The Global Solar Commons, the Future That is Still Possible

A Guide for 21st Century Activists

The Global Solar Commons, the Future That is Still Possible: A Guide for 21st Century Activists

David Schwartzman

October 6, 2020

To my granddaughters Juniper and Camellia and to the revolutionaries to emerge in this world from the marriage of Sam and Kelsie Junge

The Solar Utopia.org Press

Table of Contents

"A spectre is haunting the planet - the spectre of Solar Communism": wishful thinking or a real possibility?

"Communism and Science Inseparable!" 1962 Soviet postcard, commemorating the Sputnik 1 launch of 1957

Introduction

First the obvious, our current deep global crisis must be confronted before I introduce the focus of this book, my argument for a potential path to a 21st century planetary civilization, the Global Solar Commons, aka "solar communism". I completed five chapters of this short book only days after the WHO declared a COVID 19 Pandemic. I did not anticipate the depth of the social economic crisis this pandemic would create in just 4 months, rivalling the Great Depression of the 1930s in it severity. Like the Great Depression, the danger of a fascist upsurge again reemerges under the cloak of a populist "get us back to work" slogan, regardless of the consequences of a new spike in COVID 19 infections and deaths. But simultaneously, the fact that massive government spending has occurred, albeit mainly in the U.S. to once again bail out the big financial sector and the wealthy, has dramatically undercut the claims that a Green New Deal (GND) would be a leftist dream (1). Calls for a green stimulus in a just recovery from the crisis abound. The imperative need to organize for and win a Global Green New Deal (GGND) must now be put on humanity's agenda.

We find that even the voice of finance capital is waking up to this future. On April 3, 2020, the Editorial Board of the Financial Times declared: "Radical reforms are required to forge a society that will work for all. Governments will have to accept a more a active role in the economy. They must see public services as investments rather than liabilities, and look for ways to make labour markets less insecure. Redistribution will again be on the agenda.... Policies until recently considered eccentric, such as wealth taxes, will have to be in the mix." (2).

Likewise, we find brilliant proposals focused on the needs of the global South.
"170 Dutch academics sign manifesto for sustainable, equal and diverse societies based on international solidarity…

We propose five key policy proposals for a post-Covid-19 development model, all of which can be implemented immediately and sustained after this particular crisis has subsided:

1. **a move away from development focused on aggregate GDP growth** to differentiate among sectors that can grow and need investment (the so-called critical *public* sectors, and clean energy, education, health and more) and sectors that need to radically *degrow* due to their fundamental unsustainability or their role in driving continuous and excessive consumption (especially private sector oil, gas, mining, advertising, and so forth);

2. **an economic framework focused on redistribution**, which establishes a universal basic income rooted in a universal social policy system, a strong progressive taxation of income, profits and wealth, reduced working hours and job sharing, and recognizes care work and essential public services such as health and education for their intrinsic value;

3.**agricultural transformation towards regenerative agriculture** based on biodiversity conservation, sustainable and mostly local and vegetarian food production, as well as fair agricultural employment conditions and wages;

4. **reduction of consumption and travel**,with a drastic shift from luxury and wasteful consumption and travel to basic, necessary, sustainable and satisfying consumption and travel;

5. **debt cancellation**, especiallyfor workers and small businessowners and for countries in the global south (both from richer countries and international financial institutions).” (3)

Vijay Prashad has proposed A Ten-Point Agenda for the Global South After COVID-19 **(**4**)**:

“Neoliberalism has driven the the world system into a cul-de-sac. The Global South must lead in building a new international economic order…

1. Tackle the global pandemic.

2. Broaden medical solidarity.

3. Create an intellectual commons.

4. Cancel debt.

5. Expand food solidarity.

6. Enhance and invest in the public sector.

7. Implement wealth taxes.

8. Enact capital controls.

9. Shift to non-dollar-based regional trade.

10. Centralise planning, decentralize public action. "

In the depth of the COVID 19 crisis, the police murder of George Floyd on May 25, 2020 triggered protests challenged the regime of white supremacy on a national and international scale that no one had anticipated.

"Most striking are the intercontinental mobilizations and political repercussions of the anti-racism movement. How much the sudden global anti-racist movement owes to the collective experience of the pandemic is unclear, but the coincidence is undeniable. Out of the US Black Lives Matter has become the global most powerful anti-racist movement since the international anti-apartheid campaign. The second movement, against femicide and violence against women, has been stoked directly by the pandemic confinement effects of aggravating violence against women. Spearheaded from Mexico and South Africa with their bitter experiences, it is also a global movement of rejection of violence and exclusion." (2).

As Barbara Ransby noted "The current uprisings are what class struggle in the 21st century looks like. (5). And potentially this mass upsurge contributes to the growth of a transnational subject of sufficient power to force a GGND. Meanwhile I take note of the newly released plan "Solving the Climate Crisis" from the U.S. House of Representatives for a U.S. GND which could be the basis for a green stimulus out of the deep social economic crisis (6). But as Kate Aronoff's critique so accurately argued it is far from a plan for a GGND (7). Similarly, the European Commission (EU) has produced a plan for "A Green New Deal for Europe (8).

Even in this global depression the growth of wind energy is slowing but still resilient, in contrast to the welcome declines in fossil fuel consumption, especially coal and natural gas (9). Another excellent development for the climate justice movement: major oil and gas pipelines are being blocked because of legal challenges and the decline in their profitability (10).

I conclude this section with a poem by my friend and collaborator, Quincy Saul (11):

Who Made the Plague?

(A nursery rhyme for grownups)

Who made the plague? the children asked, Let the villains be unmasked And all the children gathered round To hear the parents of plague expound.

I, said the wet market, I made it profit, I made the plague.

I kept pangolins and bats in cages

And wrecked the wilderness for wages.

Breeding disease for pleasure and gain,

I, said the wet market, I caused the pain, I made the plague.

No I, said the factory farm, I caused the harm, I made the plague.

Food was the best medicine; I turn it to pestilence.

In vast animal prisons and oceans of shit,

I'm the source of the scourge that keeps people sick.

I defile from seed to slaughter, poisoning soil and sky and water –

I, said the factory farm, I made the plague.

No I, said the chainsaw, I am the law! I made the plague.

Whatever the wrath, I clear the path.

Whenever the curse, I was there first.

I cut down the groves where medicines grow,

I topple the trees you need to breathe.

Deforestation is my delight; I block the exit from this plight.

I, said the chainsaw, I made the plague.

No I, said the car, plague is par for my course – I made the plague.

I am the pandemic czar; I help the virus travel far

While filling the air with particulate matter, which helps it transmit even faster.

They cut down the trees to make room for more me,

I, said the car, I am the arsonist, I made the plague.

No I, said the doctor, I am the rock star, I made the plague.

My practice is vain, my theory is vague; I own this plague!

The sicker the people, the richer I get –

It's obvious where I place my bets.

I did what I was told to earn these robes,

Now I listen rarely, and heal people barely. I, said the doctor, I made the plague.

No I, said the pharmacy – drugs are destiny! I made the plague.

I dilute the cure to keep profits pure,

I keep science slow so diseases can grow.

My waste is prodigious, and your faith in me religious.

Bullets may kill, but I rule war and peace with pills.

I sow debt and reap fear, buying cheap and selling dear –

I, said the pharmacy, I made the plague.

No I, said the scientist, I persisted, I made the plague.

I labored long inside the lab,

In armor of abstraction clad,

For lofty aims and logical reasons

Weaponizing infections diseases.

Later, I will make a cure! I assure you my intentions are pure.

I, said the scientist, I patented this plague.

No I, said the school, I trained these fools, I made this plague.

I did the casting for this show;

I taught these characters all they know.

All the people implicated in making the plague are educated.

I prepared this plague, and more to come – I turn smart people dumb.

I, said the school, I make the rules, I made this plague.

No I, said the priest, plague is my feast. I bless this plague.

My predecessors burned people who believed in germs;

I gather my flock close to hear God's word.

Fear of death is good for the church – plague works.

We plan in centuries, collecting money and souls – plague's our ace in the hole!

God bless this plague.

No I, said the police, I who serve least, I protect this plague.

I stand between problems and their solutions.

I am enemy of the revolutions which accompany all plagues.

I do the legwork. I preserve pandemic order. I patrol the border.

I run drugs and kill thugs and cover it up.

I make sure there's no cure. I, said the police, I protect this plague.

No I, said the expert, I made it work, I made this plague.

Do you know how many moving parts it takes to get a pandemic started?

In every realm of human life I helped to make this crisis ripe.

I administered and supervized and held the door to disaster wide.

I ruled the world before; the plague is my encore – I made the plague.

No I, said the commander, I have mastered disaster, I made this plague.

I planned the germ games, but that's just the start –

The world is a stage for my pandemic art.

On land skies and seas I weaponize disease.

At the summit of power and skill, I am killing for thrills.

I keep you free. Be all you can be. You, said the commander, I want you to join the plague.

No I, said the politician, plague is my mission; vote here for plague!

This pandemic came at the perfect hour –

I looted the nation and sold it for power,

And just when my hustle was becoming clear,

The plague arrived and filled voters with fear –

Three cheers! Big Brother is here! They hold him dear!

I, said the politician, I endorse the plague.

No I, said the banker, I outflank and outrank all the other contenders, I made the plague.

I issued the credit for this epidemic,

And I'll collect debts from the one that comes next.

With fractional reserves I rule the world;

I devastate with interest rates and prolong the bleeding with quantitative easing.

All the others are pawns. I am the Don. I minted this plague.

No I, said the billionaire, y'all can't compare, I made the plague.

I made the mess and I'll make it clean;

I made the virus and I'll make the vaccine,

I launch the rockets and pocket the profits,

I give people jobs to help me rob them even more,

I always want more. I, said the billionaire, I want more plague!

Or me? asked the citizen. Maybe it isn't them; did I make this plague?

I heard the warnings long before,

But I stayed behind my suburban door.

I was a sheep within the herd

And got the leaders that I deserved.

I traded freedom for comfort, and consciousness for convenience;

I gave this plague clearance.

I, said the citizen, maybe I made this plague.

And who'll cure the plague, the grownups wondered, Who will reweave what we've torn asunder? And all the grownups gathered round To hear the children's words resound.

I, said the soil,

I'm ready to toil,

I'll cure the plague.

I, said the seed,

I'll grow what you need,

I'll cure the plague.

I, said the tree,

For you and for me

For her and for he

I'll cure the plague.

I, said the bird,

I'll sing the words,

I'll cure the plague.

I, said the bee,

I'll gather the sweetness,

I'll cure the plague.

I, said the wilderness

I'll bless this destiny,

I'll pass this test,

I'll cure the plague.

I, said the child,

I'll keep the world wild,

Just by being a child,

I'll cure the plague.

Now for the main theme of this book.

The concept and the name solar communism came to me in the aftermath of the collapse of the Soviet Union at the end of 1991, with the first record in my notebook, dated January 18, 1992: "Solar Communism A Scenario for 2050". I was on a trip to the west coast of the U.S. with my family in the summer of 1992 when I wrote further notes which turned into my article published in 1992 (12). (I recall this trip for another reason, I first noticed I needed reading glasses to see the fine print in a telephone book.)

Here is a selection:

"The second contradiction of capitalism forces a reexamination of the very principle proposed to guide a communist society: **"From each according to her ability, to each according to her needs"** [bold added]. We must now define "each" and "her" as referring both to human beings and to nature (ecosystems). Further, if socialism as a transition to communism is to be viable, this new principle must be progressively applied to this mixed social formation, between two modes of production…I suggest we begin, as socialists, to project a vision of a radical reconstruction of society together with a restoration of the biosphere, namely – a goal of **planetary solar communism** [bold added] that would harness the power of information

technologies and renewable energy sources to realize the dream of utopian and scientific communism." (13)

The second contradiction refers to the formulation of James O'Connor the founding Editor of the journal Capitalism Nature Socialism, the contradiction between the forces/relations and conditions of production (above all nature) (14).

I am a "red diaper baby", i.e., my parents were active Communist Party members who first met in the Young Communist League in Brooklyn New York around 1940. I started reading the Marxist classics when I was about 12 years old, finding these pamphlets in a cupboard below the family TV where my father stored them during the McCarthy years. Actually I owe my very existence to the Soviet Red Army (and in a different way so do the rest of humanity for their defeat of the Nazi war machine). My father told me I was conceived in celebration of the victory of the Red Army in the Battle of Stalingrad, a fact easily verified by my birth date, October 31, 1943, since 9 months before to the day Field Marshall Friedrich Paulus surrendered. While I am convinced that the history of our biosphere is roughly deterministic, I am fairly certain at the fine level this book would not exist were it not for the Battle of Stalingrad!

Unlike many others who like me are "red diaper babies" I did not "throw the baby out with the bathwater" in a profound rejection of communist ideals faced with the realities of how dirty, full with the blood of innocents this bathwater had become. Rather, I tried to rethink the communist vision for the 21st Century. This led to the essay I wrote in 1992.

Now I am convinced I was not deluded, as we face the great bifurcation, either a plunge in the abyss of climate hell, or an Ecosocialist Horizon, followed by the Solar Communist Horizon (15). Recognizing the S word is now more acceptable than the C word, I refuse to use as a substitute a description like the culmination of global socialism or the global solar commons except as further explanation.

How similar is my concept of Solar Communism to Bastani's Fully Automated Luxury Communism? Solar communism is superficially similar to Aaron Bastani's *Fully Automated Luxury Communism* (FALC). But the reader will see that my account of the path to and

realization of solar communism is not equivalent to FALC (16). Briefly, "Luxury" sends the wrong message, with a likely common perception that the present consumption patterns of the world's billionaires should be shared by a future population of 9 billion people, a revolting vision. FALC underplays class struggle in all its global dimension, rather argues that green capital will deliver its vision of the future.

The main themes discussed in the following chapters are how we can confront the preeminent challenges of the 21st Century, namely, preventing catastrophic climate change and nuclear war with horrors far worse than we now witness, and why this will require the near future dissolution of the Military Industrial Complex, thereby opening a path for global demilitarization and cooperation, itself a prefiguration of solar communism. To summarize this vision:

> "Jodi Dean [2012] reasserts the vision of radical materialist utopia that has been buried, reburied, yet never extinguished. But to her invocation of a communist horizon in the twenty-first century one must add that this will be solar communist. An ecosocialist horizon is imperative to prevent and prefigure activity embodied in multidimensional class struggle in our world dominated by the rule of capital; to prevent catastrophic climate change and along the way demilitarize, solarize, and transform agriculture with agroecologies; to prefigure the future in the present by expanding the commons, virtual and material; and to move toward the ecosocialist horizon, reaching it and moving toward the solar communist horizon" (17).

Chapter 1. **Communism, a short history**

The vision of communism has roots in the bible. You can find something akin to "Marx's phrase 'From each according to his ability, to each according to his needs' in the New Testament: 'In Acts of the Apostles the lifestyle of the community of believers in Jerusalem is described as communal (without individual possession), and uses the phrase "*distribution was made unto every man according as he had need*"'.

Apparently, its invocation just prior to rise of the socialist movement was by Etienne-Gabriel Morelly:

'In his 1755 Code of Nature "Sacred and Fundamental Laws that would tear out the roots of vice and of all the evils of a society," including:

Nothing in society will belong to anyone, either as a personal possession or as capital goods, except the things for which the person has immediate use, for either his needs, his pleasures, or his daily work.

Every citizen will be a public man, sustained by, supported by, and occupied at the public expense.

Every citizen will make his particular contribution to the activities of the community according to his capacity, his talent and his age; it is on this basis that his duties will be determined, in conformity with the distributive laws'

Morelly apparently influenced the communist of the French Revolution, Gracchus Babeuf, who in turn inspired the utopian socialists of the 19th Century, then Marx and Engels." (1).

Babeuf used the phrase "bonbeur commun" or "common happiness" to describe the society he was advocating , its realization to be found in the reign of true equality (2).

The government of Bhutan included a Gross Happiness Index in its constitution beginning in 2008 (3). According to a recent global survey, the country with the top ranking in Happiness

Index worldwide is Finland. It should be noted that Panama is ranked 31, a country with a world life expectancy ranking 39th, just below Spain with a Happiness Index of 30, and a life expectancy ranking 6th in the world (4). Happiness or well-being is of course a subjective perception, not necessarily an objective assessment of quality of life: "The Global Well-Being Index is a global barometer of individuals' perceptions of their well-being" (5). Life expectancy is arguably the most robust proxy for quality of life. Perceptions of well-being are surely informed by individual's views of what is possible in a society at a given time, and not what is actually possible if the existing constraints on quality of life were removed. Thus, I conclude that the use of well-being and "happiness" indices are very problematic (6).

We should be reminded to how the former governor of Puglia, Italy, Nichi Vendola, a gay Catholic Refoundation Communist, responded to the question ''So what can communism mean in this day and age?'' He replied:

> "The word is redolent of light and dark. The dark was the gulags, the tragi-comic dictatorships. But we have to return to the roots and aim for true globalization: not that of the market but of human rights and the globalization of human happiness." (7)

Happiness indeed, we hear the voice of Babeuf again.

