

The Laboratory Planet

Planetary Peasants

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Between 1961 and 2016, the number of people on Earth doubled, and the global area of cultivated land per capita was halved¹. According to United Nations projections, the world's population is set to increase by 2 billion over the next 30 years, from 8 billion today to 9.7 billion in 2050². In these new conditions, how can the Earth remain habitable for all?

Laboratories for habitable futures

In 2007, we created the journal *The Laboratory Planet*, based on the intuition that from a “factory planet” it was necessary to move on to the analysis of a “laboratory planet” – where “acceptable risk” is the adjustment variable for experiments on a scale of 1. We postulated that 1945 was the symbolic date of this transition, with the atomic bomb as marker and symptom. We were just beginning to hear talk of the “Great Acceleration” and the Anthropocene, but it was already clear that the construction of environmental monitoring, with its apparatus ranging from micro-sensors for terrestrial measurements to satellite observation, stemmed directly from the technologies and methodologies of Cold War nuclear deterrence. Without the deployment of this military-industrial complex, we now know that it would have been impossible to define either the Great Acceleration or the Anthropocene. The continuous monitoring of Earth System indicators is an indirect legacy, as are the institutions themselves, and the technocracy that accompanies them. Our aim is to highlight the “Anthropocene Bomb”³ that exploded at the turn of the 1950s, and the “alien” character of computers’ conquest of the Earth⁴.

But as science historian Christophe Bonneuil points out, awareness of the “planetary turn” goes back much farther than the view of the Earth from the Moon, or the founding of the International Union for Conservation of Nature at the end of the Second World War. He reminds us that, while the historian community now concedes the existence of a “consciousness of globality” since at least the 16th century, “regimes of planetarity” remain largely unclear⁵. And as Gayatri Chakravorty Spivak wrote in 1999, “The globe is on our computers. Nobody lives on it”⁶.



planetary turn,
biofuturism,
peasants revolts,
soil chemistry,
plantationocene,
terricide,
monohumanism,
agroforestry,
dehesa,
resource curse,
biopolitical wars,
terraformation,
extermination,
climate justice,
symbiosis,
consociation,
mutual aid,
feral living,
satoyama,
multispecies landscapes,
agroecology,
bioregionalism,
zomia,
rural public order,
oegrowth,
negentropy, energy

Since then, the Indian philosopher has been encouraging us to move away from the technicist vision of the “globe”, perceived as invading and controlling the planet, towards a “planetary” gaze that would encounter this other that we inhabit, as well as the othernesses with whom we cohabit on Earth.

At a time when living conditions are deteriorating ever further, ecologically as well as socially and humanly, this is the direction we propose to take. In this issue, we imagine a peasant and neo-peasant future, invented by planetary peasants, organized in diverse territories, cultivating biotopes that are more heterogeneous, more democratic, and therefore more habitable than those of imperial cities. This issue opens up to a central section on the recent Soil Assembly initiative, and develops some of the experiences, reflections and surveys collected within this emerging network.

The futurism that guides us here – that of the peasants who have demonstrated their millennia-old ability to shape living landscapes, and that of the neo-peasants who are inventing new forms of agricultural, pedagogical and social arts – is in solidarity with the Earth and its destiny. It does not claim to accelerate the biosphere and living beings, as we accelerate the evolution of the technosphere with capital. Rather, it seeks to thicken the living, to densify beings, to increase their consistency.

This issue of *La Planète Laboratoire* is not leaving behind the dying Earth for the Moon or the stars, it is looking toward our soils, our hedgerows, our forests, our mountains, our deserts, our rivers, our seas and the teeming world that inhabits them.

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(1) It decreased from around 0.45 hectares per inhabitant in 1961 to 0.21 hectares per inhabitant in 2016 (FAO, Land use in agriculture by the numbers, 07 May 2020).

(2) <https://www.un.org/fr/global-issues/population>

(3) Ewen Chardronnet, “La Bombe Anthropocène”, AOC, 28 March 2024.

(4) See previous issues of *The Laboratory Planet*.

(5) Christophe Bonneuil, “Der Historiker und der Planet. Planetaritätsregimes an der Schnittstelle von Welt-Ökologien, ökologischen Reflexivitäten und Geo-Mächten”, in Frank Adloff et Sighard Neckel (dir.), *Gesellschaftstheorie im Anthropozän*, Frankfurt, Campus, 2020, pp. 55-92.

