

The Prophet Leon Trotsky through Environmental Critics: STS Revisited Debate and Marxist Reply

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Abstract

At the beginning of the twenty-first century, based on Science and Technology Studies (STS) and the prophet Trotsky's forecast, critique of his visions of science, technology and environment have emerged. The article revisits four approaches: the green socioliberal of Sandy Irvine, the neo-luddite of Paul R. Josephson, the ecosocialist of Daniel Tanuro, John Foster and Enzo Traverso. Finally, the collapsologist by Miguel Fuentes Muñoz. At the end, a Marxist reply to their prophet's views is made with four hypotheses and a conclusion about the contemporary STS heritage of Trotsky's historical materialism.

Keywords

Leon Trotsky – STS – environmental critique – historical materialism – prophet controversy – heritage

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Introduction

In 1924 Trotsky, co-leader of the October revolution with Lenin, wrote on his shielding train:

The beginning of the new history of mankind will be dated from November 7, 1917. The fundamental stages of the development of mankind we think will be established somewhat as follows: pre-historic “history” of primitive man; ancient history; whose rise based on slavery; the Middle Ages, based on serfdom; Capitalism, with free wage exploitation; and finally, Socialist society, with, let us hope, it painless transition to a stateless Commune. At any rate, the twenty, thirty, or fifty years of proletarian world revolution will go down in history as the most difficult climb from one system to another.²

The centenary is approaching and the transition has suffered a setback given the capitalist restoration (1978-1996) in the USSR and Eastern Europe, China, Vietnam, North Korea and Cuba. Trotsky noted that:

² Trotsky 2005, p. 187.

The political prognosis has an alternative character: either the bureaucracy, becoming ever more the organ of the world bourgeoisie in the workers' state, will overthrow the new forms of property and plunge the country back to capitalism; or the working class will crush the bureaucracy and open the way to [world] socialism ... Will the bureaucracy devour the worker's state, or will the working class clean up the bureaucracy? Thus stands the question upon whose decision hangs the fate of the Soviet Union.³

The process has been more contradictory than Trotsky predicted. 'Without a socialist revolution, in the next historical period at that, a catastrophe threatens the whole culture of mankind'.⁴ It happened with WWII, Hiroshima and Nagasaki, holocaust and Third World poverty. Although there have been Arab Springs, outbreaks in Latin America, there have not been Trotsky-like permanent revolutions until the socialist process and other catastrophes are spreading:⁵ COVID-19 pandemic and heat waves in Europe, financial crash of 2008, 9/11, war in Iraq and Afghanistan, invasion of Ukraine, genocide in Palestine and IMF agreements in Africa.

³ Trotsky 1977b, pp. 102; Trotsky 2004a, p. 216, own brackets.

⁴ Trotsky 1977b, p. 73.

⁵ Foster and Suwandi 2021.

It is currently debated whether Trotsky erred in his analyses of science, technology and the environment (or *Environmental Science and Technology Studies*, STS).⁶ In the wake of restoration and environmental sensitivity, Trotsky's conceptions have been refuted.⁷ 'Great political defeats inevitably provoke a reconsideration of values'.⁸ According to critics of real socialism and left governments, the STS problem of Orwell's farm is not reduced to Stalin (Napoleon pig) but also to Trotsky (Snowball pig), symmetrical offspring of the Big Pig (Marx) such as environmental damage.

In ecology and environmental history, the critique of Trotsky has emerged that merits an STS review. Following the centenary of the Russian Revolution (1917-2017) and the Netflix series *The Trotsky*,⁹ Padura's novel *The Man Who Loved Dogs* (2009)¹⁰ and the cultural infrastructure of the *Museo Casa León Trotsky* in Mexico, the Trotsky's eco-modernist passage in *Jacobin Magazine*¹¹ and reprints of his works and popularisation,¹² he has reborn as a *pop* figure. The conference 'Leon Trotsky and his critics: technology, science and planet' presented in

⁶ Frickel and Arancibia 2021, pp. 458–461; Yearly, 2008.

⁷ Guseinov 2013.

⁸ Trotsky 1936, p. 9.

⁹ CEIP 2017.

¹⁰ Maguire 2015.

¹¹ Jacobin 2017, pp. 2, 4.

¹² Le Blanc 2021; Tariq and Evans 1980.

Encuentro Internacional León Trotsky event¹³ shows STS research advances.¹⁴

How to understand Trotsky's STS visions? What is Trotsky's STS heritage for the analysis of the crisis of capitalism and post-capitalist transition? First, the article addresses the reasons of Trotsky's environmental critics. It traces the green socioliberal¹⁵ and neo-luddite,¹⁶ on the other hand, the ecosocialist¹⁷ and collapsologist.¹⁸ Second, a rejoinder with four hypotheses on Trotsky's STS visions. Third, a conclusion on Trotsky's STS materialist heritage as a dialogue of traditions from the STS field and philosophy.¹⁹

This may be of interest to broad audiences and generations of labour and environmental movements such as Greta Thunberg and Francisco Manzanares. Likewise to parties inherited from Trotsky. And not only the STS community and environmental historians, sovietologists²⁰ and Marxist intellectuals.

¹³ EILT 2021, p. 13; Chaparro Arenas, 2021.

¹⁴ There aren't yet *Collected Works, Handbooks* or *Companions of Trotsky's Thought on Science, Technology and Society*. Only his writings on dialectics (1986c) and economic thinking on capitalist crises (2018). This article contributes to Trotsky's thought for the STS field path.

¹⁵ Irvine 2007.

¹⁶ Josephson 2010.

¹⁷ Tanuro 2018; Foster 2017, Traverso 2021.

¹⁸ Fuentes 2020.

¹⁹ Brown 2015; Vardy 2017; Holloway 1981; Aronova 2011; Lorimer 2017.

²⁰ Aronova 2011; Holloway, 1981; Hoffmann 1979.

Critical arguments

External sources

Trotsky's environmental critics come from different atmospheres. The external strands refer to groups with family resemblances²¹ that are not from Trotsky's family tree. While some equate the socialism of Marx and Engels with Modernity and radicalization of the Enlightenment project,²² socialist culture is not the matrix of the external strands.

This is important not only as a hermeneutical question. It also says of the place that it does not invalidate the critical content, but only shows the underdeterminations of the external strand. Sandy Irvine and Paul R. Josephson, close to the ecological critique of industrialist positions in the West, in their scrutiny of civilizational evils, criticises Trotsky. From ecologism and neo-Luddism they question the prophet.

Irvine and the Misarmed Prophet

²¹ Wittgenstein 2009.

²² Engels 1975–2005, pp. 95–151; Callinicos 1991, p. 171.

Sandy Irvine is an English historian from Newcastle University (1972) and Master of Science (MSc). Co-author of *A Green manifesto: Policies for a green future* (1988), *Beyond Green Consumerism* (1989) and member of the Green Party of England and New Wales. In *The Prophet Misarmed: Trotsky, Ecology and Sustainability* (2007), Irvine critiques Trotsky's STS visions.

Parodying Deutscher,²³ Irvine enunciates the first thesis: 'Leon Trotsky showed great insight on many issues but his biggest blind spot concerned ecological sustainability, now the greatest issues of our times'.²⁴ Not only Trotsky's blindness but a disarmed prophet to account for the ecological crisis of the twentieth century until today. Without ignoring his understanding of the short century and the second post-war period: fascism and imperialist wars, bureaucratization of the Soviet state, etc. Irvine expresses a second thesis of why Trotsky (1879-1940) was unarmed due to his life being subsidiary to Modernity since the eighteenth century with Francis Bacon²⁵ and Descartes. World went into crisis after Trotsky's death, despite the negative dialectics and ecology, it survives in the left and trade unionism.

Trotsky's STS weapons were not so sharp. In his time there were already ecological drives: Marx, Liebig and Vernadsky, John Muir, Ernest

²³ Deutscher 2015, pp. 515–520.

²⁴ Irvine 2007, p. 1.

²⁵ Irvine 2007, p. 4.

Haeckel. Trotsky ignored them all. 'Given that Trotsky was proud to place himself in the tradition of *scientific* socialism, it is rather ironic that he based so little of his thought on the teachings of geology and ecology'.²⁶ Although President of the Technical and Scientific Council of Industry, Trotsky was not informed of STS discussions. Irvine qualifies it: 'It would be absurd to criticise Trotsky for not knowing this or that aspect of ecology. The subject is the most complex of all intellectual disciplines'.²⁷ Trotsky preferred Freud and Pavlov, for him materialistic psychologies,²⁸ rather than ecology and natural science.

For Irvine, Trotsky is a paradigmatic 'study case' of myopia of the labour and socialist movement. Irvine uses Trotsky to dialogue with *all* tradition, 'especially its Marxist variant of which he was a leading representative'.²⁹ Trotsky reflects the worst vision of the radical left in environmental issues and STS, comparable to his Nemesis, Iosif Stalin.