The lessons from 20th Century Socialism

We should certainly welcome a brutally honest and thorough critique of 20th Century socialist societies, recognizing and analyzing its successes and failures, rather than simply claim we support democratic socialism unlike the previous versions of "real existing socialism", which some prefer to describe as state capitalist or dismiss as unmitigated evil systems, with the popular label of " totalitarian".

The latter position may convince some but then we fail to learn from history, to work for a genuine democratic socialist future, with real social management of the economy and society.

Within the left we find two extremes regarding the experience of 20th Century socialism, in particular its manifestation in the Soviet Union. Slavoj Zizek wrote off the Soviet experience as a

huge disaster, while my father, Max Schwartzman, a staunch Marxist Leninist to his dying day, responded to my question about Stalin's role, "Stalin, he made some mistakes" (I am leaving out the even more extreme position of those who have deified Stalin as an infallible leader). I think that an accurate account is somewhere between these two extremes.

I put some historical context behind my invocation of solar communism:

'Communism was an inspiring vision to millions in the twentieth century, with well-known failures in its realization as "really existing socialism," or what some Marxists prefer to call "state capitalism". The construction of socialist societies in the twentieth century occurred in a very unfavorable context, under continuous attack by capitalist powers – starting with initial intervention soon after the Russian revolution, followed by the Second World War and the cold war. Socialist societies of the twentieth century had both real internal achievements and well-documented state-sanctioned mass suffering and death, in parallel with immense positive impacts on global politics, including the defeat of fascism, the post-Second World War end of colonial oppression, and the development of social-welfare programmes by capitalist states challenged by the benefits for working classes in socialist countries (e.g., West Germany and the German Democratic Republic)...Really-existing twentieth-century "socialism" (and its survivals into the twenty-first century) combined characteristics of communism, capitalism and state capitalism. But this is no surprise, given the impurity and complexity of a real transition from capitalism, potentially into communism' (8).

For one rather unique assessment of 'real existing socialism", the case of the German Democratic Republic (GDR), see Victor Grossman's book (9). Here is a selection from the book description:

> "His account focuses especially on the socialism he saw and lived—the GDR's goals and achievements, its repressive measures and stupidities—which, he argues, offers lessons now in our search for solutions to the grave problems facing our world." (10)

Chapter 2. Why a Global Solar Commons, aka Solar Communism?

The reader may ask why solar when other non-carbon energy sources are available such as nuclear fission. First, I must emphasize that solar is also derived from a nuclear energy source, fusion rather than fission. And this fusion reactor is at a safe distance, in the core of our Sun, 93 million miles away. While there is ongoing research and development activity to produce fusion power right here on the surface of the Earth to power global society, the fusion reactor of the Sun is readily available now to do the same, and the technologies to harness this source are already being sited with strong, but still not sufficient growth rates.

But why not nuclear fission power which boosters claim can supply backup now allegedly lacking with wind/solar technologies? In his most recent post on nuclear power, George Monbiot says that nuclear (fission) power is low-carbon and safer than you think, but rejects the massive Hinkley C project as "an expensive white elephant," while boosting the promise of small modular reactors that use nuclear waste as fuel, one of Generation III and IV nuclear power technologies (1), problematic on several accounts (2). Similarly, Paul Cockshott is a booster of nuclear (fission) power, making misleading claims about the inefficiency of photovoltaics and other issues (3). The vulnerability of nuclear reactors to climate change-induced flooding, fires and sea-level rise must be confronted (4). But leaving aside the debate about catastrophic accidents from nuclear fission power, disposal of radioactive waste, etc., an aggressive reduction of greenhouse gas emission with a chance of avoiding catastrophic climate change requires as rapid a replacement of fossil fuels as possible. Solar technologies are already here for this replacement, faster and at a lower cost than the as-yet-unproven new generations of nuclear fission power. Funding research and development for the latter diverts resources which should go to building wind/solar infrastructure.

Solar is by far the most abundant source of energy and the technologies to harness it are already growing with a near exponential global growth rate. Given a robust social management process during its lifecycle, solar power also has very low negative health and ecological impacts. Moreover, a global transition to a solar power infrastructure is actually achievable within the time frame necessary to avoid catastrophic climate change. Under 'really existing capitalism',

solar power is also the energy source most compatible with decentralized, democratic management and control, relatively free of the dictates of the Military Industrial Complex (MIC), compared to fossil fuels and nuclear power. Finally, a solar 'clean energy' transition is a critical component of the Global Green New Deal, and an ecosocialist path out of capitalism and if realized will be the product of bottom-up struggles, a profoundly democratic process.

But is it technologically possible to replace fossil fuels with solar power? Our report was apparently the first study which computed the necessary non-renewable energy (mainly fossil fuel) needed to create the renewable capacity in a solar transition scenario (5). The critical factor that leads to exponential growth of this renewable energy supply is the feedback of energy from the growing renewable capacity back into the physical economy to create more of itself. We demonstrate that with only a small fraction of the current annual consumption of energy being used for wind/solar power creation per year, we can achieve a global-scale transition in no more than 30 years, with the complete elimination of anthropogenic carbon emissions into the atmosphere derived from energy consumption, and the provision of the minimum *per capita* energy consumption level required for state-of-the-science life expectancy level for all. Further, this solar transition has the capacity to reduce the atmospheric carbon dioxide level below 350 ppm in this century. Near future research and development of wind/solar technologies, such as thin film photovoltaics, are expected to make this energy transition faster, requiring less fossil fuels to replace itself. What currently a block on a rapid transition to renewables is political economy, not the lack of appropriate technology.

The relevance of Thermodynamics

Rethinking 21st century communism requires consideration of the quality and quantity of the energy supply for global civilization, i.e., the *thermodynamics* of communism. In this context, we must confront the ever-narrowing window of opportunity to prevent the onset of catastrophic climate change (C3). The science of thermodynamics demonstrates that a solar energy source is fundamental to truly green growth, industrial ecologies and phaseout of extractive mining. I come to this conclusion from an ecosocialist critique the misleading spectre of entropy, drawn from Georgescu-Roegen's fallacious 4th law of thermodynamics which has had strong influence on the Degrowth movement. Georgescu-Roegen (1906-1994) should be acknowledged as the

founder of ecological economics. Georgescu-Roegen claimed to have discovered a fourth law of thermodynamics: "A. Unavailable matter cannot be recycled. B. A closed system (i.e., a system that cannot exchange matter with the environment) cannot perform work indefinitely at a constant rate" (6). *But the biosphere is essentially closed to transfer of matter, but not isolated with respect to energy flux, particularly solar energy.* This purported fourth law is fallacious because it neglects to account for the possible flow of energy through a system which is closed but not isolated. By converting low entropy, high temperature energy (e.g., solar radiation) to high entropy, low temperature heat, work can be performed indefinitely, including recycling. *His fallacious fourth law is at the root of Georgescu- Roegen's pessimism regarding solar energy replacing fossil fuels:* 'Georgescu-Roegen viewed the technology of the direct collection of solar radiation as "feasible" but not "viable"- possible to construct and operate, but only by continuing to rely on fossil fuel energy inputs: "All solar recipes known at are of the current and present parasites technologies therefore will cease to be applicable when their host is no longer alive" (7). The Earth's surface is open to energy transfer to and from space, but is effectively closed to mass transfer. Hence the use of fossil fuels and nuclear fission power to drive the economy can be transcended in our open Earth system by sufficient creation of a high-efficiency collection of the solar flux to Earth. *Global solar power will then pay its ''entropic debt'' to space as non-incremental waste heat, without driving us to tipping points towards catastrophic climate change, while facilitating recycling and industrial ecologies phasing out extractivism.*

Degrowth?

Likewise the argument that "perpetual growth on a finite planet leads inexorably to environmental calamity", a common invocation by proponents of degrowing the economy (8), fails to deconstruct the qualitative aspects of growth, what is growing, what should degrow, under what energy regime? The current use of fossil fuels and nuclear fission power to drive the economy can be transcended in our open Earth system by sufficient creation of a high-efficiency collection of the solar flux to Earth. Global solar power will then pay its "entropic debt" to space as non-incremental waste heat, without driving us to tipping points towards even more catastrophic climate change than has happened over the past few decades, Coming out of this

transition, which will need to be ecosocialist, a steady-state biophysical economy can emerge in a global solar communist society (9).

Many degrowthers take this position:

> "The global material and energy "throughput" has to degrow, starting with those nations that are ecologically indebted to the rest. Energy and material throughput have to degrow because the materials extracted from the earth cause huge damage to ecosystems and to the people that depend on them." (10)

However, we have argued to the contrary, that a global renewable energy supply with greater capacity than now will be needed to confront the threat of dangerous climate change, as well as to eliminate the energy poverty now afflicting most of humanity (11). A shift to a low- energy global economy would be a suicidal choice for humanity. Such a transition would condemn most of the world to a future of energy poverty even worse than at present, and forgo the chance of creating the clean energy capacity to bring the atmospheric carbon dioxide level down below 350 ppm (it is now 410 ppm). With respect to material throughput, we argue that it should *increase* globally in an ecosocialist transition as a culmination of a Green New Deal:

> "In an ecosocialist transition, as at least we envision it, the plan would not be simply for degrowth, but for a complete phasing out of the Military-Industrial Complex (MIC). The disappearance of MIC would liberate vast quantities of materials, especially metals, for the creation of a global wind and solar power infrastructure. Likewise, the process would enable the conversion of the automobile-roadways complex to electrified rail and public transit powered by wind-solar energy sources. The land footprint for even a doubling of global energy provided by wind-solar power can be less than the present impact of fossil fuels and nuclear power (see discussion in Schwartzman 2017; Schwartzman and Schwartzman 2019). Furthermore, recycling and industrial ecologies powered by wind/solar power should greatly reduce the need for mining. Recycling rates of the rare earth metals, including neodymium used in wind turbines, is currently very low, less than 1 percent... Increasing these rates, as well as implementing alternative technologies, could greatly reduce mining for these and other metals used in modern technologies. Hence, a transition to a post- extractivist future is possible, accompanied by a wind-solar transition … " (12).

For example, sodium-sulfur batteries are now being used, instead of lithium. Most wind turbines now don't even use neodymium.

Why is more energy is needed in the coming decades ?

Besides eliminating energy poverty in the global South, incremental energy will be required for the following new challenges facing humanity:

1) *Climate mitigation by carbon sequestration* from the atmosphere into the soil and crust to bring down the atmospheric carbon dioxide level below the safe level of 350 ppm and maintaining it below this level (the atmospheric carbon dioxide level is now 410 ppm).
2) *The clean-up of the biosphere*, notably toxic metals and other chemical and radioactive waste from the nuclear weapons, energy, and chemical industries—a heritage of its long-term assault from the MIC, and other industrial wastes such as plastic particles in the ocean, threatening its ecosystems.
3) The restoration of ecosystems ravaged by climate change as we recently witnessed in the horrific forest fires in Australia.
4) *The repair and expansion of physical infrastructure* such as electrified rail, and the creation of green cities globally,
5) *Adaptation to ongoing climate change*, especially by the global South with its disproportionate impacts, even if warming could be kept to below 1.5 deg C.

To be sure, energy efficiency and conservation will significantly reduce the energy needed for transportation, home heating and cooling and industrial use. Electrification of the global energy system will make a big impact. With their wasteful excess *per capita* consumption, the U.S. and several other countries in the global North will need to reduce their energy consumption, and recognizing that of energy poverty exist even in the global North, most of the global South requires a significant increase to achieve 'state of the art/science' quality of life. In the coming decades, a shift to wind and solar-generated electricity as an energy source should ultimately reduce the required power level by roughly 30% once a global system is created, because the

efficiency of solar versus fossil fuels is greater than fossil fuels, i.e., to do the same work solar requires less energy. For example, fossil fuel combustion in a gasoline-powered vehicle produces a large fraction of generated energy going to heat the engine, in contrast to electric-powered transportation. As a result, the impact of solar generated electricity as well as plausible increases in the work to energy ratio from other technological efficiencies, the required global energy level for optimal human development should ultimately decrease upon the completion of a global solar transition. Here is a projection to a few decades in the future; now the global primary energy consumption corresponds to 19 trillion watts (power equals energy/time). Assuming a 30% saving from solar-powered electrification, a global population of 9 billion people with a minimum primary energy need for person corresponding to 3.5 kilowatt, human civilization will need about 22 trillion watts, plus the incremental energy outlined above (13).

I must emphasize that while green capital must play an important role at least in the first phase of a Green New Deal, ongoing class struggle is imperative to insure an occupational, community and environmental protection regime.

Now we witness the inspiring struggles of indigenous people around the world confronting fossil and finance capital. From April 2016 to February 2017 the people of the Standing Rock Indian Reservation, with broad solidarity from around the world, resisted the construction of the Dakota Access Pipeline to protect their water, land and culture (14). In early 2020, the Wet'suwet'en tribe in Canada was fighting the construction of a 670 km gas pipeline (15). Late in 2019, indigenous people in Manipur in NE India were confronting the World Bank-financed construction of a dam, noting that

> 'The NHPC's 105 MW Loktak hydroelectric project caused displacement and loss of livelihoods of indigenous communities, submerging more than 50,000 acres of agricultural land in the Loktak wetlands. NHPC's proposed 1,500 MW Tipaimukh dam has been opposed by local communities, as it will submerge 27,000 hectares of forest and agricultural land along the Barak River basin. In the case of the high voltage transmission and distribution lines in Manipur, the World Bank's environmental assessment failed to consider the physical and health impacts for the local populations. The planned dams and

related infrastructure projects will also destroy the floral and faunal diversity of Manipur." (16)

In Chile, the Mapuche people are resisting loggers encroaching on their ancestral land (17). And in the Amazon, the long battles of indigenous people continue,

> ""Emboldened by the institutional assault upon indigenous rights being waged by the regime of Jair Bolsonaro, rural mafias are organizing an unprecedented wave of land invasions and attacks on native territories and communities. As Brazil's indigenous agency FUNAI is systematically dismantled, with its mandate to title and monitor indigenous lands handed to agribusiness interests and religious zealots, vast Amazonian forests are becoming increasingly vulnerable to exploitation." (18)

While class struggle in every dimension informed by an ecosocialist agenda is still too weak to prevent all the negative impacts of solarization implemented by green capital, as the global climate and energy justice movement gains strength, then the opportunity to create a more sustainable and just solar transition will grow. But the creation of a wind/solar energy infrastructure with the capacity for negative carbon emissions should be welcomed now. We cannot wait for the end of the rule of capital to start building these imperative technologies, it will be too late. In a democratic socially-managed global renewable energy transition, the negative impacts to ecosystems will be far lower than what is now documented from fossil fuel and nuclear power development.

In an historic report issued in October 2018, the IPCC strongly backed the goal of keeping global warming to no more than 1.5 deg C above the pre-industrial level and noted that this target is still possible, requiring deep and early carbon emissions reductions and obviously far-reaching and unprecedented changes in all aspects of society (19). In their model pathways with no or limited overshoot of 1.5°C, global net anthropogenic carbon dioxide emissions decline by about 45% from 2010 levels by 2030, reaching net zero around 2050. Further, this report recognized that implementation of negative carbon emission technologies is imperative, coupled with radical and early reductions in carbon emissions. Since this report, though still held possible, the latest assessments point to an even greater challenge to keep warming at the 1.5 deg C target (20).

But the creation of a wind/solar energy infrastructure and a negative carbon emissions capacity should be welcomed now. We cannot wait for the end of the rule of capital to start building these imperative technologies, it will be too late. The atmospheric level of carbon dioxide, now a bit over 410 ppm, will not go below the safe level of below 350 ppm and kept there unless ongoing sequestration from the atmosphere into the crust is done for the foreseeable future because the ocean with its vast stores of carbon will continuously release it back into the atmosphere

Carbon sequestration from the atmosphere, mainly into the crust is absolutely imperative but only coupled with rapid curbs on carbon emission, starting with the fossil fuels with the biggest GHG footprint, coal, natural gas (methane leakage directly to the atmosphere) and of course tar sands oil, and using the minimum amount of conventional oil to do away with itself as an energy source for a global solar power infrastructure. Promoting sequestration into the soil (permacultures, agroecologies, reforestation) will supplement this approach but cannot replace it because warming has already reduced the capacity of soil carbon storage (it partitions back into the atmosphere); note that the potential sequestration flux of regenerative agriculture is commonly exaggerated (21). In conclusion, carbon sequestration from the atmosphere into the crust will require a rapid replacement of fossil fuels by a global solar power supply. So forgoing negative carbon emissions is a recipe for climate disaster.