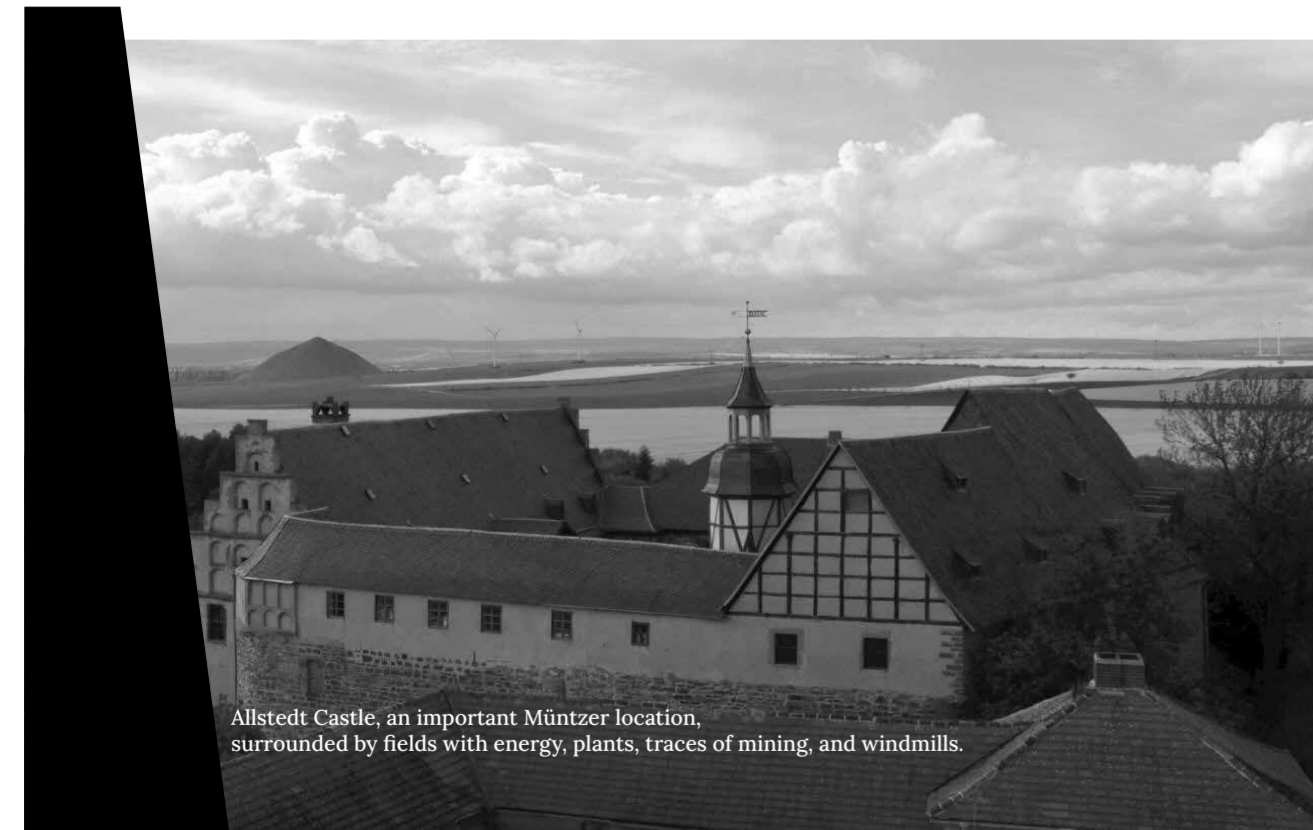
(6) Gayatri Chakravorty Spivak, *Imperatives to Re-Imagine the Planet* (Vienna: Passagen Verlag, 1999), 44. Cited in Jennifer Gabrys, “Becoming Planetary”, *e-flux Architecture*, 2018.

Planetary Peasants

ALEXANDER KLOSE

Spring 2025 marks the 500th anniversary of the German Peasants' War. According to Marxist historiography it was the first revolution on German soil, the "climax of the early bourgeois revolution, [and] one of the greatest class battles in the age of feudalism"¹. Consequently, this event played an important role in the political memory of the German Democratic Republic (GDR). The East German 5 Mark banknote showed a posthumous portrait of Thomas Müntzer (1489-1525)², the reformist preacher and militant antipode to Martin Luther, whose sermons, writings and deeds are closely identified with the Peasants' War. Other types of revolutions have reshaped the world since, though, namely socio-technological ones. In industrialized regions, both the peasantry and their agricultural labours have dramatically declined in importance, both in terms of the numbers of people involved and in terms of their political representation.

Scholars from Marx/Engels onward have predicted the death of peasantry. The categorical distinction between city and countryside, each sphere traditionally with its own rights and ways of being, has been eaten up by the dynamics of planetary urbanization. Yet, the primary materials for food are still produced on agricultural sites, and the planet's current condition of multiple ecological crises was manufactured in urban-industrial agglomerations and infrastructures, as well as on farms and fields, through the accumulation of the doings of modern machines and human beings, animals and plants³.