Analysing passages from Trotsky in *Radio, Science, Technique and Society* (1926), *Dialectical Materialism and Science* (1925), *Culture and Socialism* (1926), *Literature and Revolution* (1924), *If America Should Go Communist* (1936), *Vodka, the Church and the Cinema* (1923), *Problems of Everyday Life* (1923), *Ninety Years of the Communist Manifesto* (1937),

²⁶ Irvine 2007, p. 2.

²⁷ Irvine 2007, p. 3.

²⁸ Trotsky 1986, pp. 202, 233–234; Trotsky 1969: 90–91.

²⁹ Irvine 2007, p. 1.

In Defense of October (1932), *Terrorism and Communism* (1920), *The Permanent Revolution* (1930), Irvine sustains two theses and uses 125 sources.³⁰ He defends the existence of a disarmament of the prophet Trotsky and blind adherence to Modernity in STS issues:

Support hydroelectric dams and five-year plans of the USSR; praise of American style, Fordist and Taylorist labour; positive appreciations of nuclear energy and eugenics during the Roosevelt *New Deal*;³¹ anthropocentric, technolatric and Promethean STS visions of a planetary superhuman; union of industry and the arts, aestheticization of the landscape, management of wildlife and plant life; contemptuous view of peasantry and rural life; urbanist gamble and anti-Malthusian demographic expansion; mockery of vegetarians and pacifists, all from the know as *The Quill*.

Because of industrial revolution³² and modern humanism,³³ Irvine conjectures that Trotsky and his adepts would support GMOs³⁴ and CRISP.³⁵ Also nuclear plants,³⁶ mineral extraction and space mining, engineering megaprojects, tunnel boring machines, bulldozers, hydroelectrics, interoceanic cables and 5G network, Artificial Intelligence

³⁰ Project 2009.

³¹ Ramsden 2002.

³² Irvine 2007, p. 4.

³³ Irvine 2007, p. 5.

³⁴ Irvine 2007, p. 15; Yearly, 2008.

³⁵ Project 2019.

³⁶ Irvine 2007, p. 14.

(AI) and automation. Trotsky and his ilk turned out to be promoters of USSR-style environmental unsustainability. Thus “technocentric” perceptions of progress had a very wide range of subscribers of which Trotsky was a particularly uncritical adherent ... Trotsky lacked any ecological understanding of technology’.³⁷

Trotsky would have a modernising STS view of the socialised economy and futuristic cities. Sandy uses the expression of the ‘Paradigm of Industrial Cornucopia’: ‘[H]is essential standpoint was a cornucopian one’.³⁸ Trotsky is not guilty of this. Approaches to abundance are in the Marxian tradition itself and other modern ideologies. Hence, ‘It would seem that Trotsky’s legacy (and, to a lesser extent, Marx) is partly the reason why that movement has failed to address the ecological crisis’.³⁹ The author refers to the low environmental sensitivity and dogmatism of Trotsky and organisations in England.⁴⁰

On the historical facts, Irvine argues that Trotsky and Stalin’s disagreement over STS was more about the means employed than with the ends themselves. Both shared a hyper-industrialised socialist society, myopic of environmental risks. After Lenin’s death, Trotsky proposed a plan of accelerated industrialization, contrary to Stalin’s autarkic positions.

³⁷ Irvine 2007, pp. 5, 14.

³⁸ Irvine 2007, p. 6.

³⁹ Irvine 2007, p. 19.

⁴⁰ Kelly 2018.

Trotsky followed Lenin in the modernization of Russia and assimilation of Western STS with concessions of the NEP (New Economic Policy 1921-1928) and industrial plans (1918-1930): electric light, heavy machinery, trains and tracks, mineral extraction.

The differences between Stalin-Trotsky on the survival of the Russian revolution in nationalist or internationalist frameworks, are tactical means. Shared aims came about when Stalin embraced part of the Left Opposition program (1923-1927, 1927-1938) of five-year industrialization, recognized by Trotsky as benefits of the planned economy vis-à-vis the West, without giving support to the bureaucracy.⁴¹ The Ego of the Jewish prophet and his Georgian Nemesis would be symmetrical in the technologization for a post-capitalist civilization, starting from a single federated country (Soviet Union) or world republic of Soviets.

‘Trotsky did strongly criticise certain means used by Stalin but he made fewer criticisms of the goals ... His criticism of Stalinist economic planning was more about means than ends’.⁴² Trotsky recognized the class struggle against the kulaks, criticised the repression and forced collectivization proletariat’s allies. He opposed to the bureaucratic control of the sciences and purge of his son, the scientist Sergei Sedov:⁴³ ‘The totalitarian regime likewise exercises a disastrous influence upon the

⁴¹ Trotsky 2004a.

⁴² Irvine 2007, pp. 5, 7.

⁴³ Trotsky 1937.

development of the natural sciences'.⁴⁴ He criticised the imbalance between industrial branches, the deficit of workers' democracy, the fall in the standard of living and the privileges of the bureaucracy. In spite of this, Trotsky shared the purpose of industrialization and domination of nature without environmental conservation.

This teleological communion of Stalin and Trotsky with Bolsheviks brought environmental costs in his lifetime. Irvine refers to aggressive urban construction and hydroelectric plans, invasive industries in virgin areas generating famine, pollution and destruction of biodiversity, due to this STS symmetry.

Irvine insists that this is not congenital to Bolshevism as an evil of the East. Nor are they constitutive of the socialist tradition but come from the modern subject in his conquest of the world, the cosmos and himself. The Enlightenment and reason, 'the new god',⁴⁵ are part of the West. Western civilization would be the oasis to follow, in Stalin, through economic emulation, in Trotsky, through technical assimilation and expansion of the world revolution. This explains why, despite the differences, Trotsky praises Edison and Mendeliev, Roosevelt, Ford and Taylor. Trotsky would remain a prisoner of the rise and fall of reason with the dehumanisation of the twentieth century and environmental destruction.

⁴⁴ Trotsky 1940, p. 24.

⁴⁵ Irvine 2007, p. 5.

According to Irvine, Trotsky's STS Marxist conception⁴⁶ is *naïve* as it is neutral and instrumentalist according to which all productive force could be used for harmful capitalist ends and benign socialist ends. No technical thing is bad in itself nor has an intrinsic and metaphysical value but varies according to its mobile use. STS functionality obeys the struggle of classes and productive forces of domination and liberation. Such thinking is part of Trotsky genetics, despite his critique of militarism and fascism. To parody Lenin, abundance would be Trotsky's modernist infantile disorder. A socialist Prometheus in Eden carrying the torch of abundance, far removed from palaeolithic scarcity and luxurious capital. This would transgress Lenin's *What Is To Be Done* of realistic dreams of a post-capitalist society.

For Irvine, the alternative STS to an industrial society, after the Soviet and Western experience, would be a *sustainable society*.⁴⁷ Ideas of Rachel Carson and Eugene Odum, Aldo Leopold, Donella Meadows, Paul Ehrlich, Erwin Schrödinger, Hans Jonas. Irvine argues that, given the problems of Trotsky's time such as waste of resources, pollution and disasters (*Dust Bowl* in the 1930 decade), anthropocentrism and warmongering, a post-Marxist philosophy must be adopted.

⁴⁶ Irvine 2007, p. 14.

⁴⁷ Irvine 1992, pp. 270–274.

Irvine's sustainable society is a steady state economy with thermodynamic laws, health and environmental technologies of non-intervention zones. This implies a de-growth of production and consumption in the North and South, self-contraction of capital and labour to avoid environmental collapse, decrease ecological footprint and slow down climate change. Decreasing bourgeois civilisation in order to self-sustain life. Regarding eating meat, using cars and alcohol in the pre-war and baby boom, Irvine argues that Trotsky promoted a sectarian view of ethics. 'Like most Marxists, Trotsky had little to say about consumption patterns and lifestyle choices'.⁴⁸ In the spirit of the working class regaining its well-being, Trotsky praised irrational Western patterns, mocking vegetarian ideas. For Irvine, these practices and ideas are key to building a sustainable society of renewable energy, holistic health, post-meat diets and biocentric communion.

From an ecocentric and degrowthist point of view, Irvine advises followers of the prophet. Trotsky was disarmed but Marxism could reconsider the Club of Rome and current scientific studies,⁴⁹ as Manuel Sacristán and Wolfgang Harich did. Rather than sacred works of the prophet, the socialist project would be on the paths of sustainability and biophysical limits to capital as immanence of crisis:

⁴⁸ Irvine 2007, p. 15.

⁴⁹ Irvine 2007, p. 16.