In 2019 the emissions of carbon dioxide to the atmosphere apparently did not increase from the previous year (22). At writing, we do not know whether this has also been the case for other GHGs such as methane and nitrous oxide, which I doubt based on no evidence of curbs on natural gas or nitrate fertilizer use. Michael Roberts, a leading Marxist economist, recently argued that existing emissions policies will not stop climate change from getting increasingly more destructive, because oil and gas profits are still not threatened (23). However, the fact that leading banks now point to stranded assets of unburnable carbon corresponding to multi-billion dollars may soon pose such a threat (24). But only class struggle has a fighting chance of curbing fossil fuel in time to avoid C3.

The challenge of fresh water

Fresh water is not really a depletable resource like fossil fuels, recognizing that most of the latter must be left in the crust to keep warming below 1.5 deg C. To be sure water in aquifers can be depleted when extraction exceeds recharge, likewise disappearing glaciers in mountainous areas that now supply fresh water, for example in India. The solution to this depletion as well as ensuring a supply of fresh water to arid regions in the future is found in the nuclear reactor 93 million miles away, the fusion reactor in the core of the Sun. Solar radiation drives the global water cycle, supplying fresh water as rain to land areas, and can supply all of humanity's future needs for energy, including what is required for desalination of seawater. Even if hopefully warming can be kept below 1.5 deg C, the impact of another 0.5 deg C of warming will generate more rain in some regions, less in others. Recharge of groundwater in the former will be potentially increased, and desalination can supply fresh water to the latter regions. In addition, agricultural practices that conserve fresh water must be implemented in a shift to agroecologies/permaculture including farming crops in brackish water, as well as water harvesting during the rainy season in tropical regions. And recognizing that access to fresh water is a human right, not a commodity is already on the global climate justice agenda.

The third threat: pandemics

Besides the continued threats to global civilization arising from C3 and nuclear war, a third threat has emerged with vengeance, a pandemic. The coronavirus was declared a pandemic by the World Health Organization on March 11, 2020. Preliminary research pointed to the source of the coronavirus from exotic wildlife, in particular pangolins and more likely bats present in wildlife markets in China (25). Clearly a global protection regime is needed to prevent future viral transfers from wildlife and domesticated animals (e.g., SARs virus from bats to pigs, MERs virus from camels). The continued assault on global biodiversity and habitat destruction driven by globalized capitalism is implicated in potential pandemics (26). Only universally available world-standard health, nutrition and education services can prevent and limit the impacts of future pandemics. And of course these services require an abundant supply of renewable energy.

Chapter 3. The ecosocialist path to a Global Solar Commons

What is the Main Obstacle to Preventing Catastrophic Climate Change?

(The main obstacle, its manifestations and a strategy to overcome and eliminate it.)

Figure 1. From the world-wide web, apparently an installation in a mall in China.
In a nutshell, the challenge is to get the baby off the tank, melt it down and make renewable energy technologies like wind turbines, while ensuring the baby, indeed every baby on the planet can live to the world's highest life expectancy.

I submit that the main obstacle to preventing catastrophic climate change (C3) is the Military Industrial (Fossil Fuel Nuclear State Terror and Surveillance) Complex, or "MIC" for short, aka the "Molochian Instrument of Carnage." Haltiwanger cites a conservative estimate of $6 trillion and a half a million human lives lost from the war on terror as of fiscal year 2019, derived from the Cost of War project at Brown University's Watson Institute of International and Public Affairs (1). Recall President Dwight Eisenhower's farewell speech on January 17, 1961, with his warning about the threat of the military industrial complex; this threat has been hugely magnified, especially since 9/11. On this subject, the following selections from William Robinson, a leading scholar of the global political economy (Professor, University of California, Santa Barbara) are very relevant:

> "Neo-liberalism "peacefully" forced open new areas for global capital in the 1980s and the 1990s. This was often accomplished through economic coercion alone, made possible by the structural power of the global economy over individual countries. But this structural power became less effective in the face of the escalating crisis of global capitalism. Opportunities for both intensive and extensive expansion have been drying up as privatizations ran their course, the "socialist" countries became integrated, as the consumption of high-income sectors worldwide reached ceilings, spending through private credit expansion could not be sustained. As the space for "peaceful" expansion, both intensive and extensive, has become ever more restricted, military aggression becomes an instrument for prying open new sectors and regions, for the forcible restructuring of space in order to further accumulation. The train of neo-liberalism became latched on to military intervention and the threat of coercive sanctions as a locomotive for pulling the moribund Washington consensus forward. The "war on terrorism" provides a seemingly endless military outlet for surplus capital, generates a colossal deficit that justifies the ever-deeper dismantling of the Keynesian welfare state and locks neoliberal austerity in place, and legitimated the creation of a police state to repress political dissent in the name of security. In the period that began with the September 11, 2001, attacks in the United States, the military dimension appears to exercise an over-determining influence in the reconfiguration of global politics." (2)

Further,

> "The attacks of September 11, 2001, were a turning point in the construction of a global police state. The United States state took advantage of those attacks to militarize the global economy, while it and other states around the world passes draconian "anti-terrorist" security legislation and escalated military ("defense") spending. The Pentagon budget increased 91% in real terms from 1998-2011, and even apart from special war appropriations, it increased by nearly 50 percent in real terms during this period. In the decade from 2001-2011, military industry profits nearly quadrupled. Worldwide, total defense outlays (military, intelligence agencies, Homeland Security) grew by 50 percent from 2006 and 2015, from $1.4 to $2.03 trillion. The "war on terrorism," with its escalation of military spending and repression alongside social austerity, has collateral political and ideological functions. It legitimizes the new transnational social control systems and the creation of the global police state in the name of security. It allows states to criminalize social movements, resistance struggles, and "undesirable" populations." (3)

It is important to note that even the mainstream U.S. press is deeply concerned about this outcome, as it critiques the U.S. administration's prioritizing the interests of the MIC over the concerns of climate change and global human needs (4). Of course, to recognize the vicious cycle of the State Terror Apparatus and its terrorist antagonists in reproducing endless global conflicts in no way justifies terrorism. Rather, this recognition points to the solution by breaking this cycle, reprioritizing the colossal expenditures of both money and human resources, thereby undermining the support for terrorism by terminating conflicts with just solutions, improving the quality of life especially in the global South. The war on terror also creates a pretext for imperialist-instigated regime change, as we recently witnessed with respect to Iran. Indeed, former national security advisor John Bolton called the assassination of Iran's Major General Qassem Soleimani "the first step to regime change in Tehran" (5). It is no accident that Iran has the world's 4th largest oil reserves, while Venezuela, another target of regime change, has the biggest reserves (6).

Rather than naming our era the Anthropocene, I join Malm and Hornborg (7) in considering Capitalocene as a substitute to focus attention on the global reproduction of capital and, in

particular, on militarized fossil capital in its murderous assault on both humans and the rest of nature.

Given this reality, humanity faces the following challenge at the beginning of the 21st century: Can the monstrous boulder of *militarized fossil capital* be pushed down the slope to its well-deserved sedimentary cemetery of prehistory on a path that minimizes the destruction of nature and humans?

Figure 2. In John Milton's Paradise Lost, Moloch is one of the greatest warriors of the fallen angels. William Blake, 1809, *The Flight of Moloch*, watercolour, 25.7 x 19.7 cm.
One of illustrations of On the Morning of Christ's Nativity, the poem by John Milton:

"First MOLOCH, horrid King besmear'd with blood

Of human sacrifice, and parents tears, " (Hunter 1861, 37)

The Military Industrial (Fossil Fuel Nuclear State Terror and Surveillance) Complex (MIC) is a block to achieving global cooperation for rapid curb on global greenhouse gas emissions and a full transition to wind/solar power. As the instrumental arm of the imperial foreign policy of the MIC, it is the Pentagon/NATO, along with the $2 trillion per year in military spending, that constitue the critical obstacles posed by the MIC, not the sizable, but widely exaggerated greenhouse gas emissions of the Pentagon itself.

To summarize, the MIC is likely the biggest single obstacle to preventing C3, with the following contributing reasons:
1) The MIC is the present core of global capital reproduction, with its colossal waste of energy and material resources.
2) The integration of fossil fuel/nuclear industry in MIC.
3) The MIC's dominant role in setting the domestic/foreign policy agenda of the United States.
4) Pentagon as the "global oil-protection service" for the U.S. imperial agenda, or even for the transnational capital class itself. Also, the Pentagon functions as protection service for strategic metals.
5) The Imperial Agenda blocks the global cooperation and equity required to prevent C3.

A Critical Manifestation: Regime Change, the Imperial Agenda in the early 21st Century

The long history of U.S. imperialist-instigated regime change has been well documented by two leading scholars, Noam Chomsky and the late William Blum, notably in the latter's notorious book Rogue State (3rd edition, 2005) recommended by no other than Bin Laden. Latin America has been a major target, but the well known 1953 CIA and MI6 organized coup in Iran, overthrowing the elected Prime Minister Mossadegh must be mentioned because seizing control of Iran's petroleum reserves was the critical objective.

The case of Venezuela

At writing the U.S. regime change agenda with regard to Venezuela has been defeated mainly as a result of:

1) The mass mobilization in April and May, 2019 of the Venezuelan masses in defense of their Bolivarian Revolution, a mobilization which succeeded in marginalizing the opposition led by U.S. puppet Juan Guaido, demonstrating how pathetic his claims of legitimacy were.

2) The material support of Russia and China, in defiance of the U.S. agenda (8).

3) The UN's continued recognition of the Maduro-led government as the legitimate representative of Venezuela.

However, we know that the Venezuelan people have suffered grievously from the U.S. instigated economic warfare (9). To be sure, global solidarity must be strengthened, as the imperialist threat remains. To build this solidarity it is critical to understand how blocking the regime change agenda with respect to Venezuela is integrally connected to confronting the challenge of climate change.

Regarding some critiques of the Bolivarian Revolution from the left we observed:

> "We too would like to witness the demolition of the bourgeois state, and the abandonment of the rentier petroleum and mining economies which are a legacy of colonialism. But we don't believe a new mode of production can emerge by making demands and denunciations. We are not particularly outraged that Chavez and Maduro have failed to reverse 500 years of colonialism in a couple decades of a constitutional revolution. We struggle for solidarity with a path towards the future based on the realities of the world we live in today" (10)

In the Western Hemisphere, foreign policy consensus still prevails, so the Democratic Party leadership is currently giving a pass to the continued Trump regime change agenda regarding Venezuela. Only someone completely brainwashed by the imperial mass media can believe that this regime change agenda is actually in place because of humanitarian concerns – with Trump, Pompeo, Bolton and the war criminal from the Reagan era Elliot Abrams at the helm during the coup attempt of Spring 2019, noting that Venezuela has the biggest oil reserves in the world. There is little doubt that these political instruments of militarized fossil capital want this oil extracted. In an interview on Fox Business, Trump's then National Security Adviser John Bolton was open about the US- led coup in Venezuela being motivated by oil and corporate interests.

Bolton said, “We’re looking at the oil assets...We don’t want any American businesses or investors caught by surprise. ...we’re in conversation with major American companies now that are either in Venezuela, or in the case of Citgo here in the United States...It will make a big difference to the United States economically if we could have American oil companies really invest in and produce the oil capabilities in Venezuela. We both have a lot at stake here making this come out the right way.” (11). Note as well Bolton’s remarks in the context of the regime change agenda regarding Iran (5).

Venezuela has the largest proven oil reserves in the world: “With 300,878 million barrels of proven reserves, Venezuela has the largest amount of proven oil reserves in the world. The country’s oil is a relatively new discovery. Previously, Saudi Arabia had always held the number one position. The oil sand deposits in Venezuela are similar to those in Canada. Venezuela also boasts plenty of conventional oil deposits. Venezuela’s Orinoco tar sands are significantly less viscous than Canada’s, so the oil sands there can be extracted using conventional oil extraction methods, giving it a considerable advantage over the Northern American rival in terms of capital requirements and extractions costs.” (12)

Extraction of this huge reserve would be a climate killer, while defeating the imperial agenda driving the Venezuela coup will potentially make an important contribution to global climate security. Venezuela must be left to determine her own destiny, making possible an alternative scenario, required in a prevention program to avoid C3, that most of the oil reserve will stay in the ground, while a small fraction will be used as an energy source for a solar energy transition for Latin America. While Venezuela’s leaders may continue brag about their huge reserve, they surely know that most of it must remain in the ground to be consistent with Venezuela’s own ratification of the Paris Agreement, not to mention its own Plan of the Homeland, recognizing that much more radical curbs on greenhouse gas emission than presently committed are imperative to keep warming below the goal of 1.5 degrees centigrade.

As a major oil producer, Venezuela has the potential to significantly contribute to a solar energy transition, using this fossil fuel with the lowest greenhouse gas emission ratio to energy consumed as an energy source to replace itself. Venezuela could lead a wind/solar power transition in Latin America using a small fraction of her liquid petroleum reserves, while still

gaining revenue from oil exports as well as contributing to the same energy transition globally. Implementing this approach would be a critical component of Venezuela's self-identified path of ecosocialist development. The proven reserves of conventional light to heavy oil in Venezuela are estimated to be 39 billion barrels, (excluding 259 billion barrels of extra heavy oil in the Orinoco basin) (13), although the further expansion of this reserve has been neglected in recent years, particularly since the downturn in the economy following the sharp fall in the price of oil and sanctions regime imposed by the U.S. We have estimated that it is possible to reach the goal of ending energy poverty – necessary for a high quality of life for 400 million people in what were the Mercosur countries – and moreover that this can be achieved in 15 years or less, using 0.15 billion barrels of this oil per year to create a solar power infrastructure (10).

But of course militarized fossil capital has other plans – namely the destruction of the Bolivarian Revolution, coupled with extracting this huge oil reserve, regardless of the climatic and environmental consequences. And Cuba is explicitly next on the list for regime change; the fossil empire continues to plot the elimination of this example of ecosocialist transition, noting her vigorous conversion to agroecologies and cooperative ownership (14),

And not coincidently, the US imperial regime change agenda is also aimed to Iran, which ranks 4th in proven oil reserves with 158,400 million barrels, behind U.S. allies Saudi Arabia and Canada (12). At writing Europe is still hoping to resurrect the Iran nuclear deal, but in a reprise of the Monroe Doctrine, Europe continues to support the U.S. regime change agenda, but not direct military intervention.

Only a resurgent global movement can block this outcome. This challenge should be considered by climate and energy justice activists, and all those supporting the GND initiative in the US Congress, the growing Sunrise movement in particular. Finally, blocking the Trump coup against Venezuela would be an important step to undermining the power of the Military Industrial Complex. The US military is both the biggest institutional polluter (15) and also the biggest obstacle to freeing up resources necessary for a robust GND and creating a global regime of cooperation – so necessary to avoid catastrophic climate change in the ever-shrinking time we have left.

Over a decade ago, I wrote: "The path to climate security must pass through Gaza, i.e., climate

security for humankind will only be achieved with the end of the Israeli blockade of Gaza, termination of Israeli apartheid regime, and the full realization of the individual and collective rights of the Palestinian people." (16).

The argument still stands, more than ever. Today, noting the historic solidarity between the Venezuelan revolutionary process and the Palestinian people, we must add that the path to climate justice must pass through Caracas; i.e., climate justice for humanity will only be achieved if the world's largest reserves of fossil fuels are mobilized for a continental and then global energy transition; that this is only possible with the termination of the US regime change agenda against the Venezuelan government, allowing them to focus their attention on the full realization of an ecosocialist mode of production. The legal, scientific and spiritual mandates for this ecosocialist revolution are articulated by the government in the Plan of the Homeland (2013-2019) (17) by an independent coalition of scientists in the National Strategy for the Conservation of Biodiversity (2010-2020) (18) and by the global grassroots alliance constituted in the First Ecosocialist International (19).

I challenge anyone is serious about global climate justice to provide another proposal. Those who demand "neither Guaido nor Maduro" have not given us a strategy to prevent climate catastrophe. Venezuela is the only country in the world with the energy resources and political-legal structure necessary to launch a revolutionary global energy transition against its class enemies. Perhaps those who despise Maduro would prefer to trust the infrastructure development necessary for climate justice to the royal family of Saudi Arabia? The international left has still not awoken to the fact that the largest oil reserves in the world are under the legal control of an ecosocialist government, whose current supreme power is neither Guaido's highly problematic claim to the national assembly nor Maduro's executive government, but a constituent assembly composed of representatives of the working classes. It's past time to wake up.

I challenge those of us around the world who are looking for a way to prevent C3, from Extinction Rebellion to the Sunrise Movement to the Green New Deal: make it a top priority to join in concrete solidarity with both the revolutionary process of Venezuela and the government it has repeatedly elected. The farcebook spectacle of dueling proclamations of "I stand with" / "I stand against" (when it is obvious to all concerned that everyone is in fact sitting down in front

of their computers) would be amusing if the stakes weren't so high and the consequences so tragic. Not only history, but the geologic record itself, will record our actions and inactions in defense of climate justice, whose fate is played out today in Caracas. Meanwhile, the people of Haiti have shown the world what real international solidarity looks like – thousands of people in the streets (20).

