives. However, we remain optimistic because thousands of bright young people in Canada and internationally are engaged in this issue. They realize that the continued existence of these weapons place the future of humanity in jeopardy and are committed to achieving a nuclear weapons-free world. Failure is not an option, and all of us must do our part for the sake of our children and grandchildren.

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## Report of the Working Group on Nonviolence

It was an obvious question for a civil resistance workshop, but still unnerving. “What would happen if Donald Trump took the White House and tried to invade Canada?” It came up near the end of the February 27 and 28 seminar organized by Science for Peace’s Working Group on Nonviolent Resistance and Civil Society.

The scenario was introduced by Maciej Bartkowski, a scholar at the Washington-based International Center on Nonviolent Conflict, which graciously provided four academics to lead the intensive and riveting sessions. Bartkowski “gamed through” possible responses on behalf of the Canadian population, but after two days of deep immersion in resistance theory, participants had a pretty good idea what a successful anti-occupation uprising would look like.

Indeed, the whole jammed-packed nine-to-five affair in University of Toronto’s Bahen Centre was all about the protocols of revolt.

So here’s the dope: according to the four lecturers, social revolutions are frighteningly hard to achieve and fraught with danger. In sad fact, struggles fought nonviolently only have a 53% success rate. On the other hand, armed movements are likely to triumph only half as often, a meager 26% of the time. And five years after a campaign ends, a society is more than twice as likely to be a democracy if the gains were made without arms. (See authors Erica Chenoweth and Maria J. Stephen for more)

As ICNC president Hardy Merriman put it, “There will

be spectacular failures in all transitions, but a nonviolent one has a much better chance.” Democracy, he said, “is in the DNA of civil resistance.”

Several university programs co-hosted the seminar, which featured eight sessions, an astounding array of research data on weaponless struggle, and a survey of best-practices protest options under dictatorship. In presenting revolution as a methodology, the four lecturers drew material from First Nations uprisings, India’s independence movement, Poland’s anti-communist struggle, the anti-apartheid upsurge in South Africa, the ill-fated resistance in Egypt and Syria, and a whole lot more.

It was a kind of a dream weekend for the Working Group members, who’ve spent the months since our formation in May 2015 examining civil resistance through film and discussion, from non-cooperation under Nazi occupation to the U.S. civil rights movement, the OPTOR uprising, the Orange Revolution, and more. Many of us were looking forward to absorbing the big theoretical picture.

“Nonviolence is a science,” ICNC president Hardy Merriman told the audience of 80 students, professors, activists, and a crew of engaging participants from the Royal Military College, “but it’s not a formula.” Not a formula, but it does have a rulebook, and professor/activist Tom Hastings offered a quick summary of the key maxims: “Frame the uprising as nonviolent; frame the challenge as respectful; frame the insurgency as just; frame violence as injustice.”

The message was compelling, though daunting. Social movements can’t ride on anger or caprice. They have to be disciplined, proactive, creative, have a long-term vista, know how to negotiate, escalate, and de-escalate, and most important, they have to convince the violence-prone in their midst to hold their fire and let mass resistance do its work – all major challenges, as the stunning failures in Egypt and Syria attest.

“Seventeen days in Tahrir Square couldn’t change Egypt,” the ICNC’s Maciej Bartkowski pointed out. “In Tahrir they ran a polis based on transparency for 17 days,” but, he said, the Poles ran a civil resistance for 30 years. It takes time, focus, and skill, but only requires 3.5% of the population, provided it’s a diverse 3.5%. And unarmed struggle has three times the participation rate of uprisings where the guns come out. “Nonviolence is like social capital on steroids,” Bartkowski said.

Where movements tackling oppressive governments directly are not possible, ICNC scholar, Shaazke Beyerie, demonstrated the possibility of a low-key subversive action, like the citizen monitoring of corruption in treacherous countries, like Afghanistan, or the promotion of Mafia-free products in dangerous regions of Italy. “If you want to be nonviolent in a violent context,” she advised, “you have to have a success.”

By the end of the weekend, soaking in strategic nonviolence concepts, many Working Group members were pretty pumped by the possibilities and the challenges. Now we’re hoping for some new recruits from the participants, who got the same buzz.

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