Given the biogeo-physical limits to growth, capitalism is an inherently unsustainable form of economic organisation. This is the deepest anti-capitalist argument and the biggest one in favour of some form of planned economy.⁵⁰

Josephson and the Wireless Prophet

Paul R. Josephson is an American professor of Soviet history at Colby College and a PhD from the Massachusetts Institute of Technology (MIT). His expertise is twentieth century techno sciences history and current technologies, STS in Eastern Europe and fascism. On the other side of the Atlantic, Paul makes a critique of Trotsky in *Would Trotsky Wear a Bluetooth? Technological Utopianism Under Socialism 1917-1989* (2010). Josephson argues two theses: the unrealisation of STS socialist promises and utopian industrial equalisation between dissimilar characters and countries. The author criticises the technological utopianism of political leaders such as Trotsky. In view of a techno-environmental history of twentieth century workers' states, Josephson controverts Trotsky, the less

⁵⁰ Irvine 2007, p. 12; Irvine 1988, pp. 8, 68, 133, 141–142.

discredited wing. The author avoids falling into biases of Stalinophobia and Dark Times; rather he goes through the non-Stalinist, Stalinian period⁵¹ and the collapse of the USSR.⁵² Moving away from Soviet and anti-Soviet historiography, he promotes a techno-environmental historiography of industrial modernities.

Paul Josephson analyses rhetorics of Trotsky, Lenin and Bolshevik intelligentsia. 'I evaluate the technological experience in the USSR ... according to the rhetoric of socialist leaders ... nor in order to prove that capitalism is a better system'.⁵³ For Josephson, the West has also been an environmental destroyer at Three Mile Island, Amoco Transport, Hiroshima and Nagasaki. This reinforces Josephson's sceptical spirit towards modern technological, capitalist and socialist systems. He seeks to unveil 'the disjunction between the rhetoric of those leaders and the environmental and human costs of the chosen path to technological development'.⁵⁴

Josephson does not get a chapter on Trotsky but does offer an STS interpretation. For Paul it is better Stalin's counterpart, the utopian Trotsky, his shared 'socialist modernity'.⁵⁵ He says of the wireless prophet: '[The] rhetorical question about whether Trotsky would wear a Bluetooth. Yes,

⁵¹ Brain 2010.

⁵² Josephson, Dronin et al. 2013.

⁵³ Josephson 2010, p. 12.

⁵⁴ Josephson 2010, p. 5.

⁵⁵ Josephson 2010, p. 62.

Trotsky believed that the embrace of advanced technology was the path to communism'.⁵⁶ If today we have the internet, cellular telephony, ICT and G5 technologies, in the twentieth century Trotsky was fascinated with multilateral development, the basis for a socialist civilization starting from the USSR. If Trotsky were alive he would support wireless networks.

Following H.G. Wells on the electric paradise of the USSR⁵⁷ Josephson says 'Vladimir Lenin, Leon Trotsky, and other Bolshevik leaders were technological utopians. They believed in the power of technology to create communism'.⁵⁸ Lenin's arithmetical formula⁵⁹ of Soviets *plus* electrification is complemented by Trotsky's algebraic one of socialism as an emulation of capitalist technique and world revolution.

Trotsky as a statesman of the NTO (Scientific-Technical Department of the Supreme Economic Council),⁶⁰ head of three industrial departments, the Concessions Committee, developed electrification programs in war communism, militarization of labour and socialist edification. Josephson writes, 'absent the Bluetooth he employed the locomotive, printing press, radio, film projector, and poster. He was an Americanist in his admiration for the conveyor belt, standardisation, and mass production'.⁶¹ The Soviet

⁵⁶ Josephson 2010, p. 13.

⁵⁷ Josephson 2010, p. 56.

⁵⁸ Josephson 2010, p. 18.

⁵⁹ Josephson 2010, p. 30.

⁶⁰ Josephson 2010, p. 36.

⁶¹ Josephson 2010, p. 37.

leader would be a cosmopolitan cultist of R&D&I, rather than the romantic socialist Narodniks: 'Vladimir Lenin and Leon Trotsky saw technology as a panacea for the unfolding socialist society'.⁶²

Josephson acknowledges that Trotsky saw STS as means to overcome backwardness and poverty, city-country imbalance (*Smychka*) and protect natural reserves (*Zapovedniks*). However, he disputes his accelerationism (1918-30's) to catch up with the West, neglecting the socio-environmental risks: 'He seems to have called directly for the subjugation of nature ... Trotsky was well within the Bolshevik mainstream ... believed that the productive forces must be developed at breakneck speed, regardless of the environmental costs'.⁶³ Therefore, Trotsky would suffer from a neutral and instrumental conception of STS, even apolitical.⁶⁴

Josephson acknowledges that *The Quill's* concerns with science, art and industry, ethics and economics, were political in a broad sense.⁶⁵ Neither he nor his contemporaries would have to be drawn into ecology, although 'Trotsky wrote extensively about technology and politics in the 1920s ... his views on this topic are scarcely known'.⁶⁶

⁶² Josephson 2010, p. 7.

⁶³ Josephson 2010, p. 47.

⁶⁴ Josephson 2010, p. 61.

⁶⁵ Trotsky 1977a; Brown 2015.

⁶⁶ Josephson 2010, p. 37.

Josephson makes an equivalence between Socialism (1917-1991) and Stalinism. In Trotsky's terms⁶⁷ Paul's anti-defensism is given by equating industrial countries (capitalist and socialist) and not defending the October revolution. Given his concern for the environment and scepticism of technologies such as nuclear energy, mineral extraction, emission of polluting and toxic gases with suffocation of freedoms,⁶⁸ Josephson dismisses the USSR as an experiment, hence his criticism of technological utopianism.⁶⁹ In the bureaucratic states there was a grey and colourless technology⁷⁰ of industrial landscapes and utopian STS promises of social welfare superior to the West.⁷¹ Able to control the forces of planet Earth and even Universe: cosmism, Soviet space industry and *sci-fi* futurism.

Dreams turned into nightmares of hardly reversible catastrophes. The Aral Sea drought, the uninhabitable city of Pripyat and 'industrial deserts',⁷² decreasing indicators of species and climatic disturbances with gas pipelines and footprints. The electric prophet, Trotsky, like all utopianism, is not guilty of the Stalinian or Putinian nightmare, but his technophilia and STS rhetoric must be questioned.

⁶⁷ Trotsky 2004a.

⁶⁸ Josephson 2005a.

⁶⁹ Fortescue 1999.

⁷⁰ Josephson 2010, p. 63.

⁷¹ Holloway 1981; Hoffmann 1979.

⁷² Josephson 2010, pp. 193–232.

Josephson does not sustain his version of Neo-Luddism⁷³ but distrusts technique as a utopian panacea, cautioning modern industrial systems and US and USSR's empires. Given the disasters of the twentieth century, we should bet on something new in the twenty-first century, an eco-democratic Third Camp. In *Why We All Need to Be Neo-Luddites* (2011), Josephson suggests democratic societies without long chains of agribusiness and oil, nuclear and military drone and robot plants in Iraq and Afghanistan. In return, he promotes small-scale, decentralised, less risky technologies.⁷⁴ Renewable energies at home, agro-ecology and reductarian food with eat and buy local slogan. The massification of cycling, public transport with renewables and European-style city re-engineering.

Unlike Ned Ludd, it is not about breaking machines, strikes and violence to guarantee living conditions and curb unemployment. Nor is it about expropriating capital, socialising and planning the economy, like Marx's metabolic STS strategy. Josephson's neo-Luddism, far removed from John Zerzan and Theodore Kaczynski, considers dispensing with mega machines and disbelieving in technological utopias, far removed from *Homo Sovieticus* and the *American Way of Life*. A democracy of capital and labour in small-scale, eco-efficient machines that influence nearby

⁷³ Josephson 2010, p. ix.

⁷⁴ Josephson 2005b, pp. 222–229.

institutions and markets: 'When we're making technological choices, we should understand that their political choices and choose the ones that are more democratic'.⁷⁵

Alternate strands

According to the notion of game,⁷⁶ alternate strands are family resemblances which, while recognising themselves as part of socialist culture, are a different garden from Trotsky and Marxist hegemony. Therefore, they compete with Trotsky and his followers in academic and political earthliness. They aren't internal strands as they do not make a neo-Trotskyist critique of Trotsky⁷⁷ but posit another socialism.

Ecosocialism and collapsism make an alternative critique of the socialism of bureaucratic states and models of capitalism. Through an environmental programme in rupture with productive forces, material abundance and hyper-technological society, they are influenced by the ecological tradition of the second post-war period. Their shockwave reaches Trotsky's anti-bureaucratic socialism and critical Western Marxism. It is a challenge to Trotsky's STS and figures in the West and

⁷⁵ Josephson 2011; Josephson 2005b, pp. 229–236.