Allstedt Castle, an important Müntzer location, surrounded by fields with energy, plants, traces of mining, and windmills.

At the same time, peasants around the globe, though operating under very different conditions, are currently struggling for their rights – to earn a living, to continue traditions, to stay on their lands. The following text tries to string together some of those diverse and partly contradictory ties that define this complex situation.

In the self-mythologization of the early GDR, the "land reform" of 1945 – i.e., the expropriation of large landowners and (alleged) collaborators of the Nazi-regime and the redistribution of their land among small farmers – and the subsequent collectivization of land and work in agricultural production cooperatives (LPG: Landwirtschaftliche Produktionsgenossenschaft) was presented as the completion of the Peasant's War: "Via defeats and victories in the class struggle, the peasants' path through the centuries has led to socialism. The oppressed class of feudal farmers became the socialist class of cooperative farmers under the leadership and alongside the working class in the GDR."⁴

After the end of the GDR in 1990, many of the LPG's vast agricultural lands were bought by multinational agribusinesses and, more recently, bypassing existing laws that are intended to prevent this, by real estate speculators. Seen from today, the period of "actually existing socialism" in agriculture turned out to be a rationalisation measure that prepared the land for total neoliberal plundering by real existing capitalism⁵. This was a dialectical dynamics somewhat comparable to the historical role of the German Peasants' War as a trailblazer for early capitalism and a punitive counter-reformation: in its aftermath, the peasants, freed from serfdom, were

now in possession of themselves and their labour power, but not much more (except for a tighter grip on their wives and children as a result of extended property rights); at the same time, they were deprived of their traditional rights to common property as well as traditional entitlements to community services provided by the landlords⁶.

Technical and scientific revolutions

Parallel to political and socio-economical turns, a potentially even more profound revolutionary dynamic has transformed things around the globe, on all political sides: the development of modern agronomy and the mechanization, industrialization and "chemicalization"⁷ of agriculture. A key figure was the doctor and agriculture researcher Albrecht Daniel Thaer (1752 – 1828), who is considered the originator of the science of agronomy. He began to work for the Prussian state in 1804, founding agricultural research and teaching facilities north and east of Berlin. In 1809 he published the first of four volumes of his seminal *Principles of Rational Agriculture (Grundsätze der rationellen Landwirtschaft)*. Another key figure was the economist, agronomist and farmer Johann Heinrich von Thünen (1783 – 1850), one of Thaer's first pupils, who pioneered principles of business administration in agriculture. Later, the centre of agronomical research in Germany moved south, to the fertile grounds of the Prussian province of Saxony (which is also where Thomas Müntzer came from, and where the Werkleitz festival 2025 *Planetary Peasants* is focused). Here, Julius Kühn (1825-1910) worked as the founding professor at the institute for agronomy at Martin Luther University Halle. His experiments on the monocultural cultivation of crops, which he called "eternal rye", and which started in 1862, continues to this day.

In the mid 19th century, the region between Magdeburg to the North, the Harz mountains to the West, Merseburg to the South, and the Saale river to the East had become one of the world's leading regions for sugar production refined from sugar beets. The world market price for sugar was determined at sugar boards in London and Magdeburg – an encounter of colonial and continental productive economies. What used to be one of the most important colonial commodities (and a luxurious one for most) – sugar made from cane grown on slave-operated plantations in tropical regions – was turned into a kind of staple food. Production exceeded demand, so new demands had to be created to normalise an ever-increasing sugar consumption. For some time, sugar was the most important export of the newly found German Empire. Prussian Saxony went

through a phase of agriculture-led industrialization. The implementation of the infrastructure needed to produce sugar, namely mills and refineries and the machines used in them, attracted a saccharine geography of factories for the production of specialized agricultural machines and for food production (bread, cakes, chocolate). This economic success in competing with the colonial economies and breaking free from the dependency on their main goods, such as sugar, rubber or saltpetre, developed into an important trope in the self-historization of the "belated nation" of Germany.