The path to climate justice passes through Caracas, but it doesn't stop there. It passes into the countryside, where a radical rural renaissance is taking place with the formation of ecosocialist communes in every bioregion (21). A new socio-territorial order, as called for by Hugo Chavez in his final "Strike at the Helm" speech to his ministers (22), and a return to Mother Earth, as articulated in the Combined Strategy and Plan of Action of the First Ecosocialist International, awaits the solidarity it deserves (23).

At writing, another coup attempt has been at least temporarily successful, the overthrow of the government of Evo Morales in Bolivia (24). In this case controlling the supplies of lithium, a critical global resource for batteries, was the apparent target of regime change (25). But the so-called "pink tide" in Latin America is not dead, given the election of the leftist Obrador as President of Mexico in November 2018, and the defeat of the U.S:-backed President Macri in Argentina in October 2019.

The Global Green New Deal (GND)

First three theses:

Nothing teaches like experience, hence mass struggle for radical reforms provides the school for growing ecosocialist consciousness with the goal to end the rule of capital.

Is capitalism now in terminal crisis? Let's not find out, rather terminate it before it drives us and our children's future to climate hell.

Is global solar capitalism possible or a mirage? My answer: a mirage because overcoming the obstacles to C3 prevention will end the rule of capital on our planet with a path forward to an ecosocialist transition.

As I recall my first exposure to the potential of a GND was when I was asked to sign on to the 10 point GND platform in a 2010 news release featuring Green Party candidates across the United

States, an initiative of Howie Hawkins who was running for Governor of New York State (26). I have been advocating since 2011 how a GND should be embraced by ecosocialists as a site of class struggle with the potential of preventing C3 (27). Now that the GND is getting a lot of attention as a potential prevention program to avoid catastrophic climate change, it is important to note the contributions of the Green Party of the United States (GP) to making the link between the GND, climate change and the U.S. imperial agenda. Following Howie Hawkins' initiative in 2010, the two Presidential campaigns of Dr. Jill Stein brought the vision of a GND to the attention of millions, with a significant impact. The GP's GND includes cutting the military budget and ending the imperial U.S. foreign policy which is in utter contradiction to the agendas of both the Republican and Democratic Party leadership (28). Nevertheless, there has been growing dissent in Congress with Rep. Ilhan Omar (D-MN) vigorously challenging Reagan era war criminal Elliot Abrams in a hearing in 2019. And because of the assassination of Khashoggi and their murderous war in Yemen, the U.S./Saudi alliance became under attack in Congress.

Sen. Bernie Sanders (I-VT)'s Presidential campaign for 2020 promoted a detailed GND plan which included a commitment 'to reducing emissions throughout the world, including providing $200 billion to the Green Climate Fund, rejoining the Paris Agreement, and reasserting the United States' leadership in the global fight against climate change" (29). Sanders' GND was coupled with a pledge to cut military spending (30). This represented a welcome addition to the historic GND Congressional Resolution, introduced in 2019 by Alexandria Ocasio-Cortez (D-NY) (31). Howie Hawkins who ran for the GP nomination as President in the 2020 election relaunched a comprehensive plan for an ecosocialist GND (32). Likewise, the Democratic Socialists of America had their own version of an ecosocialist GND (33).

In 2019, the UK Labour's Party issued a very detailed GND program (34), and so did the European Union, following Yanis Varoufakis' earlier initiative (35).

The struggle for a Global GND has many dimensions, including promoting concrete plans for urban areas (36).

It is imperative engage in the debates and struggles around and for the GND to deepen its ecosocialist character, fighting for a just transition out of militarized fossil capitalism.

We wrote in 2019,

"To have any chance left to prevent climate catastrophe, the climate justice movement needs strategic thinking. It is not enough to recognize that the present global system is unsustainable and that a rapid and radical transformation is necessary. And not only does a strategy require a plausible plan to bring about such change — recognizing the obstacles and how to overcome them — it must also have the capacity, when implemented, to ignite the imagination of millions around the world to form a collective transnational Subject, arguably the only force capable of preventing climate catastrophe and creating the other world that is possible (OWSP). We hope our discussion will, in its modest way, help promote such a strategy before humanity plunges into the abyss of climate hell.

We are convinced that a critical component of this strategy must be bottom-up movements of all those bearing the weight of this world of extreme disparity and inequality: the exploited and the oppressed. Prefigurations of the OWSP are being created all over the world — whether they be farming or solar power cooperatives, worker-owned industries, or community land trusts creating affordable housing outside the constraints of capital-driven speculation in urban areas. We reject the dogma that competitive and individualist behavior will always drive social interactions because 'you can't change human nature'. Even today, in real existing capitalist societies, cooperation spontaneously springs up when communities are under attack.

We are not content to simply dream of a different future, smoking the pipe of a drug-enabled escape from present realities. Nevertheless, the process of lucid dreaming, imagining a future utopia, is a necessary place to start. As Ernst Bloch (1986) discusses, the recognition of the 'Not-Yet' is an anticipation founded on the principle of hope, the title of his seminal three volume magnum opus. We provocatively quote Lenin, 'We ought to dream!' (Lenin, 1929, p. 158), notably a passage quoted by Bloch (1986), with the inspiration of 'Imagine' (John Lennon's well-known song). Thus, we submit the outline of a strategy that must begin where we are now, a strategy for a Green New Deal (GND), indeed a Global Green New Deal (GGND), which even with partial realization could significantly improve the quality of life for millions around the world. At the same time, the implementation of a GGND has the potential of opening up a path to a global ecosocialist transition, to create the OWSP. The struggle for a GND must include

achieving a real measure of national state power, even entities of transnational state power, synergized with the growing strength of bottom-up prefigurations." (37).

Of course having this vision of the future, utopian rather than dystopian, the common theme of science fiction, is far from sufficient—it must be followed up by concrete activity, foremost political organizing for a GGND. Climate science is telling us this process must start now, in a world dominated by capital reproduction. We should recognize the essential role of green capital in achieving a GGND at least in its first stage, both for its financing of an ever-growing renewable energy infrastructure replacing fossil fuel, as well as its political activity in defeating the agenda of militarized fossil capital. But, since the coalition for a GGND must be led by those most affected by the climate/environmental crisis, namely the global working class, indigenous peoples and social movements around the world, especially in the global South, green capital will be challenged on multiple fronts of transnational class struggle in this process. I am convinced that a robust GGND will ultimately lead to a radical transformation of global political economy, resulting in "a flourishing future for all life on this planet", as a recent paper by Lenton and Latour put it (38).

Can humanity manage Gaia ?

I have been in the Gaia research network since I participated in the first scientific meeting on the Gaia Hypothesis in 1988 sponsored by the American Geophysical Union (39). There I met Tyler Volk, a long-term collaborator (40). Collaborative research culminated in our two books (41). and is ongoing (42). Briefly, "[t]he Gaia hypothesis … proposes that living organisms interact with their inorganic surroundings on Earth to form a synergistic and self-regulating, complex system that helps to maintain and perpetuate the conditions for life on the planet" (43). There has been a long debate about this hypothesis and its permutations, including the claim that the Earth is itself alive or is an entity with the status of a superorganism. My own research in collaboration with Tyler Volk puts emphasis on the important role of life in the complex system called the biosphere, but life is not the only player in both short- and long-term biogeochemical cycles, so James Lovelock's claim of homeostasis for and by life is overstated (44). In particular, Earth's

surface conditions since the origin of life would have remained habitable for hot temperature microbes even if life's influence was negligible (45).

Therefore, I was honored to be invited as a panelist in the program of "The Future of Global Systems Thinking: Celebrating James Lovelock's Centenary", July 29-31, 2019 at the University of Exeter (46). The chief organizer of this event was Tim Lenton, the Director of the Global Systems Institute and a protégé of Lovelock, the co-founder of the Gaia hypothesis in collaboration with the late, great biologist Lynn Margulis (47).

Gaia 2.0

Lenton and Latour have provoked me to think about Gaia 2.0, confronting and going beyond what they recommend. Yes, they say we have "an occasion to reevaluate our collective goals, as well as the means of achieving them. A central goal for this century is surely to achieve a flourishing future for all life on this planet." Meanwhile, "[c]reating an infrastructure of sensors that allows tracking the lag time between environmental changes and reactions of societies is the only practical way in which we can hope to add some self-awareness to Gaia's self-regulation." They also advise us "that we cannot expect to know the best solution in advance, but only that we can improve the quality of the sensors—both instruments and people—that detect shortcomings and the speed with which we rectify the course." (48).

Nevertheless, I strongly agree with their prescription that

> engineering should shift attention to become as smart as Gaia in achieving nearly closed material cycling powered by sustainable energy. The input of solar energy has the potential to far outstrip current fossil energy consumption, and renewables are rapidly becoming cost-competitive with fossil fuel energy for electricity generation. There should thus be no long-term shortage of energy. The challenge is to design and incentivize a transition to a circular economy. As in the original Gaia, this must be built on waste products becoming useful resources to make new products. Despite practical obstacles and thermodynamic constraints, there is huge potential to increase material recycling in Gaia 2.0." (38)

Before further commenting on their take on Gaia 2.0, I should mention that Bruno Latour has long promoted the concept of hybridism, which " holds that reality is made up of hybrids of the social and the natural and that the two terms therefore have no referents any longer, if they ever [did]" (49). I strongly endorse Malm's critique of hybridism but I find that this concept has little influence on Lenton and Latour's discussion of Gaia 2.0 since there is a clear recognition of anthropogenic impacts on nature.

The quality and quantity of global energy supplies is foundational to meeting the goal of a "flourishing future for all life on this planet." This must inform the design of Gaia 2.0, as we advocate and analyze in-depth in our book The Earth is Not for Sale (50). But what is absent in Lenton and Latour's 2018 article is an examination of the critical political economic obstacles to achieving this future, especially given the rapidly diminishing window of opportunity to implement an effective prevention program to C3, defined as capping warming at near 1.5 ^{o}C by 2100, if not sooner.

From the Capitalocene to the Solarcommunicene

As I previously discussed, an effective prevention program to avoid C3 will require organizing a transnational movement in the near future, with the strength to defeat the imperial agenda of militarized fossil capital, dissolve the MIC, and in the process, implement an ecosocialist GGND, thereby opening up a post-capitalist path to the solar communism. Inspired by the recent discourse on the Anthropocene, I have named this future stage of human civilization the "Solarcommunicene". I define the Solarcommunicene as a socially governed global civilization, a Global Solar Commons, socially managed at all scales, rather than by ruling elites, ruling classes or Central Committees, powered by the nuclear reactor 93 million miles away, because only this reactor, fusing hydrogen to helium in the Sun's core, can supply to the Earth's surface both the quantity and quality of energy sufficient to meet this objective. I note that in the historic interview of James Lovelock in the Lovelock Centenary on July 30, 2019, both Tim Lenton and James Lovelock agreed that nuclear power is the desired energy source for humanity's future,

but like Tim Lenton I favor this source being a safe 93 million miles away, rather than fission power on the Earth's surface.

China and the prospects for a Global Ecological Civilization in the 21st Century (51)

Introduction

From 2019 to 2020, the news from China focused on the tariff conflict with the U.S. the ongoing protests in Hong Kong and of course the emergence of the coronavirus epidemic. But there is a critically important question regarding China's current and future global impact, that of its potential leadership towards a post capitalist future while confronting the climate crisis.

In December 2016, President Xi Jinping called for the "building of socialist ecological civilization" for China, and "policies [that] contribute more to a greener China and global ecological security" (52). This commitment is very welcome, especially since the U.S. and global environment are currently under assault by the Trump administration as a result of withdrawal from the Paris Agreement and the undermining of the U.S. Environmental Protection Agency. I highly recommend Gare's 2012 paper for its thorough discussion of the prospect of an ecological civilization and the necessary changes in China's political economy to make this transition possible (53). Ecosocialist writers have invoked a similar goal for global civilization (54).

However, there is a huge threat facing humanity which will potentially block achievement of this goal for many generations in the future, the ever growing threat of catastrophic climate change (C3), recognizing as well as the continuing threat of nuclear war (see previous discussion). Only a robust global commitment to achieving this goal will effectively confront the threat of C3, requiring a strong decline in GHG emissions starting in the near future, rapidly phasing out fossil fuels, combined with even stronger growth of renewable energy supplies and sequestration of carbon from the atmosphere to the soil and crust to bring the atmospheric carbon dioxide level below 350 ppm. In addition, the agricultural sector must be addressed with a shift from industrial

and GMO modes to agroecologies (organic agriculture), including the termination of factory farming of meat production and massive beef production from cattle (55).

In summary, there are three critical requirements for achieving the goal of a global ecological civilization in this century; demilitarization (current global military expenditures are close to $2 trillion a year, with the U.S. responsible for roughly one-half), solarization of the global energy infrastructure (fossil fuels now constitute 85%), and a transition to organic agriculture, agroecologies, permacultures (56).

China can lead the world

In view of the fact that China has the largest renewable energy capacity and leads the world as a producer of renewable energy technology (57), she has the historic potential of leading a global ecosocialist transition. However, a thorough assessment of the contradictions in Chinese political economy and energy/environmental policy is needed to inform an analysis of how this potential could be realized. In 2015, Richard Smith provided a very critical account of China's environmental record (58).

Coal has long been a major energy source for China. Its combustion has driven very unhealthful levels of air pollution, especially in Chinese cities. An estimated 1.6 million deaths/year or nearly 20% of all deaths were found to be caused by air pollution (59). A recent growth in coal power plants (60) has apparently led to a significant increase in carbon emissions, the fastest growth in seven years (61). Especially unwelcome is China's climate-killing investment in coal extraction (such as in Africa (62). Nevertheless, there was been some progress in recent years. Air pollution levels in Beijing have been significantly reduced (63). However, "Despite the improvement in Beijing, however, other regions in China appeared to be moving backward as local authorities sought to stoke growth amid an economic slowdown, said Lauri Myllyvirta of Greenpeace." (64). And despite its improvement, Beijing's air quality ranked the 10th worst among major cities, as of September 15, 2019 (65).

On the other hand the plan to create a next-generation transmission grid (66) is a positive step to a sufficient infrastructure for expansion of China's renewable energy capacity, meeting and going beyond her commitments in the Paris Agreement. It should be noted that a transition to subsidy=free renewables is planned by 2021 apparently because wind and solar will no longer need subsidies to compete with existing coal and gas (67). Another welcome step is China's apparent speedup of its commitment to peak carbon dioxide emissions:

> "China's emissions of climate-warming greenhouse gases are likely to peak by 2022 even without the introduction of tougher policies, well ahead of an original target of "around" 2030" (68).

According to one source, China was retreating from its ambitious commitment to build nuclear power plants, but a more recent report indicates a rededication to building 6-8 nuclear reactors a year from 2020-2025 (69). We have critiqued the claim that nuclear power is a good choice for carbon-free energy, particularly because of the massive investments and long time to have it feed electricity into the grid compared to wind and solar power of equal or even greater capacity (70). Climate science is telling us that the replacement of fossil fuels must come as soon as possible to have a chance to keep warming below 1.5 °C. For the same reason, China's investment in uranium mining in Namibia, her largest investment in Africa to date, is unwelcome (71). Rather, investment should be encouraged for renewable energy supplies, e.g., concentrated solar power in the Namibian desert.

David Harvey made a presentation on the Circuit of Capital summarized from Marx's Capital, volumes 1 and 2 to a plenary of the 2nd World Congress on Marxism in May 2018. On a powerpoint image of this Circuit he pointed to a potential source of danger for China's economic stability and growth. Capital reproduction inherent in capitalism is by many observers a reality in China today. While some socialists prefer to characterize Chinese political economy as "market socialism" (72), or as the Chinese leadership say "socialism with Chinese characteristics" (73), others have a different analysis, emphasizing the dominant role of capital reproduction (74). A leading Marxist scholar, Robinson argues that a large part of Chinese capital is really a component of transnational capital, recognizing the contradictions within

nation states which impact on the transnational capitalist class (75). An example is how China is intervening in the global financial sector (76).

The achievements of the last decades of economic growth in China are undeniable. What stands out is the remarkable increase in life expectancy. “Chinese average life expectancy increases by 8.6 years in 35 years… The development in the field of health services has brought concrete benefits to the Chinese people," said the document titled "Development of China's Public Health as an Essential Element of Human Rights." Maternal mortality dropped from 88.9 per 100,000 persons in 1990 to 19.9 per 100,000 persons in 2016; and infant mortality declined from 34.7 per 1,000 in 1981 to 7.5 per 1,000 in 2016” (77). Even more striking is the fact that China has now overtaken the U.S. for healthy lifespan, according to WHO data (78). If the impact of air pollution on mortality were eliminated the life expectancy gains would be even more spectacular.