⁷⁶ Wittgenstein 2009.

⁷⁷ Callinicos 1990; Bensaïd 2007; Mandel 1995.

East. We address the ecosocialist critique of Daniel Tanuro and John Foster in Europe and North America, as well as the collapsologist critique of Miguel Fuentes Muñoz in Latin America.

Tanuro, Foster and the Promethean Prophet

Daniel Tanuro is a Belgian agronomer engineer from Gembloux, founder of the NGO *Climat et Justice Sociale*, author of *L'impossible capitalisme vert* (2010), *Un autre regard sur le climat* (2019), *Trop tard pour être pessimistes: Ecosocialisme ou effondrement* (2020). Leader of Gauche Anticapitaliste and intellectual of the european Fourth International: 'The ecology question is one of the greatest challenges for a renewal of Marxist thought at the dawn of the 21st century'.⁷⁸

Tanuro is part of a project of 'greening Marxism' and 'environmental non-destructive post-industrial development'.⁷⁹ The ecosocialist critique is self-critical of the Trotskyist movement.⁸⁰ From the Iberian Peninsula and the European Union, in *Écologie: le lourd héritage de Léon Trotsky*⁸¹ (2010/2018) Tanuro criticises him. Likewise, in *Green Capitalism: Why It*

⁷⁸ Fourth International 2003, p. 11.

⁷⁹ Tanuro 2018.

⁸⁰ Bensaïd 2007; Kelly 2018; Callinicos 1990.

⁸¹ In English title: *The Heavy Inheritance of Leon Trotsky*. Below our own translation comes from the Spanish version of Tanuro's article.

Can't Work, he anticipates: 'Anti-Stalinist Marxists such as Trotsky also forgot Marx's bold revolutionary anticipation of the necessity of rational management of exchange of matter' although 'His judgement on the putrefaction of the objective conditions, however, seems to have broader historical implications'.⁸²

'Contrary to widespread opinion among environmentalists, the failed meeting of Marxists with the environmental question constitutes more of an enigma than an obvious one'.⁸³ The preoccupation with the Trotskyan inheritance arises from this disengagement after the death of the prophet (1940) and the classics (1883/1895). If 'post-war revolutionary Marxists lost the thread of Marx's ecology', Tanuro asks: 'Why did their environmental concerns find so little relevance afterwards?'.⁸⁴ One reason is Trotsky and his imaginary STS.

Trotsky's Promethean spirit is the most exacerbated in the Marxist tradition. If one compares him with Engels and *The Dialectics of Nature* (1873-1883), Marx and the metabolic break in *Capital: Critique of Political Economy* (1867/1883), naturalism and humanism in the *Economic-Philosophical Manuscripts* (1844), there is no such prudence in Trotsky. Bukharin on climate in his *Theory of Historical Materialism. Popular Essay on Marxist Sociology* (1925), Bogdanov with the *Red Star* sci-fi novel

⁸² Tanuro 2014, p. 145.

⁸³ Tanuro 2018.

⁸⁴ Tanuro 2018.

(1908) and cybernetic unification of sciences in *Tectology* (1912-1917) raise metabolic problems of a communist society with a realistic conception of STS conflicts, different from Trotsky's industrial optimism. 'The tools developed by Marx and Engels to understand the metabolism between humanity and nature were not part of it'.⁸⁵ In contrast, Kautsky addressed agronomic damage in *The Agrarian Question* (1899), as well as Lenin in *The Agrarian Question and the Critics of Marx* (1907) and other writings (1910-1916, 1917-1922) supported natural conservation work (*Zapovedniks*), naturalistic research and non-pollution industrial cities.

These authors had powerful environmental intuitions. 'Nothing similar in Trotsky: he is unilaterally positive'.⁸⁶ Trotsky praises the Fordist chain and metropolitan landscapes. He conceived a domineering vision of technique that, together with Stalin, hegemonised the movement. He would be jointly responsible for Marxism's late arrival at the rendezvous with the sciences. Although Tanuro acknowledges Trotsky's novel analyses of fascism and bureaucratisation, 'every medal has its reverse side. In Trotsky, ecological consciousness is at degree zero ... Trotsky sometimes passes very close to interesting ecological questions, but without seeing it'.⁸⁷

There are absences about the waste of resources and economic anarchy, contradiction between city and countryside, etc. Between Trotsky and the

⁸⁵ Tanuro 2018.

⁸⁶ Tanuro 2018.

⁸⁷ Tanuro 2018.

classics there is an abyss because 'the unlimited technical-scientific optimism –far from Marx's prudence—'⁸⁸ prevented him from seeing the metabolism in the USSR and the West.

In Trotsky's *The Revolution Betrayed*, with impuginations to Stalinism and capitalism, there is no ecological critique. For Tanuro it is true that backward Russia explains the eagerness for development and welfare, being devastated by war and famine. 'Indeed, on pain of anachronism, the difficulties of Soviet power must be taken into account'. The Russian Civil War of 1919-1921 forced the development of an industry and the NEP. In fact, the planned economy allowed the USSR to be a great power nation was 'essentially correct'⁸⁹ without ignoring the bureaucratic inefficiency and Stakhanovism.

Tanuro speaks of the greatness of Russia and its riches, little prone to environmental disquisitions. Also the late circulation of *Dialectics of Nature* not read by Trotsky. Neither the bureaucratization of Soviet society nor its backwardness explains Trotsky's STS drive, nor does it exculpate him. Tanuro controverts his ideas coming from the modern mode of production and unveils their origins. 'It will be stressed that the possible dangers of the technologies known in 1927 did not have much in common

⁸⁸ Tanuro 2018.

⁸⁹ Tanuro 2018.

with the dangers of today. It is indisputable'.⁹⁰ However, Tanuro argues that Trotsky's anti-ecological ideas cannot be shared today.

Tanuro shows biographical facts about Trotsky. The construction of the Chatoura power station as an 'art object' and the 'enormous use of masses of peat to produce electricity' (2018), the Dnieper Hydroelectric (1926-1932) too.⁹¹ In his enthusiastic speech to the Komsomol youth, Trotsky expresses the control of the dam, the value of agriculture and river for housing, factories and industrial landscape.

Being chairman of the *Scientific and Technical Council of Industry*, in 1925 Trotsky disregards scientific claims concerned about the environment, 'faithful to the technician and modernist culture of the time, which was that of the entire Bolshevik leadership and which found its artistic expression in the constructivist and futurist current'.⁹² He was fascinated by skyscrapers, speeding machines and asphalts; Trotsky did not foresee their 'perverse effects'. He and other social democrats criticised the STS romanticism of Nadorikis, nostalgic for communes and retail markets.

Tanuro probes Trotsky's productivism in his STS view. In his discourse on Mendeleev, Trotsky makes a semblance and his implications for Soviet society. He argues that the periodic table shows the transmutation of chemical entities of dialectics. Trotsky imposes a metatheory on reality

⁹⁰ Tanuro 2018.

⁹¹ Josephson 2010, p. 19.

⁹² Tanuro 2018.

and the science of soviet DIAMAT,⁹³ an alchemical chimaera with aberrations such as the Lysenko controversy, whom Trotsky 'seems to have been little inclined to criticise'.⁹⁴ Trotsky recognizes that Mendeliev has a 'techno-scientific optimism'; far from criticising it, the leader deepens it.⁹⁵

Refuting neo-Kantian epistemology, Trotsky professes his STS creed: 'The unknowable does not exist for science. We will understand everything! We will learn everything! We will reconstruct everything!'.⁹⁶

Contrary to Emil du Bois' agnostic credo *Ignoramus et ignorabimus*, which Trotsky identifies with cultural decadence, it is less prudent than Lenin's theory of unfinished truth. Trotsky's epistemology embraces an STS realism. Far from Socratic epistemic humility about planet Earth and knowledge, human finitude and cognitive limits to an ambitious unifying Theory of Everything⁹⁷ to understand the forces of the Universe.

Trotsky STS progress believer in aviation, atomic energy, infrastructures, inventions and discoveries. On the uneven and combined, 25 years exceeding 250.000, he writes: 'life has been invaded by the motor-car, the aeroplane, the gramophone, the cinema, radio-telegraphy and radio-telephony ... That technique has entered a new phase, that its rate of

⁹³ Aronova 2011; Hoffmann 1979.

⁹⁴ Tanuro 2018.

⁹⁵ Trotsky 1940, p. 30.

⁹⁶ Trotsky 1940, p. 30.

⁹⁷ Hawking 2005, pp. 119–137.

development is getting continually faster and faster'.⁹⁸ By foreseeing leaps: 'scientific and technical thought is approaching a great turning-point ... the revolutionary epoch in the sphere of the cognition of matter ... Unbounded technical possibilities will open out before liberated mankind'.⁹⁹ The materialist dialectic would be ascending spirals and geometrical projections. With his blind faith STS, Trotsky would have a scientificist, modernist and instrumentalist vision.

On Malthus, Trotsky sides with Mendeleev in favour of population increase. Mendeleev calculates that in a century there will be a population of 10 billion and there would be no problem in covering their needs.¹⁰⁰

Trotsky ignores risks of the demographic bomb for environmental sustainability, resource management and the way of life with his Faustian spirit STS. Although Malthus' alarm was deferred by the green revolution, Tanuro conceives that Trotsky lacks demographic discernment.

Trotsky's STS view stems from his view of the productive forces: 'What is the basis of bases –the class organisation of society or its productive forces? Without doubt the productive forces'.¹⁰¹ Trotsky saw this notion as the rough way of applying industry to dominate the natural forces. Tanuro's first critique is the neutral and operative view of the productive

⁹⁸ Trotsky 1957, p. 167.

⁹⁹ Trotsky 1957, p. 168.

¹⁰⁰ Trotsky 1940, p. 30.

¹⁰¹ Trotsky 1986, p. 228.

forces, not as a social relation. This precludes any critique of technique as technique. The second is technique as a deterministic metabolic source of the historical process; obviating that technology is a social relation of class struggle. There is a 'Chinese wall' between two structures. The third one is that Trotsky's STS vision minimised the antagonisms between machine and land, proletariat and machine.

Distant from the *The German Ideology*, *Grundrisse* and *Capital* on machinism and money as destructive forces, Trotsky effectivized the productive apparatus as a tool of the modern classes. He would fall into a one-sided development of liberating labour by extolling the technology that enslaves it: 'Therein lies ... the root of the error! ... therefore [it is] technology itself that is in question, not only the organisation of production'.¹⁰² Tanuro refers to 'inherently domineering' technologies (such as Trotsky's eugenics in 1934) with deleterious effects on health. The technologies present messes in a market economy as in a planned economy, as the environment is indifferent to this if CO₂ levels increase.¹⁰³ Rather than the Promethean and techno-utopian principle, Tanuro opts for the principle of precaution and care, distant from Trotsky's STS.

On *Literature and revolution*, also on *Culture and socialism*, Tanuro writes 'his vision of domination is clearly ... more ... domineering; it gives the

¹⁰² Tanuro 2018, own brackets.

¹⁰³ Choma 2021, p. 6.

temptation to say: male chauvinist'.¹⁰⁴ Trotsky would have a patriarchal view of domination of the natural as a resource to be instrumentalized and discarded, analogous to the treatment of men with women in bourgeois society, according to eco-feminism. In *Questions of Everyday Life, History of the Russian Revolution* and *The Revolution Betrayed*, Trotsky explained the imbrication of a regime and gender, but he ignored the metabolic regime with nature. Distant to Rosa Luxemburg's sensibility for buffaloes, flora and ornithology. The Western Prometheus would give the STS torch to men, being punished; now the Soviet Prometheus would pay dearly for his disobedience, transgressing the biophysical limits of Gaia. The prophet Trotsky would be imprisoned by metanarratives of modernity¹⁰⁵ as he 'does not understand the negative feedbacks of progress, when this phenomenon was already well known at the time'.¹⁰⁶ To conclude, in North America, the ecosocialist critique surfaces in John Bellamy Foster. American sociologist and economist, editor-in-chief of *Monthly Review Magazine*, professor at the University of Oregon. He's the author of *Marx's Ecology: materialism and nature* (2000), *The return of nature: socialism and ecology* (2020), *The Ecological Rift: Capitalism's War on the Earth* (2010), *The Ecological Revolution: Making Peace with*

¹⁰⁴ Tanuro 2018.

¹⁰⁵ Callinicos 1991, pp. 3–4, 9–10.

¹⁰⁶ Tanuro 2018.

the Planet (2009). Foster, precursor of a new reading of Marx and Engels on the metabolic rupture, fleetingly criticises Trotsky.

Despite his interest in the October Revolution, environmental science and dialectics, Foster lacks a systematic study of Trotsky. Foster, specialising in environmental sociology, Marxian thought, and the economics of imperialism,¹⁰⁷ claims an ecology in Marx thought and other Marxists thinking; however, he does not include Trotsky. Citing *Literature and Revolution*, in *The Long Ecological Revolution* (2017) Foster argues the danger of repeating Trotsky's mistake. The author is excusable because of his not only Soviet but modern historical determination; for Tanuro, on the other hand, it is inexcusable. 'Trotsky was hardly alone in promoting such reckless productivism in the early 1920 decade, and can be at least partly excused as an individual of his time'.¹⁰⁸

This error can be deepened by endorsing geoengineering and artificial intelligence, atomic energy and extractivism of natural goods, genetic and transgenic engineering, space industry and automation. For Foster, such eco modernisation of *Jacobin Magazine* (Phillips, Frase and Hubber) and organisations (SWP UK, Spartacist League and Communist Parties) are dangerous. They threaten a regression from ecological science and the

¹⁰⁷ Foster and Suwandi 2021.

¹⁰⁸ Foster 2017, p. 4.

New Left. This repeating Trotsky would imply compromising to capital, its genocide and biocide:¹⁰⁹

The current attempt to claim the conquest of nature and ecomodernization as a "socialist" project is dangerous enough ... we risk turning back the clock on the vital ... advances made by the ecological left over the last half-century.¹¹⁰

Miguel Fuentes and the Industrial Prophet

To culminate in Latin America, collapsology¹¹¹ gains strength in Miguel Fuentes Muñoz. Trotsky's new assassination seeks to bury his industrial ideas. Fuentes is a Chilean historian and anthropologist from the University of Chile and a PhD candidate in Archaeology at University College London. He is a former activist of the Partido de Trabajadores Revolucionarios (PTR). Let us focus on *La senilidad teórico-estratégica del Trotskysmo y la tradición marxista-industrialista* (2020a) and *El segundo asesinato de Trotsky* (2020b).¹¹²

¹⁰⁹ Foster and Suwandi 2021.

¹¹⁰ Foster 2017, p. 4–5.

¹¹¹ Servigne and Stevens 2020.

¹¹² English titles: *The theoretical-strategic senility of Trotskyism and the Marxist-industrialist tradition*, *The Trotsky's second assassination*. Below our own translation comes from the Spanish version of Fuentes's articles.

For Fuentes, Trotsky's STS conception can be traced back to developmentalism as an ideology of modern societies.¹¹³ Trotsky draws on developmentalism and modernism as processes of secularisation, technification and rational mastery of the self and the living environment. 'Trotsky was one of the main representatives of Marxist Industrialism',¹¹⁴ writes Fuentes. Industrial Marxism is an ethnographic category with figures who advocate developing productive forces. It contains Fidel and Che Guevara, Lenin and Trotsky, Stalin, Mao and Ho Chi Min, Erich Honecker and Tito. Also Gramsci and Kautsky, Bernstein and Hilferding, Bukharin, Edgar Zilsel, J.B.S. Haldane, J. D. Bernal, Otto Neurath and Boris Hessen, precursors of STS. To a lesser extent, Marx and Engels. Fuentes includes a disciple of Trotsky as Emilio Albamonte, author of *Estrategia socialista y arte militar* reflecting STS instrumentalist.¹¹⁵ The roots of non-destructive socialism lie in the intuitions of Walter Benjamin, passages from Marx and Engels, Foster and Lowy, Castro and Nahuel Moreno.

According to Fuentes, Industrial Marxism has been in figures of the first, second, third, fourth and fifth internationals, as well as outside authors. Developmentalism and the apology of modernity seem to be constitutive of the ideology of the last centuries. The eco-collapsist approach of

¹¹³ Kaku 2011.

¹¹⁴ Fuentes 2020a, p. 3.

¹¹⁵ Albamonte and Maiello 2017, pp. 487, 565–67.

Trotsky is a critique of the 'centuries-old' tradition of Marxism and its 'strategic branches',¹¹⁶ from a multidisciplinary approach of archaeology, anthropology and history of collapses, climatic and ecological sciences of catastrophic style.¹¹⁷

Fuentes specifies: 'Technically ... when Trotsky wrote his phrase about the human conquest of the "heavens" ... he was not even thinking about outer space'.¹¹⁸ Trotsky only envisioned the age of aeroplanes. On the domination or conquest of the natural, not as destruction but as apprehension of its laws and usefulness for well-being, Fuentes says: 'If we understand by conquest ... understanding and manipulation of natural laws ... for human benefit, then ... our "conquest of the heavens" appears ... as very precarious'.¹¹⁹ The sciences have immersed themselves in oceans, soil, subsoil and skies, but climate disruptions and the cosmos are far from knowing natural laws. There are not only epistemological barriers but technical limitations. Drawing on Michio Kaku¹²⁰ Fuentes argues that there can be no conquest of the skies when humanity has only managed to go to the Moon, despite promises of travel to Mars and the Solar system. After five centuries, the skies are saturated with CO₂. We

¹¹⁶ Fuentes 2020a, p. 4.