Nevertheless, there remain very problematic features in Chinese political economy, as Gare (53) argues, consistent with William Robinson’s more recent analysis:

> “China is best understood as a capitalist economy going through the stage of primitive accumulation with the state serving the interests of the bourgeoisie, with its pre-eminent concern to assure high profitability of business enterprises by dispossessing the peasantry of means of production to create a pliable proletariat in the cities. It is more complicated than this, however. Transnational corporations have been the greatest beneficiaries of the cheap labor and lax environmental regulation. The local bourgeoisie use everything at their disposal to increase their share of profits,… but often work on very low margins and are very susceptible to changes in the global economy. The central government also makes some effort to ameliorate the conditions of employees, but decentralization of government with local government performance defined mainly in terms of growth of GDP and therefore primarily oriented to attracting and maintaining foreign investment, along with a corrupt and ineffective legal system, means that the government effectively sides with capitalists against employees and local populations. And it is becoming evident that many officials and Communist Party members are leading capitalists, and are aligned with international capital rather than local capital.” (79).

Returning to the potential of China becoming a world leader in ecosocialist tranition, I argued in 2016:

> "As in the industrial revolution, capitalist growth in China was driven by the consumption of several billion tons of coal, and as a result China now has the highest carbon emissions in the world (Andreas Malm, Fossil Capital, London: Verso, 2016, pp. 327-66). But China is also the biggest investor in wind/solar technologies. Could China actually emerge as the leader of an ecosocialist path for the rest of the world? Could this be the outcome of class struggle of sufficient power growing out of both the huge negative impacts of its industrial infrastructure on its population, and the paradox of its capitalist development under the banner of 'communist' ideology, with remnants of twenty-first-century socialism still in place?" (80)

As Gare observed, there is real and growing documented interest among Chinese intellectuals in ecosocialism (81). The late Joel Kovel, former Editor-in-Chief of leading ecosocialist journal Capitalism Nature Socialism, gave several lectures in Chinese universities, likewise the present Editor-in-Chief Salvatore Engel Di Mauro. But what is even more significant is the ongoing vigorous resistance of Chinese workers and citizens to the present mode of economic growth (82) as well as dissent even from Chinese intellectuals living in China (83). We should take note that there are Chinese students who take their Marxism seriously, acting in solidarity with striking workers, with government repression of their efforts (84).

Finally, we should recognize China's positive role in helping to check the U.S./NATO imperial agenda. Standing out has been China's (and Russia's) material support for the people of Venezuela under murderous attack from economic warfare led by the Trump regime.

Conclusion

Call me a dreamer, but I have confidence that the people of China will realize their potential to lead the world in ecosocialist transition from this world now dominated by militarized fossil

capital, towards a future for our children and grandchildren in the 21st Century, the realization of a Global Ecological Civilization. This potential has been reinforced by President Xi Jinping in his speech to the UN in September 2020. He announced that China will aim to hit peak emissions before 2030 and for carbon neutrality by 2060 and called for a green recovery for the world economy in the wake of the coronavirus pandemic. (85). Recognizing that an even more aggressive emissions goal is necessary to keep warming at no more than 1.5 deg C, only class struggle of the Chinese working class and its allies can make this potential a reality.

Chapter 4. Prefiguration of the Global Subject

Prefiguration

Prefiguration of the commons, an essential characteristic of communism, in existing capitalist societies is critical to the emergence of a global Subject with the capacity to create a global Ecological Civilization, ending the rule of capital on the planet. A comprehensive analysis of prefiguration is found in the writings of Ernst Bloch, a 20th Century Marxist scholar, especially in his *The Principle of Hope* (1). A rediscovery of Bloch's writings has reignited the consideration of the role of concrete utopias being born in global capitalism as a prefigurative mode of struggle for a world without the rule of capital, e.g., in the work of Ana Dinerstein (2). It is no accident that Bloch quotes Lenin, 'We ought to dream!' (3). We find the concept of prefiguration invoked by Joel Kovel, who regards *The Principle of Hope* as 'absolutely core for ecosocialist discourse' (4). Prefiguration is the creation in the womb of capitalist society concrete embryos of anticipations of the future, in the cultural sphere and in material reality including social relations, such as cooperatives producing food and renewable energy. Cark Boggs defines prefigurative in relation to political practice as follows:

> "By "prefigurative", I mean the embodiment, within ongoing political practice of a movement oi those forms of social relations, decision-making, culture, and human experience that are the ultimate goal." (5)

We should recognize that the Universal Declaration of Human Rights (UDHR) is a prefiguration of potential alternative social rights and relations. Its adoption on December 10, 1948 by the General Assembly of the United Nations was inspired by the victory over fascism in the Second World War. The critical role of the Soviet Union in making this victory possible forced the inclusion of economic, social and cultural human rights language into this historic document, although Western governments succeeded in splitting off these rights in legally binding covenants starting in 1951 and have continued to resist implementation… Nevertheless, the human rights discourse has emerged in the struggles of civil society, even within the United States. The ongoing global disparities in life expectancy and other measures of quality of life

clearly demonstrate that the vision of the UDHR and conventions that followed remains unfulfilled in this world of continuing great disparities dominated by the reproduction of capital. As Bill Bowring put it:

> "... neither the concept of human rights nor that of social justice can have content, meaning and significance except through their complete reinvention and reintegration in the real activity of women and men in the always turbulent and dangerous world into which they are thrown" (6).

A critical complement to universal human rights is the right of future generations to continue to enjoy the existing biodiversity of our planet, which is rapidly being destroyed in what has been called the 6th Mass Extinction (7). On December 29, 1993, the historic Convention on Biological Diversity entered into force, now ratified by 196 countries, but not by the United States, a fact that greatly weakens its implementation (8). The protection of biodiversity is closely tied to the imperative of replacing present unsustainable energy sources with wind and solar, the conversion of agricultural systems to agroecologies, and of course implementing an effective prevention program to avoid catastrophic climate change (C3). Biological research demonstrates that biodiversity plays a key role in ecological resilience.

Prefiguration captures the vision of 'eroding' capitalism, while reforms such as the nationalization of the energy industry are close to the category of 'taming' capitalism (9). Reaching the ecosocialist horizon is a process of 'eroding capitalism' going on the offensive for social governance of production and consumption including the creation of decentralized solar power, food, energy and farming cooperatives, worker-owned factories and publicly-owned banks. But only multi-dimensional, transnational class struggle converging into a global Subject of sufficient power will make a global Ecological Civilization possible (10), because only this global Subject has the capacity to overcome the huge obstacles that block this outcome. Capital is transnational, so must be the power to challenge it and end its rule on the planet, embodied in a global Subject leading and coordinating class struggle. This global Subject will have the transnational working class at its core, along with its allies, the exploited and oppressed of the world, with the organic participation of indigenous communities a priority. We can expect that the global Subject will crystallizes through growing transnational solidarity. Ronaldo Munck =

has provided an encouraging progress report on this process of transnationalization of the labor movement (11).

Prefigurations of the Global Subject

There have been three Communist/Socialist Internationals, starting with the 1st from 1864-1876, ending with the 3rd from 1919-1943. Counting the Trotskyist International of the 20th Century there were four. In 2017, the late Samir Amin has proposed a 5th (12). In his prophetic science fiction novel, Wagar (13) envisioned the World Party as a transnational political force, discussed more systematically in his 2001 book (14). Inspired by Wagar, I wrote the following:

> "The World Party does not form a separate party opposed to other progressive parties. It has no interests separate and apart from those of humanity as a whole. It does not set up sectarian principles of its own, by which to shape and mold the movement for a sustainable global economy in a healthy planetary environment. The World Party is distinguished from other progressive parties by this only: 1) In the national struggles of progressives in different countries, it points out and brings to the front the common interests of all of humanity, independently of all nationality. 2) In the various stages of development which the struggle for global sustainability has to pass through, it always and everywhere represents the interests of the movement as a whole." (Schwartzman, 1992, after The Communist Manifesto, with apologies to K. Marx and W. Warren Wagar). (15)

In 2018 Quincy Saul wrote:

> 'In [the same year] 1992, James O'Connor wrote an article in Capitalism Nature Socialism titled "Think Globally, Act Locally? Toward an International Red Green Movement" in which he handled some burning questions of his times: "Is it possible to organize an international red green movement, a coordinated response to global capital, to initiate new democratic, ecologically rational, and economically and socially equitable ways of life? To link economic, social, and ecological issues theoretically and practically

> in ways that would further alternative development paths and visions of the future? To overcome capital's strategy of divide and conquer, which pits labor against environmentalists, urban workers against small farmers, men against women, majorities against oppressed minorities, and, last but not least, the North against the South?" '(16)

A prefiguration, albeit a network rather than a coherent movement with a concrete program of action, came with the World Social Forum, the first occurring in 2001 at Porto Alegre, Brazil, followed by one every year since, with the most recent in 2016 at Montreal.

A modest, but likely historic implementation of O'Connor's proposal came with the First Ecosocialist International Convocation held from October 31 to November 3, 2017 in Yaracuay, Venezuela, the home of mainly people of African descent (17)

Without directly citing Wagar's original proposal, Patomäki advocates for the creation of a global political party with roughly the same agenda:

> " we cannot stand passively by until crises explode before working for social transformation. If and when a window of opportunity opens, the capacity for such action must already have been established. The time has come, then, to devote our efforts to building a World Party as an overarching organizational expression of global citizens' power." (18)

A very important symposium on Samir Amin's proposal for a 5th International appeared in the Journal Globalizations in 2019. What follows are some of the critical insights expressed in this volume.

Worth argues that the fifth International should be conceived as a transnational global expression growing out of the World Social Forums, rather than a "collection of inter-connected self-determined sovereign entities that resembles more of a traditional understanding of internationalism". (19).

Karatasli argues that "today we need two distinct forms of global political organizations. First

one should serve as a horizontal 'movement of movements' that reflects the spontaneous and creative energy of mass movements from below; the second one should serve as a hierarchically organized international party which points out, brings to front and represents the global and long-term interests of the movements against their local/ short-term interests." (20).

Álvarez and Chase-Dunn hark back to the World Social Forum, why this "process needs to be reinvented for the current period of rising neo-fascist and populist reactionary nationalism and to foster the emergence of a capable instrument that can confront and contend with the global power structure of world capitalism and aid local and national struggles." Further, they "propose a holistic approach to organizing a vessel for the global left based on struggles for climate justice, human rights, anti-racism, queer rights, feminism, sharing networks, peace alliances, taking back the city, progressive nationalism.." (21).

Robinson also emphasizes the growing danger of a fascist international emerging which must be countered by an International informed by the reconception of "the three-way relationship between states, parties, and social movements." (22). We should recognize the potential critical role of transnational green capital as a countervailing force to defeat the agenda of militarized fossil capital which has been encouraging the emergence of a fascist international (23). At a Board meeting of the journal *Science & Society* on December 8, 2018, Robinson presented an outline of his book. In the question period, Robinson agreed with my point regarding this key role of transnational green capital as a counterforce to militarized fossil capital.

Now the teenager Greta Thunberg is known around the globe for her inspiring voice demanding climate security, confronting those in power. The Extinction Rebellion is growing and the first global climate strike occurred in September 2019, with more to come. Transnational labor is joining this struggle. Indigenous people around the world are confronting fossil capital and its enablers (24). Therefore, I find the proposal put forward in Almeida's paper having great potential in creating a fifth International of sufficient power to constrain and then defeat militarized fossil capital. He argues persuasively that "the ecological crises identified by Amin in the form of global warming and climate change have created an unprecedented global environmental threat capable of unifying diverse social strata across the planet. The climate justice movement has already established a global infrastructure and template to coordinate a

new international organization for confronting neoliberal forms of globalization. Pre-existing movement organizing around environmental racism, climate justice in the global South, and recent intersectional mobilizations serve as promising models for building an enduring international organization that will represent subaltern groups and have a substantial impact on world politics." (25).

Jodi Dean argues that:

> "A global alliance of the radical Left or, better, a new party of communists, can be knit together from the concentrated forces of already existing groups…" (26).

I submit that the complexity of multidimensional transnational class struggle requires that the global Subject is heterogenous in structure, with a multiplicity of alignments; a global alliance is not equivalent to a party, but both are necessary.

Buck-Morss argues that,

"Outside of the traditional Marxist frame, mobilizations of opposition are not only happening, they are also gaining support, and developing a global consciousness in the process. This is a case for hope."(27)

"The idea is not to replace the global working class as a category with another category of identity (such as Black, women, indigenous, peasant, and so on). The collective is not the universalization of an abstraction. Rather, the collective is instrinsically multiple – defined by the Bolivian Rene Zavakleta Mercado as *abigarramiento*: heterogenous, disparate, motley, mixed, inpossible to locate on some scale of class or indigenous or national identity." (28)

Nevertheless, I submit that the transnational working class is the historically determined antagonist to the TNC, and as such will be at the core of multi-dimensional class struggle to first defeat militarized fossil capital in the unfolding of a GGND, then culminate with an ecosocialist transition ending the rule of capital on a global scale. "Multi-dimensional class struggle is waged at every level, from the workplace and the classroom to the globe (transnational), and at every

intersection of the oppressed and the exploited (race, gender, sexual orientation, ethnicity, citizenship status, religion, age, degree of able-bodiedness). But intersectionality should be unpacked with Marxist analysis, as done with great clarity by Victor Wallis (29) who emphasizes that class domination is its cement or binding agent." (30).

It is essential to note the contributions of the long history of indigenous peoples' culture which should be recognized as prefigurations, including governance structures (31), material infrastructure and practices (32). We emphasized that "Socialist or Marxist political economy is necessary but not sufficient in itself to advance a vision of 21st Century socialism. This vision must fully engage the natural, physical and informational sciences — in particular, climatology, ecology, biogeochemistry, and thermodynamics — as well as take full account of the wisdom derived from the experience of thousands of years of indigenous peoples' agriculture and culture. This will inform the technologies of renewable energy, green production, and agroecologies, whose infrastructure are to replace the present unsustainable forms." (33) One example of this wisdom is how Australian aborigines have managed forest fires for thousands of years in contrast to the recent experiences of modern Australia (34).

I conclude with a summary of Balso's "Seven Propositions Concerning Internationalism" (35):

"Proposition 1
Capitalist organization today is global.

Proposition 2
There are an infinite variety of international organizations in the service of global capitalism: whether it is in the economic, financial, military, institutional, or state sphere, the world is literally teeming with inter- and supranational organizations.

Proposition 3
Marx's idea of an internationalism of workers probably developed as an echo or reflection of the international nature of capital.

Proposition 4

Proletarian" means someone who has no place in their own country, who is counted only as a force capable of work.

Proposition 5

..to seriously examine the problems facing humanity, wherever these problems arise, and assuming that the answers to them are probably essentially the same everywhere.

Proposition 6

Taking this approach, the declarations below, drafted over the course of a long period of work by assemblies in the École des Actes8 in Aubervilliers, state the absolute need for "rights," which are completely non-existent today but which clearly should exist and have value everywhere, whatever the country. These declarations are part of a much longer document written over the years 2017 and 2018 and made public in May 2018 under the title *Premier Manifeste* (First Manifesto):

"We all need a right of the land where we live, a little humanity in the C *place on earth where we are."*

That is why we are writing this manifesto, to make suggestions that are good for everyone, for the collective organization of everyone's life:

"Everyone needs a right to be here, to be able lay their head down somewhere."

"Everyone needs a right of fraternity because fraternity binds humans together and fraternity is about what was great and good about France." "Everyone needs a right to work because no one likes to live with assistance. And work is the basis of life: it provides men and women with food, clothing, shelter, and medical care. Giving someone something to do is what can be called a job. It means:"you are one of us, you count."

"Everyone needs a right to shelter in any way possible, by building their own home, by occupying an uninhabited house, because being homeless is not normal, is not acceptable." "Everyone needs a right to move freely, because the world doesn't belong to anyone, and goods arrive on big ships now, while humans are deprived of the freedom of movement and cross the water on dinghies, the desert like packages, and the snow-covered mountains at the risk of their lives."

"Everyone needs a right to have people know who they are: because to know someone is to be able to know what is good about them; anyone who arrives somewhere should be able to say that they are there, and what their background is and their plans are."

…These laws pre-exist the laws of states. They have the power of the real, which is why police forces around the world are powerless against them.

Proposition 7

When we talk about "internationalism" we inevitably think about the "Internationals" that represented that category and project. When Engels and Marx wrote *The Manifesto of the Communist Party*, they did not have any particular national attribution of that "party" in mind. They sought to define the specificity of what it would be more accurate to call the "party of the communists" inside the then-existing workers movement. In every situation, working in the overall interests of the proletariat was its basic task.

"In conclusion, I think that deploying a "transnational" political strategy more accurately identifies both what has already been done and the additional tasks, for it is less a question of establishing ties between people of different nations than of ensuring that, from country to country, in Europe and around the world, similar convictions and new principles circulate and gain influence, demonstrating that the keys to a just politics & are not nationality and especially not national identity."

Chapter 5. " 2121 AD"

In year 2121 the 21st Century ecosocialist David Schwartzman's great granddaughter Claudia and great grandson Fidel are living in canal-dissected Lagos, Nigeria in a solar-powered 25 story high rise with a vertical farm in its core. Claudia was named after Claudia Jones, the 20th century theorist of triple oppression of Black working class women and Fidel after that giant of 20th Century "real existing socialism" and national liberation struggles. They are fortunate to be global citizens, alive on the planet Earth, now a newly emerged mature global civilization, the Global Solar Commons, the epoch of the SolarCommunicene.

What would earn this designation, which would have been the subject of ridicule by most of our ancestors? There are no remaining disparities of health, education, quality of life in any region of human civilization, with all these measures corresponding to the highest levels achieved in human history, as a result of timely applications of information and renewable energy technologies and of course the termination of class exploitation and multiple oppressions.

Marx wrote about prehistory:

> The bourgeois mode of production is the last antagonistic form of the social process of production – antagonistic not in the sense of individual antagonism but of an antagonism that emanates from the individuals' social conditions of existence – but the productive forces developing within bourgeois society create also the material conditions for a solution of this antagonism. The prehistory of human society accordingly closes with this social formation. (1)

Humanity has now left prehistory behind!

The Museum of Prehistory

The prehistory of Fossil Capitalism with its core the "Military Industrial (Fossil Fuel Nuclear State Terror and Surveillance) Complex" is now available on display in the Museum of

Prehistory on personal quantum computers with the computing power of early 21st Century supercomputers, along with full access to the libraries of the world.
Here is an image of one painting displayed in this Museum:

Figure 3. ‘Moloch (aka the “MIC”) locked in hell forever, reaching for his bomb’
David Schwartzman (1943-2054; *shamelessly optimistic, and why not!)*

Energy

All energy is now provided by solar power, mainly in the form of highly efficient thin-film photovoltaics invented in 2025, requiring no rare elements for its manufacture. Most of these photovoltaic arrays are on the roofs and sides of buildings in green cities, with power complemented by open ocean wind farms and concentrated solar power in less than 5 percent of desert areas around the Earth, and a steady supply guaranteed by highly efficiency storage technologies. Electricity derived from these renewable energy sources power all the needs of humanity, with public transit largely replacing electric cars (except for taxis), now a relict of the mid-21st Century. The power level of human civilization is now 30 trillion watts, almost double the level of the early 21st Century, with energy poverty terminated, with every child born now living to the maximum life expectancy possible (averaging now 110 years, with options for much

higher levels being explored using cyborg technologies). Air travel continues powered by electricity stored in ultra-capacitors and carbon-neutral hydrocarbon fuel synthesized from water and carbon dioxide.

The Cleansing of the Biosphere

The biosphere is largely cleaned up, including the legacy of the Military Industrial Complex, chemical, radioactive and plastic wastes (especially in the ocean) utilizing this renewable energy infrastructure along with bacteria and fungi digesters and accumulators obtained by experimental selection of microbes obtained from deep sea sediments. Solar-powered robots continue to filter residual nanoparticles of plastic from seawater in all the world's oceans. Radioactive wastes are now safely contained in deep sealed mines in Precambrian bedrock, mainly in Canada and Siberia. As a result of recycling powered by the solar infrastructure, mining has ceased on the Earth's surface, but continues for rare elements on the Moon, where the only fission reactors are sited, for power and production of radio-isotopes for medical purposes. Space elevators facilitate transport of these materials to Earth.

The challenge of bringing and keeping the early 21st Century carbon dioxide levels in the atmosphere down below the safe limit of 350 ppm was solved largely through solar-powered carbon sequestration from the atmosphere into the crust, by massive industrial scale reaction with basaltic and ultramafic rock. This was supplemented by restoration of wetlands and agricultural land along with afforestation, completed by the mid-21st century. The revolutionary inventions of low-cost and highly efficient photovoltaics in the third decade of the last century made this all possible, even though global carbon emissions peaked nearly a decade later than what the IPCC called for in October 2018. Ongoing carbon sequestration from the atmosphere continues, although its level is now safe at 330 ppm, necessary because of the legacy of anthropogenic carbon dioxide stored in the ocean, continuing to equilibrate with the atmosphere.

Food

Agriculture is now completely in the form of agroecologies, using molecular biology to select the most productive organisms along with their symbionts from preserved biodiversity, rather

than the early corporate driven GMO technologies. Most food is now grown in cities, including vertical farms, and in a perimeter of about 100 kilometer area. Human and animal wastes are digested and cycled back into these farms, metaphorically speaking a negation of the negation of medieval cities with carts returning the urban human wastes to the adjacent farms.

Meat production from killing animals has ceased, with meat substitutes being synthesized in factory production, but not living animals. Of course, carnivores are still eating herbivores in a globally managed biodiversity. After an eighty year growth phase entailing creation of a solar power infrastructure and green cities worldwide, along with biosphere cleanup and restoration, a steady-state global physical economy is now in place, with accelerated throughput of materials in industrial ecologies.

Political Economy and the End of the White Race

As a result of the growing strength of the transnational climate/energy justice movement, in 2028 the implementation of a Global Green New Deal started the 60 year long ecosocialist transition out of Fossil Capitalism. What was once at a level of $2 trillion per year in the second decade of the 21st Century, global military expenditures plunged in an unprecedented era of global cooperation. By 2100 global political economy was of course radically altered, utilizing the best insights and experience of the movements from the last three hundred years, in particular ecosocialist/communist/green/anarchist/indigenous peoples movements, which along with the legacy of the women's and Black liberation movements informing a reinvention of the prefigurations created under the rule of capital. The "white race" is no more, this social construct of white supremacy so important to the reproduction of the hegemony of capital to be terminated in the 21st Century, with the notorious example of the Trump regime (Trump died of a heart attack in late 2020, apparently from overindulgence of fast food and steaks eaten in his hotel on Pennsylvania Avenue. Trump's designated successor VP Mike Pence was found frozen in his chair, in the state of "rigor mortis fundamentalist") (2). The terms "race" (applied to humans) and "multiracial" are obsolete, just as the "Third World" of the 20th Century. All discrimination based on gender, sexual preference and disability is outlawed, with violators subject to social therapy, informed by the Rational Emotive Methodology of the 20th Century Albert Ellis.

Social governance of the political and physical economies is now in place on all scales, facilitated by quantum computers. As W. Warren Wagar predicted (3), a great variety of social experiments are now flourishing, but all are constrained by the global governance bodies representing the common interests of all humanity. The old divisions are gone, no countries, no borders. The prefiguration of the Tute Bianchi (White Overalls, Genoa, Italy 2000) is now reality; in celebration of this history, in 2100 millions wore white overalls, coated with organic photovoltaics.

Contact

In 2103, a weak signal from the Galactic Club was finally detected by an orbiting radio telescope with a diameter of 500 km culminating a SETI search of nearly 150 years. The decoded message was an astounding introduction to "Encyclopedia Galactica", concluding with an invitation for Planet Earth to join this Club. After deliberative global consideration, this invitation was responded to with this message: *YES WE ARE READY!* As proposed 136 years ago, J.D. Bernal's scenario (4) was realized, how once emerging from a primitive civilization, Earth would be then welcomed (5).

Endnotes

Introduction

1. BBC News, March 27, 2020, “Coronavirus: Jeremy Corbyn says he was proved 'right' on public spending”, https://www.bbc.com/news/uk-politics-52048213.

Jeremy Corbyn tweeted on June 5, 2020:

“Today is #WorldEnvironmentDay

In this troubling period, we need to ensure a just, green recovery. Environmental destruction made a pandemic more likely and inequality has exacerbated its impact. We need to build a new world, deliver good jobs and prevent a climate crisis.”

2. Goran Therborn, “Opus Magnum: How the Pandemic is Changing the World | thesis eleven”, July 5, 2020, https://thesiseleven.com/2020/07/06/opus-magnum-how-the-pandemic-is-changing-the-world/

3. “Five proposals for a better world after the pandemic”, April 20, 2020, climateandcapitalism.com/2020/04/20/five-proposals-for-a-better-world-after-the-pandemic.

4. Vijay Prashad**,** June 21, 2020, “A Ten-Point Agenda for the Global South After COVID-19”, climateandcapitalism.com/2020/06/21/a-ten-point-agenda-for-the-global-south-after-covid-19, See as well: ROAR Collective, ROAR Roundtable: COVID-19 and the climate crisis, ROAR Magazine, June 23, 2020, https://roarmag.org/essays/roar-roundtable-covid-19-and-the-climate-crisis/.

5. Barbara Ransby, July 2, 2020, ”The White Left Needs to Embrace Black Leadership”, https://www.thenation.com/article/activism/black-lives-white-left/.

6. https://climatecrisis.house.gov/report, https://climatecrisis.house.gov/sites/climatecrisis.house.gov/files/Climate%20Crisis%20Action%20Plan.pdf; also see “A green stimulus to rebuild the economy, by The Next System Project”, March 23, 2020, https://thenextsystem.org/learn/stories/green-stimulus-rebuild-economy.

7. Kate Aronoff, July 1, 2020, “The Democrats’ New Climate Plan Is Weirdly Isolationist”, https://newrepublic.com/article/158339/democrats-new-climate-plan-weirdly-isolationist.

8. https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en.

9. https://www.nytimes.com/2020/06/30/business/renewable-energy.html; https://www.iea.org/news/the-covid-19-crisis-is-hurting-but-not-halting-global-growth-in-renewable-power-capacity.

10. https://insideclimatenews.org/news/07072020/pipeline-climate-victories-dakota-access-keystone-xl-atlantic-coast.

11. Quincy Saul, July 2, 2020, https://www.counterpunch.org/2020/07/02/who-made-the-plague/.

12. David Schwartzman (1992). 'To Each According to Her Needs', *Dialogue & Initiative*, 4: 16–19; Footnote 12 is my caveat: "I may have come across this formulation in the green or ecologist literature. I just don't remember precisely where, so I apologize now for possible nonattribution. Identifying nature with the feminine gender has ancient roots. Some greens have used the Term "Gaia", the mother of earth in Greek mythology, for nature – this is also the term used for a new scientific theory of the biosphere elaborated by Lovelock and Margulis; see Scientists on Gaia, MIT Press, 1991." (In retrospect, Gaia is still not a theory in the scientific sense, rather a very fruitful set of hypotheses. As far as I know I have priority for this reconceptualization of Marx's aphorism.)

13. p.18, Schwartzman (1992) ibid.

14. James O'Connor (1988) Capitalism, Nature, Socialism A Theoretical Introduction, *Capitalism Nature Socialism*, No. 1: 11-38.

15. David Schwartzman (2013) The great bifurcation and prospects for solar communism in the twenty-first century, *International Critical Thought* 3(4): 480–495.

16. Here is my overall critique, the strengths and weaknesses of Bastani (2019). Bastani's original version (2017) was better, "Fully Automated Green Communism". I share Bastani's (2017) rejection of "An eternal present: the tyranny of capitalist realism" and in the main his technological utopian projections (contingent, not inevitable!), but join some of the published critiques in his failure to confront the obstacles to the realization of this utopian future, in particular his neglect of considering a strategy to overcome and defeat militarized fossil capital in the short time left to prevent climate catastrophe (defined as breaching the 1.5 deg C warming limit). In addition, Bastani's discussion of the climate and energy challenge is superficial. Here I will concisely present and update our 2019 book's in-depth analyses in this regard. I mainly agree with Ian Angus' review (2019), particularly on Bastani's lack of critique of the Green

Revolution and his uncritical boosting of GMOs in his chapters 7 and 8. Likewise, Bastani's "Mining the Sky" (chapter 6) lacks an analysis of how a global solar energy infrastructure can greatly facilitate industrial recycling and reduce extractivism, with mining our Moon a far distant prospect. However, Angus neglects to mention Bastani's recognition of the contradictions in capitalism that hold back the full realization of the FALC future, e.g., the continuing slow pace of automation and its negative impacts (see p. 119, 137, 239, 242). He emphasizes the role of politics:

"What happens next, however, and how these technologies are woven into the fabric of modernity, is our responsibility [the role of the working class?]. There is no necessary reason why they should liberate us, or maintain our planet's ecosystems, any more than they should lead to ever-widening income inequality and widespread collapse. The direction we take next won't be the result of a predictive algorithm or unicorn start-up – it will be the result of politics." (p. 242).

A major criticism of FALC is its faint hint of class struggle in all its dimensions. Class struggle is mentioned as relevant only for Marx's epoch (p. 55). Bastani dismisses the continuing role of organized labor and political parties committed to "a society of work enduring forever" (p.194). Yes, but this formulation ignores a recognition that more, not less work is needed in a green ecosocialist transition as militarized fossil capital is overcome, in the one scenario I find most plausible, a Global Green New Deal (GGND), not mentioned is his text. A just transition must include organized labor as a leading force. Is Bastani's invocation of "green populism" a gesture in this direction? My proposed book will expand and update the discussion of the GGND in our 2019 book. I largely agree with Gareth Dale's (2019) critique of "Bastani's Law". Nevertheless, I emphatically second Yohann Koshy's (2019) point, "By conceptually linking radical reform with a utopian horizon, Fully Automated Luxury Communism succeeds in its most achievable goal: reminding the left to start thinking in the future tense." But lets think strategically.

Cited: Angus, Ian, (2019) 'Gee Whiz! Communism is sure gonna be keen!', June 27, https://mronline.org/2019/06/27/gee-whiz-communism-is-sure-gonna-be-keen/.: Bastani, Aaron (2017) 'Fully Automated Green Communism', https://novaramedia.com/2017/11/19/fully-automated-green-communism/; Bastani, Aaron (2019) *Fully Automated Luxury Communism.* London: Verso; Jefferies, Bill (2019) Review of Fully Automated Luxury Communism: A Manifesto,

https://marxandphilosophy.org.uk/reviews/17006_fully-automated-luxury-communism-a-manifesto-by-aaron-bastani-reviewed-by-bill-jefferies/; Koshy, Yohann (2019) 'Cookshops of the Future', May 30, https://thebaffler.com/latest/cookshops-of-the-future-koshy.

17. p. 146, David Schwartzman (2016) 'Beyond eco-catastrophism: the conditions for solar communism', In *Socialist Register 2017*. edited by L. Panitch, and G. Albo, 143–160. New York: Monthly Review Press.

Chapter 1

1. p.236-237, Peter Schwartzman and David Schwartzman (2019) *The Earth is Not for Sale: A Path Out of Fossil Capitalism to the Other World That is Still Possible*. Singapore: World Scientific.

2. See chapter 10, Ian Birchall (2016) *The Spectre of Babeuf*. Chicago: Haymarket.

3. Gross National Happiness, Wikipedia.

4. World Happiness Report 2019, Editors: John F. Helliwell, Richard Layard, and Jeffrey D. Sachs Associate Editors: Jan-Emmanuel De Neve, Haifang Huang, Shun Wang, and Lara B. Aknin. For life expectancy: https://en.wikipedia.org/wiki/List_of_countries_by_life_expectancy, UNDP (2018).

5. http://www.gallup.com/poll/175694/country-varies-greatly-worldwide.aspx.

6. See Lorenzo Pellegrini and Luca Tasciotti (2014) 'Bhutan: between happiness and horror', *Capitalism Nature Socialism* 25 (3): 103-109.

7. Mark Mardell, 'Europe Diary: Italian Reds', *BBC News*, April 6, 2006, published online at: http:// news.bbc.co.uk/2/hi/europe/4882180.stm.

8. p. 145, Schwartzman (2016) ibid.

9. Victor Grossman (2019) *A Socialist Defector*. New York: Monthly Review Press.
Another illuminating analysis of "real existing socialism" of the 20th Century focusing on time and capital reproduction: Anej Korsika (2017) 'Capital and Soviet Communism', In *Reading 'Capital' Today*, Ingo Schmidt and Carlo Fanelli, editors, 48-63, London: Pluto Press.

10. https://monthlyreview.org/product/a-socialist-defector/.

Chapter 2

1. George Monbiot (2016) 'Nuclear Power, Yes Please. Hinkley Point, No Thanks', *The Guardian*, September 15. https://www.theguardian.com/commentisfree/2016/sep/ 15/nuclear-power-no-hinkley-point-yes-atomic-energy.

2. Jim Green (2017) 'James Hansen's Generation IV Nuclear Fallacies and Fantasies', *Renew Economy*, August 28. https://reneweconomy.com.au/james-hansens- generation-iv-nuclear-fallacies-and-fantasies-70309/; Joe Romm (2019) 'Taxpayers Should Not Fund Bill Gates' Nuclear Albatross', *Think Progress*, February 4. https://thinkprogress.org/nuclear-power-is-so-uneconomic al-even-bill-gates-cant-make-it-work-without-taxpayer-funding-faea0cdb60de/.

3. Paul Cockshott (2017) 'Fossil Fuel and the Ebbing of Globalization', Author's Blog. https://paulcockshott.wordpress.com/2017/04/18/fossil-fuel-and-the-ebbing-of-globalisation/; see David Schwartzman (2017) "100% Renewables: 'Wishful Thinking' or an Imperative Goal?", Symposium: Pathways to the Post-carbon Economy, October 24. https:// medium.com/insurge-intelligence/100-renewables-wishful-thinking-or-an- imperative-goal-9879a8947d1b; Schwartzman and Schwartzman (2019) ibid.