¹¹⁷ Montebianco 2019.

¹¹⁸ Fuentes 2020a, p. 6.

¹¹⁹ Fuentes 2020a, p. 6.

¹²⁰ Fuentes 2018, pp. 231–234.

are a fossil civilisation, level 0 on the scales of the Soviet physicist Kardashov, with polluting power.¹²¹

Fuentes controverts Trotsky's 'techno-optimist delusions'¹²² that failed the test. Writes Fuentes: 'Trotsky's dream (or *delirium*) regarding the imminent evolution of the average man ... have been transformed into the opposite'.¹²³ The superhuman, classless industrial civilisation itself has turned into environmental destruction, social degeneration, the reign of barbarism. Regarding the Six Mass Extinction of Species and post-Holocene, Fuentes says¹²⁴:

Should we not fear that man's "taste" for manipulating nature is bad? Far from an aesthetic discussion, the "problem" of techno-industrial "mastery" of nature turned out to be ... more dangerous than a mere general philosophical disquisition, giving rise to one of humanity's hottest existential problematics since the origin of our species¹²⁵.

Fuentes criticises facets of the prophet: eugenic programmes; fascination and subsequent environmental destruction of the Dnieper River dam; his disdain for the rural peasant and ignorance of agricultural technologies

¹²¹ Fuentes 2020a, p. 5.

¹²² Fuentes 2020a, p. 9.

¹²³ Fuentes 2020a, p. 10.

¹²⁴ Lorimer 2017.

¹²⁵ Fuentes 2020a.

that allowed ancient civilisations to emerge (Incas, Chavin and Tiwanaku) which in comparison to modern civilisations are more sustainable.

Fuentes writes: 'Conquest? What?',¹²⁶ if we inhabit a 'dirty prison', as Trotsky expresses: 'Amid the vast expanses of land and the marvels of technology, which has also conquered the skies for man as well as the earth, the bourgeoisie has managed to convert our planet into a foul prison'.¹²⁷ As Trotsky consigned in his *Testament*,¹²⁸ socialist conquest and 'Life is beautiful' became the destruction of working-class, environmental and animal life. The infernal reign is the aesthetics of capital, as opposed to the Trotskyan aesthetics of an industrial paradise STS.

Fuentes considers it necessary to liquidate pro-industrial Marxism in order for life to be reborn. Through uchrony 'there is another version in which I assassinate Trotsky ... after a talk with my victim in which I show him some of the now obsolete aspects of his political programme and theory, I bury the ice axe in his head, not once, but multiple times'.¹²⁹ Fuentes sits at his desk and, wielding his pen, socialism begins a new path. A story to manage the civilisational collapse in the coming decades. The epistemological assassination consists of a pulverisation of the Trotskyan

¹²⁶ Fuentes 2020a, p. 7.

¹²⁷ Trotsky 2005b.

¹²⁸ Trotsky 1959, p. 30.

¹²⁹ Fuentes 2020b, p. 10.

episteme. It is necessary to undermine its conceptions at the root, to commit patricide in order to confront socio-ecological collapse.

In *The Demon-Haunted World*, Carl Sagan, with regard to Soviet censorship and his trip to the USSR, showed his interest in Trotsky. Sagan confesses to having illegally disseminated the author's *History of the Russian Revolution*. Sagan mentions that a German Communist newspaper published an ephemera of Trotsky: 'His murderer ... tried, in killing him, to kill this civilization'.¹³⁰ Sagan supports his words: 'was a man who had in his head the most valuable and best-organised brain that was ever crushed by a hammer ... fight[ing] for all of us who love human civilization, for whom this civilization is our nationality'.¹³¹

While for Sagan the assassination of Trotsky is the negation of democracy, science and civilisation. For Fuentes, the second piolet to Trotsky implies burying the dismal fruits of the same. Fuentes' collapsology and patricide, radicalising Jared Diamond (2005) and Joseph Tainter (1988), is expressed in the irreversibility of civilisatory collapse and dystopia STS¹³² of a post-abundance communism with tribal networks, due to Trotsky's original sin.

¹³⁰ Sagan 1997, pp. 390–391.

¹³¹ Sagan 1997, pp. 390–391, own brackets.

¹³² Lorimer 2017.

Reply

The following is an STS reply to the rainbow of environmental criticism of Trotsky. It does not promote foolishness but Marx's motto to Weitling: 'Ignorance never yet helped anybody!'.¹³³ Trotsky will say 'the foundation ... must be the fight against illiteracy, semi literacy, and near-illiteracy'.¹³⁴

Hypothesis one

As historian Yann Kindo (2010) notes, it is anachronistic to judge Trotsky as productivist and anti-ecological since environmental debates only emerged strongly in the post-war period (1950-1990). There is a deficient understanding of the history of the USSR, the transition (1917-1991), the restoration (1989-today) and the location of Trotsky (1879-1940).

First, the defeat of sustainability in the twentieth century occurred by processes in certain way described by the Trotsky approach. The bureaucracy of 15 states only had policies of industrialisation and dependence on imperialist centres and peripheralisation –Cuba vis-à-vis the USSR–. Neither Stalinist nor Soviet leaders like Trotsky could see the destruction of the environment and the disruption of fossil fuels. Moreover,

¹³³ Annenkov 1957, p. 272.

¹³⁴ Trotsky 1986, p. 236.

as Tanuro acknowledges, if post-Tzarist Russia had not modernised, the quality of life would have fallen and they would have been prisoners of the West. The environmental critique of the USSR does not take this into account.

Second, because of this lack of awareness in non-capitalist countries, despite the environmental wave, it was cut short by the capitalist domination of the globe and the failure to defeat the bourgeoisie worldwide with a process of revolutions combining anti-colonial, democratic and anti-bureaucratic tasks in the two blocs.

Thirdly, during the Cold War, imperialism and its economies, disregarding its scientists and the environmental wave, did not initiate the energy and integral transition. The bureaucracy with its second world great power (USSR) also failed to establish socialism on a global level and could not address the climate crisis with a reconversion.

In counterfactual STS logic, if Trotsky's political revolution had triumphed in the socialist bloc with a global planned economy, Soviet democracy could probably be nourished by the scientific and environmental debate in the West. The world revolution would have spread with better conditions for the fulfilment of anti-nuclear, ecological, animal, technological and scientific alternative demands. Writes Trotsky:

It would be necessary only to organise the economic life within each country and over our entire planet correctly ... as the main productive forces of society are held by trusts ... for domination of the world, must inevitably assume a more and more destructive character.¹³⁵

Trotsky was part of the vanquished. The symmetry of capitalist and socialist models as environmental destroyers is fragile. Trotsky thought of communism as planning of human life and rational technological development. The expropriation of capital demands a reconversion of the energy matrix and metabolic STS regime: 'The old technology, in the form in which we took it over, is quite unsuitable for socialism. It constitutes a crystallisation of the anarchy of capitalist economy'.¹³⁶

Hypothesis two

Trotsky's methodological tools are being used by researchers and activist expertise on the environmental crisis, ecological International Relations (IR) and STS.¹³⁷

The dialectical logic of uneven and combined development and the permanent revolution in ideas, methods, strategy and culture. The STS

¹³⁵ Trotsky 2005b.

¹³⁶ Trotsky 1986, pp. 230–231.

¹³⁷ Siebert 2021, pp. 165–166; Hobson 2016, pp. 219–239; Rosenberg 2021, pp. 146–147, 150, 156.

socio-legal assemblage of truth and post-truth of Stalin in the Moscow Trials and the Independent Commission preceded by the American philosopher, John Dewey, who acquitted Trotsky.¹³⁸ STS politicisation of science and imbrication of natural and technical (engineering and military),¹³⁹ social and political sciences.¹⁴⁰ The epochal crisis, factors and waves in economic science;¹⁴¹ the planning of natural resources and defence of national energy sovereignty.¹⁴² Anti-imperialism and proletarian democracy, transitional programme and party conception. Marxist ethics, the quill and Trotsky's relationship with plants and animals (dogs, greyhounds, rabbits, chickens) in *The Man Who Loved Dogs* novel.¹⁴³ All are part of an STS materialist method.¹⁴⁴

With uneven and combined development are levels of environmental awareness and leaps that social agents have in countries. It also refers to public policies and the technological level of economies to make the environmental transition.¹⁴⁵ Trotsky used this STS concept in the *History of the Russian Revolution* to compare Tsarist Russia, the peasantry and

¹³⁸ Granger 2013; Dewey, Beals et al. 1937.

¹³⁹ Trotsky 2004b.

¹⁴⁰ Brown 2015; Vardy 2017; Chaparro Arenas 2021.

¹⁴¹ Trotsky 2018.

¹⁴² Trotsky 1938.

¹⁴³ Maguire 2015; Chaparro Arenas 2020.

¹⁴⁴ Blackledge 2006.

¹⁴⁵ Hobson 2016; Rosenberg 2021.

its culture, the penetration of capital, the industrial proletariat and institutional powers.¹⁴⁶

With the transitional programme a bridge is established between immediate social demands and the anti-capitalist transition.¹⁴⁷ Trotsky put forward a transitional programme for the new World War, the anti-bureaucratic struggle in the USSR, colonial and central countries.¹⁴⁸ The permanentist logic is the elaboration of measures and methods of action that will enable the working class and its allies to solve immediate problems and attend to strategic problems, making the social revolution.

The character of a transitional method turned action programme is to deal with environmental, economic, political and military conflicts and catastrophes that threaten liberties. The transitional programme in permanent updating¹⁴⁹ according to the time, stages and countries, is to move to a civilisation that regulates CO₂ emissions and generates a new energy matrix.

Finally, on Trotsky's Marxist ethics in relation to fauna and flora, there are questions that have been little explored. In his *Biography of Stalin*, Trotsky analyses his psychological state.¹⁵⁰ Trotsky, who in *My Life* practised sport hunting and trading of animals (marmots, fish, bears, wolves and foxes,

¹⁴⁶ Trotsky 2007a, pp. 24–34.

¹⁴⁷ Trotsky 1977b, pp. 74–76.

¹⁴⁸ Trotsky 1977b, pp. 97–106.

¹⁴⁹ Moreno 2015.

¹⁵⁰ Trotsky 2016.

ducks and geese) and insects (tarantulas) for his agrarian milieu¹⁵¹ and had escaped from Siberian prison by reindeer sledge,¹⁵² a culture normalised since Engels and Lenin's time, he knew how to locate the pathological in his coeval:

An undoubted characteristic of Stalin is personal, physical cruelty, which is usually called sadism ... After he had become a Soviet dignitary, Stalin would amuse himself in his country home by cutting the throats of sheeps [and shoot wild animals, near Zubalovka] or pouring paraffin on ant hills and setting fire to them. Such stories about him, coming from independent observers [and Lev Kamenev] ... Special historical conditions were necessary before these dark instincts would find such monstrous developments.¹⁵³

The STS socialist ethic encompasses empathy with animal suffering and natural beauty. That which Trotsky recognised in his *Testament*, looking at the garden and Natalia Sedova's wife: 'I can see the bright green strip of grass beneath the wall, and the clear blue sky above the wall, and sunlight everywhere. Life is beautiful. Let the future generations cleanse it of all evil, oppression, and violence, and enjoy it to the full'.¹⁵⁴

¹⁵¹ Trotsky 1971, pp. 4, 34, 315, 470, 497, 550–551.

¹⁵² Trotsky 1971, pp. 193–194.

¹⁵³ Trotsky 2016, pp. 667–668, own brackets.

¹⁵⁴ Trotsky 1959, p. 30.

Elsewhere¹⁵⁵ is shown how Trotsky analysed the Spanish regime, bullfights and horse-riding, considered reactionary: 'Autos-da-fé were suppressed; but the bullfights were preserved. However, between the barbarity of bullfighting and that of burning a witch, the difference is not great ... The public is invited to witness horse races ... a disgusting picture'.¹⁵⁶ These animal and environmental sensitivities belie the Trotsky legend. New studies on Trotsky are in the making. If Foster and Kohei Saito have contributed to the hermeneutics of Marx and Engels, they cannot ignore Trotsky, on pain of replicating environmental ahistoricism: 'Trotsky is too complex, too large and too important to be treated in this way'.¹⁵⁷

Without worshipping Trotsky, in the face of STS problems, technosciences such as psychology (not the psychoanalysis of Trotsky and Althusser),¹⁵⁸ zoology and climatology, ecology, geology and Earth Systems Science¹⁵⁹ need to be addressed¹⁶⁰ because: 'The proletariat needs to master the sum total of the knowledge and skill worked out by humanity in the course of its history, in order to raise itself up and rebuild life on principle of solidarity'¹⁶¹ both intraspecies and interspecies.

¹⁵⁵ Chaparro Arenas 2018.

¹⁵⁶ Trotsky 1927.

¹⁵⁷ Law 1993, p. 192.

¹⁵⁸ Trotsky 1969, pp. 90–91; Althusser 2015, pp. 60–89.

¹⁵⁹ Lorimer 2017.

¹⁶⁰ Lorimer 2017.

¹⁶¹ Trotsky 1986, p. 229.

Hypothesis three

Programmatic elaborations on the destructive forces of capital to the detriment of public health, environment and STS are needed. Something Trotsky didn't finalise. So there is no reason for socialist currents not to become STS literate.

A comparison test of Trotsky is the feasibility and reasonableness of his critics. In the face of hydropower, energy transition and nuclear energy, use of technologies, management and social agency, his proposals are one-sided. Tanuro and Irvine demonise hydropower as destructive of the environment and communities as well as transgenic engineering (GMO) (Kind, 2010). Josephson accepts small-scale, decentralised technologies. Fuentes is more tragic. Energy transition is no longer possible. They all suffer from a certain technophobic bent (Kindo, 2010).

There are theoretically and historiographically untenable STS critiques. In *Technological Utopianism*, Josephson quotes Trotsky, where Soviet science and technology thought¹⁶² 'reflected the politics and values of ruling class':

¹⁶² Holloway 1981.

But technique and science develop not in a vacuum but in human society, which consist of classes. The ruling class, the possessing class, controls technique and through it controls nature. Technique in itself cannot be called either militaristic or pacifistic. In a society in which the ruling class is militaristic, technique is in the service of militarism.¹⁶³

This view of Trotsky refutes the instrumentalist conception as equivalent. The social mediation of technology puts a class stamp on the technoscientific use in a country and society, which, like the imperialist one, is militaristic. Trotsky conceives of the political instrumentalisation of technology and its social order, not as a neutral and valueless entity.

Trotsky did not conceive of atomic energy as a harbinger of nuclear war, but he did foresee another World War where capital is subjugating sciences and technologies as functional technosciences:¹⁶⁴ ‘the war at the same time gave a tremendous fillip to scientific and technical thought, which was suffocating in the clutches of decaying capitalism’.¹⁶⁵ Trotsky prefigured nuclear energy for peaceful and transitional energy purposes. STS debate on the efficiency of nuclear plants contrasted with catastrophes of Hiroshima and Nagasaki, Long Island and Chernobyl, Fukushima, which Trotsky did not live through: ‘The greatest task of

¹⁶³ Josephson 2010, p. 44; Trotsky 1957: 169.

¹⁶⁴ Trotsky 1986b.

¹⁶⁵ Trotsky 1957, p. 169.

physics consists in pumping out this energy ... Then the possibility will be opened up of replacing coal and oil by atomic energy, which will also become the basic motive power'.¹⁶⁶

On the STS logic of co-evolutionary, revolutionary and involutory processes, distant from post-structuralism and without denying the category of progress¹⁶⁷ Trotsky points out:

Liberal scholars –now they are no more– commonly used to depict the whole of the history of mankind as a continuous line of progress. This was wrong. The line of progress is curved, broken, zig-zagging ... Scientific and technical thought, not without interruptions and failures, marches on.¹⁶⁸

Hypothesis four

Claiming Trotsky's STS method implies questioning some futurist, techno-optimist and modernist statements, gaps and absences. Writes Nahuel Moreno: 'Marxism intends to be scientific and science teaches that there are not absolute truths ... to be Trotskyist is to be critical, including of

¹⁶⁶ Trotsky 1957, p. 168,

¹⁶⁷ Callinicos 1991, pp. 62–91.

¹⁶⁸ Trotsky 1957, p. 167.

Trotskyism itself'.¹⁶⁹ Trotsky continues: 'If *this* be Trotskyism then I at least am no Trotskyist'.¹⁷⁰ Helena Sheehan concludes: 'Marxists must judge matters on the basis of the evidence ... established by the highest level of development of scientific method ... not on the basis of conformity or nonconformity to established Marxist premises'.¹⁷¹

Some STS objections to Trotsky are valid. Irvine, on Trotsky's prejudice towards vegetarianism and equating it with the pacifism of pastors and intellectuals. Understanding the destructive and unhealthy character of the meat and agro-industry, solving social food shortages and proposing a planned economy of veg(etarian) diets, according to some scientists, makes sense.¹⁷² For this transition, material conditions are necessary for the defence of life: 'To make the individual sacred we must destroy the social order which crucifies him. And this problem can only be solved by blood and iron',¹⁷³ transgressing the inviolability of life in revolutions, conflicts and red terror.