4. Heidi Hutner and Erica Cirino (2019) 'Nuclear Power Is Not the Answer in a Time of Climate Change', *Aeon*, May 28. https://aeon.co/ideas/nuclear-power-is-not-the- answer-in-a-time-of-climate-change.

5. Peter Schwartzman and David Schwartzman (2011*) A Solar Transition is Possible*, Institute for Policy Research and Developmen]. Available at: http:// solarutopia.org/wp-content/uploads/2013/04/A-Solar-Transition-is-Possible_ new.pdf.

6. Quotation from p. 304, Nicolas Georgescu-Roegen (1989) 'Afterword', in Rifkin, J., *Entropy*. Revised edition. New York: Bantam Books.

7. David Schwartzman (1996) Solar Communism**.** *Science & Society* 60 (3): 307-331, citing Nicolas Georgescu-Roegen (1981), p.70-71, In *Energy, Economics, and the Environment*. Herman E. Daly and Alvaro F. Umana,, editors, AAAS Selected Symposium 64, Boulder, Colorado: Westview Press.

8. Quotation from George Monbiot (2019) 'The Problem is Capitalism', https://www.monbiot.com/2019/04/30/the-problem-is-capitalism.

9. Schwartzman (1996), Schwartzman and Schwartzman (2019) ibid.

10. Quotation from p.192, Giorgos Kallis (2019) Socialism Without Growth, *Capitalism Nature Socialism* 30 (2): 189–206; See our critique: David Schwartzman and Salvatore Engel-Di Mauro (2019) A Response to Giorgios Kallis' Notions of Socialism and Growth, *Capitalism Nature Socialism* 30 (3): 40-51.

11. Schwartzman and Schwartzman (2019) ibid. For updates go to http://theearthisnotforsale.org, and on the imperative of negative carbon emissions: https://climateandcapitalism.com/2020/03/07/ecosocialist-case-for-co2-removal/.

12. Quotation from p. 42-43, Schwartzman and Engel Di Mauro (2019) ibid.

13. About 3.5 kilowatt per person is the minimum level necessary in today's world for the highest life expectancy; see chapter 4, Schwartzman and Schwartzman (2019) ibid. Jacobson et al. (2019) give a significantly lower projection for global end use energy needs by 2050 with full electrification using renewable wind-water-solar power but most incremental needs noted are not included, and judging from previous papers energy poverty is still a factor especially in India and China. Reference: Mark Jacobson et al. (2019) Impacts of Green New Deal Energy Plans on Grid Stability, Costs, Jobs, Health, and Climate in 143 Countries, *One Earth* 1: 449–463.

14. IIPFCC in solidarity with Standing Rock Sioux Tribe (IIPFCC is The International Indigenous Peoples` Forum on Climate Change), https://www.iitc.org/wp-content/uploads/Final-Version-IIPFCC-in-solidarity-with-Standing-Rock-Sioux-Tribe.pdf

15. https://www.theguardian.com/world/2020/feb/10/canada-protest-indigenous-wetsuweten-pipeline.

16, https://www.brettonwoodsproject.org/2019/12/local-communities-oppose-planned-dam-construction-boom-in-manipur-backed-by-world-bank/.

17. https://www.theguardian.com/world/2018/jun/14/chile-mapuche-indigenous-arson-radical-environmental-protest.

18. Brazil's Indigenous Peoples Suffer Wave of Invasions and Attacks, February 20, 2019, by Christian Poirier, https://amwt.ch/4392.

19. IPCC (2018). (Report): (IPCC). 7 October 2018. Available at: https://www.ipcc.ch/report/sr15/.

20. E.g., Tim Lenton, T.M., Rockström, J., Gaffney, O., et al. (2019) Climate tipping points — too risky to bet against, *Nature* 575: 592-595.

21. Schwartzman and Schwartzman (2019) ibid.
22. Press Release, International Energy Agency (IEA), 'Defying expectations of a rise, global carbon dioxide emissions flatlined in 2019', February 11, 2020, https://www.iea.org/news/defying-expectations-of-a-rise-global-carbon-dioxide-emissions-flatlined-in-2019.
23. Michael Roberts, 'Climate change, emissions, and the fat tail risk', February 11, 2020, https://www. climateandcapitalism.com/2020/02/11/climate-change-emissions-and-the-fat-tail-risk.
24. Alan Livsey, 'Lex in depth: the $900bn cost of 'stranded energy assets'
Climate targets may force energy groups to leave huge reserves of coal, oil and gas in the ground", February 4, 2020, https://www.ft.com/content/95efca74-4299-11ea-a43a-c4b328d9061c.
25. Helen Briggs, 'Coronavirus: The race to find the source in wildlife', February 25, 2020, https://www.bbc.com/news/science-environment-51496830.; Rachel Nuwer, 'To Prevent Next Coronavirus, Stop the Wildlife Trade, Conservationists Say', February 19, 2020, https://www.nytimes.com/2020/02/19/health/coronavirus-animals-markets.html.
26. Sonia Shah, 'Think Exotic Animals Are to Blame for the Coronavirus? Think Again', February 18, 2020, https://www.thenation.com/article/environment/coronavirus-habitat-loss/. Mike Davis, 'Mike Davis: The Coronavirus Crisis Is a Monster Fueled by Capitalism', March 20, 2020 http://inthesetimes.com/article/22394/coronavirus-crisis-capitalism-covid-19-monster-mike-davis; 'Mike Davis on pandemics, super-capitalism and the struggles of tomorrow', March 30, 2020, https://www.madamasr.com/en/2020/03/30/feature/politics/mike-davis-on-pandemics-super-capitalism-and-the-struggles-of-tomorrow/. For an in depth analysis I highly recommend: Andreas Malm (2020) *Corona, Climate, Chronic Emergency: War Communism in the Twenty-First Century*. London: Verso.

Chapter 3

1. John Haltiwanger (2018) 'America's 'War on Terror' has Cost the US Nearly $6 Trillion and Killed Roughly Half a Million People, and There's No End in Sight', *Business Insider*, November 14. https://www.businessinsider.com/the-war-on-terror-has-cost-the-us-nearly-6-trillion-2018-11.

2. p.117, William. I. Robinson (2018) *Into the Tempest: Essays on the New Global Capitalism*. Chicago: Haymarket Press.

3. p.193, Robinson (2018) ibid.

4. The New York Times (2019) 'Rethinking America's Approach to the World', Editorial. August 19, A22.

5. Michael Crowley (2020). 'Long Before President's Drone Strike, Iran Hawks Pushed for the Killing of a General', *New York Times,* January 7, A10.

6. David Schwartzman and Quincy Saul (2019) 'The Path to Climate Justice Passes through Caracas', *MR Online*, https://mronline.org/2019/06/25/the-path-to-climate-justice-passes-through-caracas/.

7. Andreas Malm and Alf Hornborg (2014) The Geology of Mankind? A Critique of the Anthropocene Narrative, The Anthropocene Review 1(1): 62–69; Andreas Malm (2016) *Fossil Capital: The Rise of Steam Power and the Roots of Global Warming*. London: Verso.

8. China, Russia to Defy US Sanctions Over Support to Venezuela, February 10, 2020, https://www.telesurenglish.net/news/China-Russia-to-Defy-US-Sanctions-Over-Support-to-Venezuela-20200210 0005.html?utm_source=planisys&utm_medium=NewsletterIngles&utm_campaign=NewsletterIngles&utm_content=8.

9. Economic Sanctions as Collective Punishment: The Case of Venezuela**,** By Mark Weisbrot and Jeffrey Sachs, April 2019, Center for Economic and Policy Research, http://cepr.net/publications/reports/economic-sanctions-as-collective-punishment-the-case-of-venezuela. For a thorough documented analysis of the U.S. regime change attempt, see Venezuela: Disturbing Echoes of History, July 31, 2019, by Maria Paez Victor, https://www.counterpunch.org/2019/07/31/venezuela-disturbing-echoes-of-history/.

10. Schwartzman and Saul (2019) ibid.; See also 'A letter to intellectuals who deride revolutions in the name of purity', by Roxanne Dunbar-Ortiz, Ana Maldonado, Pilar Troya Fernández, and Vijay Prashad, Nov 20, 2019, https://mronline.org/2019/11/20/a-letter-to-intellectuals-who-deride-revolutions-in-the-name-of-purity/. Our proposal for the solarization of the Venezuelan economy and Mercosur outlines such a potential future: David Schwartzman and Quincy Saul (2015) An Ecosocialist Horizon for Venezuela: A Solar Communist Horizon for the World, *Capitalism Nature Socialism,* 26 (3): 14-30; Similar version at

http://ecosocialisthorizons.com/2014/10/an-ecosocialist-horizon-for-venezuela-a-solar-communist-horizon-for-the-world/.

11. https://thegrayzone.com/2019/01/29/us-coup-venezuela-oil-corporate-john-bolton/.

12. https://www.worldatlas.com/articles/the-world-s-largest-oil-reserves-by-country.html.

13. IESA (2016). Venezuela Energy in Figures 2014-2015, Instituto de Estudios Superiores de Administración, Venezuela, p. 21.

14. See chapter 8 in Schwartzman and Schwartzman (2019) ibid.

15, Source; https://www.ecowatch.com/military-largest-polluter-2408760609.html. But this fact is commonly exaggerated. Regarding the Pentagon's fuel use, Crawford (2019)'s report gives 59 million metric tons for 2017 or 0.11 % of the global GHG CO2 equivalent emissions for that year (UNEP 2018, Emissions Gap Report). Crawford (2019)'s report gives 1.2 billion metric tons of GHG since the beginning of the "Global War on Terror" in 2001, or no more than 0.15% of the cumulative total of global GHGCO2 equivalent emissions in that period (Olivier et al., 2017, Figure 2.1, plus adding data for 2016 and 2017). This confirms the point we made in our book: "Military spending and the MIC's [Military Industrial Complex] Imperial Agenda are the critical obstacles posed by the MIC, not the sizable, but widely exaggerated greenhouse gas emissions of the Pentagon itself" (p.101, Schwartzman and Schwartzman, 2019, ibid).
Cited: Crawford, Neta C. (2019) 'Pentagon Fuel Use, Climate Change, and the Costs of War', https://watson.brown.edu/costsofwar/.; Olivier, J.G.J.. K.M. Schure, J.A.H.W. Peters (2017) Trends in global CO2and total greenhouse gas emissions: 2017 Report, PBL Netherlands Environmental Assessment Agency The Hague, PBL publication number: 2674.

16. p. 38, http://stopthejnf.org/documents/JNFeBookVol4.pdf.

17. http://links.org.au/node/3079.

18. https://issuu.com/diversidad_biologica/docs/encdb_ingles.

19. https://venezuelanalysis.com/analysis/13916.

20. 'Haiti's Unfolding Revolution is Directly Linked to Venezuela's', by Kim Ives, *Haiti Liberte*, February 2019: https://haitiliberte.com/haitis-unfolding-revolution-is-directly- linked-to-venezuelas/.

21. http://www.telesurtv.net/english/opinion/Venezuela-Farmers-Fight-Monsanto-Seed-Imperialism---and-Win-20161014-0026.html. Also see "Building Socialism from Below: A

Conversation with Martha Lia Grajales" by Cira Pascual Marquina, May 31, 2019, https://venezuelanalysis.com/YUYn.

22. https://monthlyreview.org/commentary/strike-at-the-helm/.

23. http://ecosocialisthorizons.com/2017/12/the-first-ecosocialist-international-combined-strategy-and-plan-of-action/.

24. 'The OAS lied to the public about the Bolivian election and coup', by Mark Weisbrot, November 19, 2019, https://www.marketwatch.com/story/the-oas-lied-to-the-public-about-the-bolivian-election-and-coup-2019-11-19.

25. The Bolivian coup: A case of lithium regime change, by Muhammad Mahmood, November 23, 2019, https://thefinancialexpress.com.bd/views/the-bolivian-coup-a-case-of-lithium-regime-change-1574519657.

26. News release: http://www.howiehawkins.com/2010/index.php/media-news-reports/162-green-change-62-green-candidates-call-for-qgreen-new-dealq-to-change-the-course-of-our-nation. Howie Hawkins'flyer in his 2010 campaign for Governor of New York State is accessed at: http://howiehawkins.com/2010/images/stories/2010/labor-day-flyer.pdf .

27. David Schwartzman (2011) Green New Deal: An Ecosocialist Perspective, *Capitalism Nature Socialism* 22 (3): 49–56.

28. The Green Party of the United States, Green New Deal: https://www.gp.org/green_new_deal.

29. https://berniesanders.com/en/issues/green-new-deal/.

30. 'Bernie Sanders explains his plan to cut military spending', by Tara Golshan, May 2, 2019, https://www.vox.com/2019/5/2/18525580/bernie-sanders-plan-cut-military-spending. Here is a selection from Sanders' campaign website: "A Responsible, Comprehensive Foreign Policy… Together, as the forces of militarism have kept us engaged in unending wars, we have stood arm-in-arm to fight back. We're not going to invest in never-ending wars.", https://berniesanders.com/issues/responsible-foreign-policy/.

Here are three recent books on the GND:

Kate Aronoff, Alyssa Battistoni, Daniel Aldana Cohen, and Thea Riofrancos (2019) *A Planet to Win: Why We Need a Green New Deal.* London: Verso.

Naomi Klein (2019) *On Fire: The (Burning) Case for a Green New Deal*. New York: Simon & Schuster. (an excellent case is made, but too little on how militarism impacts our climate challenge.)

Jeremy Rikfin (2019) *The Green New Deal*. New York: St. Martin's Press (even more than FALC, Rifkin argues that green capital will deliver a GND, class struggle is ignored.)
And here you will find an illuminating interview of Kali Akuno, leader of Cooperation Jackson, on the relation of the GND to the global struggle for ecosocialism:
https://jacobinmag.com/2019/02/kali-akuno-interview-climate-change-cooperation-jackson.
31. https://www.congress.gov/bill/116th-congress/house-resolution/109/text.
32. Howie Hawkins, 2020, Ecosocialist Green New Deal Budget:
https://howiehawkins.us/the-ecosocialist-green-new-deal-budget/. See his analysis "Which Green New Deal ?" at: https://solidarity-us.org/atc/203/which-green-new-deal/.
33. Democratic Socialists of America, Ecosocialist GND Principles:
https://ecosocialists.dsausa.org/2019/02/28/gnd-principles/.
34. 'Manifesto for A Green Industrial Revolution', https://labour.org.uk/manifesto/a-green-industrial-revolution/.
35. The European Green Deal, December 11, 2019,
https://ec.europa.eu/info/sites/info/files/european-green-deal-communication_en.pdf.;
Yanis Varoufakis (2014) 'Think Big, Think Bold: Why the Left must aim for a radical Pan-European Green New Deal', Centre for Labour and Social Studies, London.
36. My own ideas for a GND in Washington DC can be found at:
https://www.gp.org/green_new_deal_for_working_class_residents.
37. p.182-183, Schwartzman and Schwartzman (2019) ibid.
38. p.1067, Timothy M. Lenton and Bruno Latour (2018) Gaia 2.0., Science 361: 1066-1068.
39. See David Schwartzman, John Evans, Harold Okrend, and Soe Aung (1991) 'Microbial Weathering and Gaia.', In: *Scientists on Gaia*, Stephen H. Schneider and Penelope J. Boston, editors, 320-329, Cambridge MA: MIT Press.
40. For example, David Schwartzman and Tyler Volk (1989) Biotic Enhancement of Weathering and the Habitability of Earth, N*ature* 340, 457-460.
41. Tyler Volk (1998) *Gaia's Body: Toward a Physiology of Earth*. New York: Springer, and David Schwartzman (1999, 2002) *Life, Temperature, and the Earth: The Self-Organizing Biosphere*. New York: Columbia University Press.
42. David Schwartzman (2017) Life's Critical Role in the Long-term Carbon Cycle: the Biotic Enhancement of Weathering, *AIMS Geosciences* 3(2): 216 -238; David Schwartzman (2018)

‘The Dialectics of Biospheric Evolution’, In *The Truth is the Whole: Essays in Honor of Richard Levins*, Tamara Awerbuch, Maynard S. Clark, and Peter J. Taylor, editors, 21-33. Arlington MA: The Pumping Station; David Schwartzman (2020) Biospheric evolution is coarsely deterministic, *Journal of Big History* IV (2): 50-66.

43. https://en.wikipedia.org/wiki/Gaia_hypothesis.

44. David Schwartzman (2015) From the Gaia Hypothesis to a Theory of the Evolving Self-organizing Biosphere, *Metascience* 24: 315–319.

45. Schwartzman and Volk (1989) ibid.

46. David Schwartzman (2019) ‘My Take on Gaia 2.0.’, Youtube video. https://www.youtube.com/watch?time_continue=8&v=xRHpCpFDNXg. Conference Program, Abstracts: https://www.lovelockcentenary.info.

47. See James E. Lovelock and Lynn Margulis (1974) Atmospheric Homeostasis by and for the Biosphere: The Gaia hypothesis, *Tellus* 26: 2–10.

48. Lenton and Latour (2018) ibid.

49. p. 158, Andreas Malm (2019) Against Hybridism: Why We Need to Distinguish between Nature and Society, Now More than Ever, *Historical Materialism* 27.2: 156–187.

50. Schwartzman and Schwartzman (2019) ibid.

51. This is an updated and highly revised version of a paper I gave at the 2nd World Congress on Marxism, Peking University, May 5-6, 2018.

52. Xinhua (2016) ‘China: CCP calls for an Ecological Civilization’, December 2. http://english.cctv.com/2016/12/02/ARTIIzUfkgW5FoLCi1cph6aq161202.shtml.

53. Arran Gare (2012) China and the Struggle for Ecological Civilization, *Capitalism Nature Socialism* 23 (4): 10-26.

54. Fred Magdoff and Chris Williams (2017) *Creating an Ecological Society: Toward a revolutionary transformation*. New York: Monthly Review Press.; John Bellamy Foster (2017) ‘The Earth-System Crisis and Ecological Civilization: A Marxian View’, *International Critical Thought* 7(4), 439–458.; David Schwartzman (2013) The great bifurcation and prospects for solar communism in the twenty-first century, *International Critical Though*t 3(4), 480–495., Schwartzman (2016) ibid, and Schwartzman and Schwartzman (2019) ibid.

55 See full discussion of these requirements in Schwartzman and Schwartzman (2019) ibid.

56. For example see FAO (2015). Agroecology for Food Security and Nutrition: Proceedings of the FAO International Symposium. Rome, Italy.
57. RENEWABLES, GLOBAL STATUS REPORT (2018). REN21 Renewable Energy Policy Network for the 21st Century. http://www.ren21.net/wp-content/uploads/2018/06/17-8652_GSR2018_FullReport_web_-1.pdf.
58. Richard Smith (2015) 'China's Communist-Capitalist ecological apocalypse', *real-world economics review*, issue no. 71.
59. Robert A. Rohde and Richard A. Muller (2015) Air Pollution in China: Mapping of Concentrations and Sources, *PLOS ONE,* 10(8), e0135749, DOI: 10.1371/journal. pone.0135749.
60. Matt McGrath (2018) 'China coal power building boom sparks climate warning', *BBC News*, September 26. https://www.bbc.com/news/science-environment-45640706.
61. Lucy Hornby and Leslie Hook (2018) 'China's carbon emissions set for fastest growth in 7 years', *Financial Times*. May 29. https://www.ft.com/content/98839504-6334-11e8-90c2-9563a0613e56.
62. See Paulina Garzon and Leila Salazar-Lopez (2017) 'China's Other Big Export: Pollution', *New York Times*, July 21. https://www.nytimes. com/2017/07/21/opinion/china-climate-pollution-global-warming.html.; David Shukman (2018) 'China-backed coal projects prompt climate change fears', *BBC News*, November 22. https://www.bbc.com/news/science-environment-46310807.
63. Gerry Shih (2019) 'Study finds much less pollution in Beijing', September 13, *The Washington Post*, A13; Editorial (2019) 'Cleaner air for China', *Nature Geoscience* 12: 497.
64. Shih (2019) ibid.
65. IQAir Air Visual (2019) https://www.airvisual.com/world-air-quality-ranking.
66. James Temple (2018) 'China's giant transmission grid could be the key to cutting climate emissions', *Technology Review*, November 8, https://www.technologyreview.com/s/612390/chinas-giant-transmission-grid-could- be-the-key-to-cutting-climate-emissions/.
67. Giles Parkinson (2019) 'China prepares transition to subsidy-free solar and wind by 2021', *Renew Economy,* April 12. https://reneweconomy.com.au/china-prepares-transition-to-subsidy-free-solar-and-wind-by-2021-2021/.

68. David Stanway (2019) 'China CO2 emissions to peak in 2022, ahead of schedule: government researcher', September 5, *Reuters*, https://www.reuters.com/article/us-china-carbon/china-co2-emissions-to-peak-in-2022-ahead-of-schedule-government-researcher-idUSKCN1VQ1K0.

69. Peter Fairley (2018) 'China's losing its taste for nuclear power. That's bad news', *Technology Review*. December 12. https://www.technologyreview.com/s/612564/chinas-losing-its-taste-for-nuclear-power-thats-bad-news/; Reuters Staff (2020) 'China to build 6-8 nuclear reactors a year from 2020-2025 – report', *Reuters*. July 8. https://in.reuters.com/article/china-nuclearpower/china-to-build-6-8-nuclear-reactors-a-year-from-2020-2025-report-idINKBN24A0DL.

70. Schwartzman and Schwartzman (2019) ibid.

71. Meredith J. Deboom (2018) *Developmental Fusion: Chinese Investment, Resource Nationalism, and the Distributive Politics of Uranium Mining in Namibia*. PhD Dissertation, University of Colorado, Department of Geography, 362 pp.

72. Domenico Losurdo (2017) Has China Turned to Capitalism? - Reflections on the Transition from Capitalism to Socialism, *International Critical Thought* 7 (1): 15-31.

73. Wikipedia (2019). "Socialism with Chinese characteristics." https://en.wikipedia.org/wiki/Socialism_with_Chinese_characteristics.

74. For example, Gare (2012) ibid: Arran Gare (2017) From 'Sustainable Development' to 'Ecological Civilization': Winning the War for Survival. *Cosmos and History: The Journal of Natural and Social Philosophy* 13 (3):130-153.

75. Robinson (2018) ibid.

76. Dion Rabouin (2019) 'How China is shaking up the global financial order', *Axios*. April 11. https://www.axios.com/china-economy-global-financial-order-currency-7a0f9f5b-3470-4e59-a804-3390d5cdca94.html.

77. Xinhua (2017) 'Chinese average life expectancy increases by 8.6 years in 35 years', September 29. http://www.chinadaily.com.cn/china/2017-09/29/content_32641685.htm.

78. Tom Miles (2018) 'China overtakes U.S. for healthy lifespan: WHO data', *Reuters*, May 30. https://www.reuters.com/article/us-health-lifespan/china-overtakes-u-s-for-healthy-lifespan-who-data-idUSKCN1IV15L.

79. p.13-14, Robinson (2018) ibid.

80. Note 28, p.158, Schwartzman (2016) ibid.

81. Gare (2012, 2017) ibid.

82. Z. Li, E. Friedman and H. Ren (eds.) (2016) *China on Strike: Narratives of Workers' Resistance*. Chicago: Haymarket Books.

83. J. Ma and J. Xu (2017) 'China's energy rush harming ecosystem', *Nature* 541: 30.

84. Gerry Shih (2019) 'In China, voices from the vanished', May 26, *The Washington Post*, A1, 17.

85. https://www.bbc.com/news/science-environment-54256826.

Chapter 4

1. Ernst Bloch (1986) *The Principle of Hope* (three volumes). Cambridge: MIT Press.

2. Ana Dinerstein (2015) *The Politics of Autonomy in Latin America*. New York: Palgrave Macmillan.

3. p. 158, Vladimir. I. Lenin (1929) *What is to be Done?* New York: International Publishers.

4. Joel Kovel (2017) 'Ernst Bloch as an ecosocialist thinker for the present crisis', Presentation at Left Forum, 2 June, John Jay College of Criminal Justice, New York, N.Y.

5. p. 100, Carl Boggs (1977, 1978) Marxism, Prefigurative Communism, and the Problem of Workers' Control, *Radical America* 11 (6), 12 (1): 99-122.

6. p.166, Bill Bowring (2008) *The Degradation of the International Legal Order*. New York: Routledge.

7. Ceballos, G., Ehrlich, P. R., Barnosky, A. D., et al. (2015) Accelerated modern human–induced species losses: Entering the sixth mass extinction, *Science Advances* 1(5), e1400253, DOI: 10.1126/sciadv.1400253; Ceballos, G., Ehrlich, P. R. and Dirzo, R. (2017) Biological annihilation via the ongoing sixth mass extinction signaled by vertebrate population losses and declines, *Proceedings of the National Academy of Sciences (U.S.*A.) 114 (30): E6089-E6096.

8. Convention on Biological Diversity (2017) *'List of Parties',* Available at: https://www.cbd.int/information/parties.shtml.

9. Erin Olin Wright (2015) *'Why Class Matters'*, *Jacobin*, December 23, Available at: https://www.jacobinmag.com/2015/12/socialism-marxism- democracy-inequality-erik-olin-wright.; Erin Olin Wright (2016). *'How to Think About (And Win) Socialism'*, J*acobin*, April 27.

Available at: https://www.jacobinmag.com/2016/04/erik- olin-wright-real-utopias-capitalism-socialism.
10. David Schwartzman (2016) 'Beyond eco-catastrophism: the conditions for solar communism', In *Socialist Register 2017*, Leo Panitch, and Greg Albo, editors, 143–160. New York: Monthly Review Press.
11. Ronaldo Munck (2019) 'Workers of the World Unite (At Last)', *Great Transition Initiative*, April. https://www.greattransition.org/publication/workers-of-the-world-unite.
12. Samir Amin (2017) 'It is imperative to construct a 5th International of workers and peoples', July 29, http://www.defenddemocracy.press/it-is-imperative-to-reconstruct-the-internationale-of-workers-and-peoples-by-samir-amin/.
13. W. Warren Wagar (1989, 1992, 1999) *A Short History of the Future.* Chicago: University of Chicago Press.
14. Chapter 15, W. Warren Wagar (2001) *Memoirs Of The Future.* Global Academic Publishing,
15. p.5, David Schwartzman (1992) 'A World Party. Vehicle of Global Green Left', *Ecosocialist Review* Spring, 4-5.
16. Quincy Saul (2018) 'James O'Connor and the Ecosocialist International', March 21. http://www.cnsjournal.org/james-oconnor-and-the-ecosocialist-international/.
17. Quincy Saul (2017) 'From the Plan of the Homeland to a Plan for the Planet: A gathering of 100 revolutionary delegates from five continents gathered in Venezuela and founded the First Ecosocialist International', December 8, https://www.telesurtv.net/english/opinion/From-the-Plan-of-the-Homeland-to-a-Plan-for-the- Planet-20171208-0010.html; David Schwartzman (2017) 'Report from the First Ecosocialist International Launch Meeting in Venezuela', December 23, http://forhumanliberation.blogspot.com/2017/12/2783-report-from-first-ecosocialist.html; Kanya D'Almeida (2018) '¡Somos Locos!', June 22, http://ecosocialisthorizons.com/2018/06/somos-locos/.
18. Heikki Patomäki (2019) 'A World Political Party: The Time Has Come', *Great Transition Initiative,* February, https://www.greattransition.org/publication/world-political-party.
19. Abstract, Owen Worth (2019) The fifth International: international or global?, *Globalizations*, DOI: 10.1080/14747731.2019.1654679.

20. Abstract, Sahan Savas Karatasli (2019) The twenty-first century revolutions and internationalism: a world historical perspective, *Globalizations*, DOI: 10.1080/14747731.2019.1651525.
21. Abstract, Rebecca Álvarez and Christopher Chase-Dunn (2019) Forging a diagonal instrument for the global left: the vessel, *Globalizations*, DOI: 10.1080/14747731.2019.1654284.
22. Abstract, William I. Robinson (2019) Capital has an Internationale and it is going fascist: time for an international of the global popular classes, *Globalizations*, DOI: 10.1080/14747731.2019.1654706.
23. See William I. Robinson (2018) *Into the Tempest: Essays on the New Global Capitalism*. Chicago: Haymarket Press.
24. Transnational labor and the global climate strike of September 2019:
Union Statements and Actions in Support of the Youth-Led Calls for Global Climate Action, http://unionsforenergydemocracy.org/union-statements-and-actions-in-support-of-the-youth-led-calls-for-global-climate-action/; 'We Must Be Bolder Than Ever': Labor Federation Representing 30 Million Workers Calls on All Unions to Join Global Climate Strike, https://www.commondreams.org/news/2019/09/12/we-must-be-bolder-ever-labor-federation-representing-30-million-workers-calls-all.
25. Abstract, Paul Almeida (2019) Climate justice and sustained transnational mobilization, *Globalizations*, DOI: 10.1080/14747731.2019.1651518.
26. p. 262, Jodi Dean (2016) *Crowds and Party.* London: Verso. Also see my discussion of Heron and Dean's polemic "Revolution or Ruin**"** at http://theearthisnotforsale.org/dsrev_revolution.pdf.
27. p.1, Susan Buck-Morss (2019) *Revolution Today.* Chicago: Haymarket.
28. p.66, Buck-Morss (2019) ibid.
29. Victor Wallis (2015) Intersectionality's Binding Agent, *New Political Science* 37(4): 604–619.
30. p.236, Schwartzman and Schwartzman (2019) ibid.
31. Raychelle Daniel (2020) Understanding our Environment Requires an Indigenous Worldview, *EOS Earth & Science News* 101(3): 14-15.
32. Rachel Fritts (2020) Pre-Inca Canal System uses Hillsides as Sponges to Store Water. *EOS Earth & Science News* 101(3): 12.

33. p. 240, Schwartzman and Schwartzman (2019) ibid. A very important in-depth analysis of class struggles in the extractive sector and their relevance to these prefigurations: Martin Arboleda (2020) *Planetary Mine*. London: Verso.
34. Thomas Fuller (2020) 'Reducing Fire, and Cutting Carbon Emissions, the Aboriginal Way', New York Times, Jan. 16, https://nyti.ms/2u03Rpv.
35. Judith Balso (2020) Seven Propositions Concerning Internationalism, *Crisis & Critique* 6 (1): 11-23.

Chapter 5.

1. Karl Marx (1859, published 1970) *A Contribution to the Critique of Political Economy*, New York: International Publishers, pp. 21–22.
2. This was written in October 2020, with the more likely and hopeful outcome a landslide defeat for Trump/Pence in the 2020 election with the post election opportunity for ferocious class struggles for a GGND.
3. W.W. Wagar (1989) *A Short History of the Future.* Chicago: University of Chicago Press.
4. J.D. Bernal (1967) *The Origin of Life*. London: Weidenfeld & Nicolson.
5. David Schwartzman and Lee J. Rickard (1988) Being Optimistic about SETI, *American Scientist* 76 (4): 364-369; David Schwartzman (2010) 'SETI Redux: Joining the Galactic Club', posted in the Global Library at https://www.astrobio.net/alien-life/seti-redux-joining-the-galactic-club/.

Figure Documentation

Figure 1. (also used as cover background) A sculpture of a baby on a tank is displayed outside a cafe at the 798 art zone, a decommissioned machine tool factory in Beijing, China 14 May 2009. After many months in the doldrums there are signs of recovery in the Chinese art market. May 14, 2009, Thursday | Source: EPA/BGNES.

Figure 2. "First MOLOCH, horrid King besmear'd with blood Of human sacrifice, and parents tears, " (Hunter 1861, 37)**.** Hunter, John. 1861. The first book of Milton's Paradise lost: with a prose tr. and notes. London: Longman, Green, Longman and Roberts.

ENDORSEMENTS

"This book is a much needed set of guiding posts, of which there are still too few, for those on the left who take political strategy seriously and want to come up with practical ways to bring about, eventually, an egalitarian, if not classless and state-free future that is at same time ecologically sustainable. But this proposed manuscript goes much further than any so far of its ilk in that Schwartzman combines clarity regarding overall political strategy with the necessary technical know-how and basis to get to the sort of society desired by increasingly many. Schwartzman's work is especially important in contexts like European and offshoot settler colonial regimes, such as the US, Canada, Australia, and New Zealand, where many activists are getting lost between purist leftism and social democratic and liberal perspectives ensconced in faddish radical language."

Salvatore Engel-Di Mauro, Editor-In-Chief, Capitalism Nature Socialism

"This is an important book which intervenes at a crucial time in debates around the Green New Deal, and its refreshing clarity will make the book indispensable, even to those who might initially disagree on some points. The author situates 'solar' not just as a set of technologies, but in terms of the earth-system itself. In a strategic sense, this points towards our whole relation with the living world, including our food systems; however, Schwartzman also indicates the key immediate steps needed to halt climate change, never shying away from a clear stance: against nuclear, for carbon capture, for example. In opposition to 'degrowth' theories, Schwartzman boldly states the need for an increased (renewable) energy demand to fuel the transition itself.

While observing that "we cannot wait for the end of the rule of capital" to begin the transition, the book is clear about the fundamental incompatibility of capitalism with the social system humanity deserves. This issue is posited right now by the role of the military industrial complex in blocking systemic change. Challenging head-on today's xenophobic nationalism, Schwartzman rightly calls for the emergence of a new global Subject, a process inseparable from a collective visioning of radical alternatives."

Robert Biel, Professor, University College London