The STS image in which everyone will be able to travel in cars is unsustainable due to CO₂ emissions. A nationalisation of public transport with mixed and non-fossil energies, including innovative trains, is

¹⁶⁹ Moreno 2020, p. 1.

¹⁷⁰ Trotsky 1973, p. 168.

¹⁷¹ Sheehan 2017, p. 24.

¹⁷² Chaparro Arenas 2021.

¹⁷³ Trotsky 2007b, p. 63.

required.¹⁷⁴ In Trotsky there is a socialisation of the American way of life for the working class, regardless of overproduction, ecological footprint and imperialist overconsumption: 'To make the system deliver the concrete goods which the average man desires: his food, cigars, amusements, his freedom to choose his own neckties, his own house, and his own automobile. It will be easy to give him these comforts in Soviet America'.¹⁷⁵ Trotsky was aware that the struggle for the satisfaction of needs was part of his STS project: 'The passion for mechanical improvements, as in America, will accompany the first stage of every new Socialist society'.¹⁷⁶

Tanuro and Fuentes discuss the technical rearrangement of nature: engineering of mountains, forests and animals, genetic engineering of humans. It is risky to move wild animals and build habitats without protected areas and rewilding policies:

Through the machine, man in Socialist society will command nature in its entirety, with its grouse and its sturgeons. He will point out places ... Most likely, thickets and forest and grouse and tigers will remain, but only where man commands them to remain. A man will

¹⁷⁴ See Trotsky 1986, p. 230.

¹⁷⁵ Trotsky 1951, p. 56.

¹⁷⁶ Trotsky 2005a, p. 247.

do it so well that the tiger won't even notice the machine, or feel the change.¹⁷⁷

Although questionable, this does not invalidate hydroelectric, energy and road engineering projects (intra-sea bridges, mountain bridges and connections), particle accelerators and space telescopes. Technologies where environmental disruption is minimised, an issue rejected by Josephson and Fuentes.

Trotsky identified war catastrophes, economic catastrophes and disasters such as the earthquakes in Japan.¹⁷⁸ He mentioned the risk that the cessation of sunlight would cause the extinction of human and non-human life, if we do not colonise another planet first, when the real cause is the growth of the Sun, its radiation and implosion. Given the prolonged, Trotsky could not see the risk of climate change and post-holocene.¹⁷⁹ Trotsky says: 'I think that in the centuries immediately ahead of us, scientific and technical thought, in the hands of socialistically-organised society, will advance without zigzags, breaks or failures'.¹⁸⁰ On the contrary, there will be socio-environmental catastrophes and limits to techno-scientific and industrial development in a socialist society,

¹⁷⁷ Trotsky 2005a, p. 247.

¹⁷⁸ Trotsky 2005a, p. 247.

¹⁷⁹ Lorimer 2017.

¹⁸⁰ Trotsky 1957, p. 167.

depending on the response to CO₂ levels, cycles of natural resources and soils and indices of destruction bequeathed by capital: coral reefs and loss of biodiversity, etc. All of these put the human species at existential risk no longer in the indeterminate future but in the processual present.

On the improvement of human beings in Trotsky. Although life has been prolonged, in a socialist society, while free time, access to arts, sciences and education may increase, it is utopian that the average level of each individual will be that of mainstream geniuses: Newton, Einstein, Marie Curie and Rosalind Franklin, Galileo, Aristotle, Hawking, Darwin and Marx. Writes Trotsky's futurology: 'The average human type will rise to the heights ... And above this ridge new peaks will rise'.¹⁸¹

There could be higher IQ per number of inhabitants, without the equivalent of 'a new breed of men'¹⁸² overcoming the imperfect and terrestrial human condition.¹⁸³ Barbarism with climatic catastrophes, planetary resource cycles, demographic cycles¹⁸⁴ (Trotsky shared with Mendeleev that a population of 10 billion would not be risky), doubting abundance and industrial socialisation. Transhumanist engineering in which 'Man will become immeasurably stronger, wiser, and subtler ... and thereby to raise

¹⁸¹ Trotsky 2005a, p. 239.

¹⁸² Trotsky 1951, p. 57; Yasnitsky 2014.

¹⁸³ Arendt 1998, pp. 1–6, 9–11.

¹⁸⁴ Trotsky 1940, p. 30.

himself to a new plane, to create a higher social biologic type, or, if you please, a superhuman'¹⁸⁵ could run up against planetary limits.

The delay of the socialist transition is jeopardising the anthropological future of the species, its capacities for technological leap, planetary environment and space exploration. Given the social inequalities and underdevelopment, functional illiteracy and environmental destruction, revisiting Trotsky's STS logic, the process of barbarism is inversely proportional to the possibilities of the human being that will limit its development as a generic being. The new society will inherit and transform the productive forces STS with past civilisational problems. IPCC reports on climate instability with consequences for thousands of years suggest this.¹⁸⁶

Conclusion: a Mortal Prophet

In an interview, Historian Enzo Traverso criticises Trotsky's apologetics:

[A] small minority that makes every effort to demonstrate that Trotsky was an ecologist, that one can draw from Trotsky all the ideas necessary to put together a project today ... One can recognise

¹⁸⁵ Trotsky 2005a, p. 239.

¹⁸⁶ Choma 2021; Lorimer 2017.

Trotsky's role and assume his heritage critically ... We are talking about the problem of how to transmit this heritage to the new generations.¹⁸⁷

Traverso acknowledges Trotsky's critical inheritance to orthodoxy,¹⁸⁸ close to Frankfurt Critical Theory:

[I]f we read anything he wrote in the 1920s about the domination of nature by technology there are terrible formulations read today. There is a eugenicist Trotsky ... Socialism would be almost a process of [transhuman] selection up to the new man ... There is an osmosis ... of faith in the development of productive forces with ... an ability to question all those premises ... He is a classical thinker whose certainties are more problematised.¹⁸⁹

The paper revisited four environmental visions of Trotsky's STS and a rejoinder on the mortal prophet. Traverso calls it the Trotsky's facet in permanence. The concern about prophet images is reciprocal, examining Irvine and Josephson, Tanuro and Traverso, Foster and Muñoz approaches. In the end, on Trotsky it is wise to ponder with the philosopher Bensaïd on how Marx has coming back: 'neither green angel

¹⁸⁷ Fernández and Pastoriza 2020, p. 10; own translation.

¹⁸⁸ Mandel 1995.

¹⁸⁹ Fernández and Pastoriza 2020: p. 97; own translation.

nor [red] demon of [black] production'.¹⁹⁰ *Ecce homo*. The same intemperate gaze STS applies to Trotsky.

At this point, where civilisational collapse infects science and public audiences,¹⁹¹ Trotsky resonates: 'only a victorious revolution is capable of preventing the degeneration not only of the party but of the proletariat itself and of modern civilization as a whole'.¹⁹² Warning of barbaric times, Trotsky announces: 'The bourgeoisies today is a falling class ... its imperialist methods of appropriation is destroying the economic structure of the world and the human culture ... It holds to power, and does not wish to abandon it. Thereby it threatens to drag after it into the abyss the whole of [modern] society'.¹⁹³

On heritage,¹⁹⁴ the socio-ecological crisis of capitalism in 'decadence' and 'agony'¹⁹⁵ challenges us. It is necessary to re-examine Trotsky's materialist STS method, to update the transitional programme with the sciences and workers' parties in the face of contemporary catastrophes. In short, to analyse facets of the mortal prophet through STS and philosophy,¹⁹⁶ his mistakes and successes.

¹⁹⁰ Bensaïd 2014, p. 171; own brackets.

¹⁹¹ Vardy 2017.

¹⁹² Trotsky 1973, p. 92.

¹⁹³ Trotsky 2007b, p. 63; own brackets.

¹⁹⁴ Fernández and Pastoriza 2020; Mandel, 1995.

¹⁹⁵ Trotsky 1977b.

¹⁹⁶ Brown 2015; Frickel and Arancibia 2021; Yearly 2008; Aronova 2011; Holloway 1981.

Trotsky is back. Reviews show it. In the ‘precarious times’¹⁹⁷ of civilisational crisis and apocalypse, the mortal prophet's STS ideas continue to haunt the brains of the living. After all, latent is the messianic promise, Traverso will say with Benjamin,¹⁹⁸ of permanent revolution and of *the wretched of the Earth*, Fanon¹⁹⁹ would synthesise.

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¹⁹⁷ Vardy 2017; Lorimer 2017.

¹⁹⁸ Enzo 2017, pp. 253–263,

¹⁹⁹ Fanon 2004, pp. 113, 235–240.

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