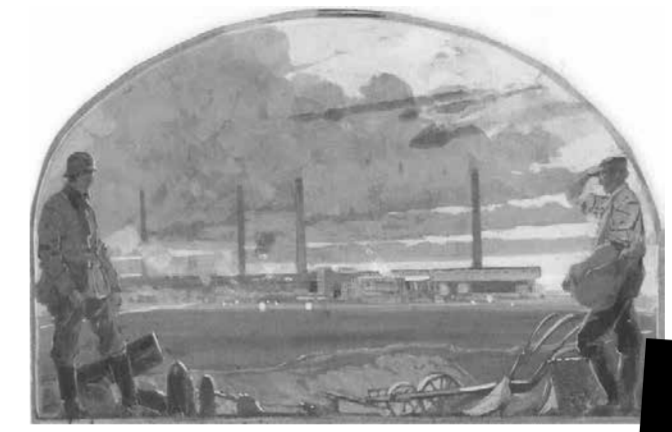
Without significant access to the colonial production regions, it had to apply principles of an "inner colonization": intensified agriculture, industrialized production and innovation. Popular publicists, including the non-fiction author and early Nazi propagandist Karl Aloys Schenzinger, repeated this trope time and again, especially with regard to the historical development and significance of the chemical industry⁸.

The rendering of an "agricultural biological chemistry" and the development of the first artificial phosphate fertilizer by the chemist Justus von Liebig (1803-1873) in the 1840s, who taught and lived in Gießen in the state of Hesse-Darmstadt and later in Munich, were a pillar of the emerging chemical industries of Germany and other nations. When the new "Badische Anilin und Soda Fabrik" (BASF) Ammonia Synthesis Factory Merseburg opened in 1916, as the first in a network of chemical production plants later known as the "chemical triangle" formed by Bitterfeld/Wolfen, Leuna and Buna, its production was directed towards ammunition for the ongoing war (replacing the saltpetre from Chile that was no longer accessible because of the British Naval Blockade) and towards artificial fertilizers for an intensified agriculture.

From Gerechtigkeyt to Climate Justice

The invention and large-scale deployment of artificial fertilizers, together with the mechanization and industrialization of work, investigated by far the most profound changes in agriculture since its invention. Following tractor tracks and artificial fertilizer traces of phosphor, potash and nitrogen leads us to regions around the globe and across political borders. The same machines were put to work, the same substances used, even in the strictly politically divided countries on both sides of the "iron curtain". The tracks and traces of agriculture's industrialization lead to fields of maximized productivity, as well as to exhausted and eroded soils and to areas of excessive accumulation akin to the

dead zones that result from the over-nitrification of runoff water close to ocean estuaries around the globe. Today's planetary condition is to a significant degree defined by such—human-made, intended or unintended—migration of organic and inorganic substances linked to agricultural activities: plants and animals, but also, and mainly, chemical com-



Soldier and peasant looking at the ammonium plant Merseburg, Fritz Bersch 1917-18.

pounds such as CO2 or ammonium-nitrates and their accumulation in the Earth's ecosystems. Today, agricultural machines in the former LPG plantations of Müntzer's homeland are tracked and controlled by GPS, and the yield of local fields is sold at international stock exchanges such as the Chicago Board of Trade. Peasantry, like the working class, seems to have dissolved into milieus. So, the question might be, what do our present and future have in common with the causes of the Peasants' War? Seen from a planetary perspective, it quickly becomes clear that the adversities of peasant labour have only shifted – whether to the exploitation of seasonal workers, very often migrant workers without passports and legal rights, who are still made necessary in many agricultural processes, despite all mechanizations and automatizations, or to regions of the world where crop failures and extreme weather events continue to be existentially threatening. Besides, the end of serfdom in European countries was paralleled by the enslavement and forced migration of millions of people to work on plantations in the American and Asian colonies. Their insurgencies and anti-colonial struggles carry many of the aspects of the European peasants' wars, both in their contents and in their outcomes. The "Plantationocene" holds up under post-colonial conditions⁹. The question of justice today must be considered not only on the level of classes or strata of one society, but also between the populations of rich and poor countries. The concept of climate justice, as it is discussed and demanded today, emphasizes how much people within and between societies benefit from industrialization, and the price they pay for it: pollution, devastation, or the loss of habitats due to climate change.

Feeding the world-to-come in a fairer way still requires revolutionary action, or so it seems. Given the expansion of capitalist conditions in the deve-

lopment of the world system in the last 500 years, but especially in the last decades, many ecological thinkers and activists around the globe interpret the rule of ownership and capital as being at the core of all environmental problems. The question of agricultural land for a steadily growing world population is still decisive for territorial conflicts and geopolitics, and will increasingly become so in the climate-changed future. The expansion of plantations reduces rainforests and displaces human communities. On the other hand, the growth of settlements, industries and infrastructures is destroying agricultural land worldwide. These circumstances, as well as the expansion of markets, the ongoing industrialization of agriculture, and the threat to rural areas due to changing climate conditions, have resulted in a massive increase of migratory movements of people leaving soils that don't feed them anymore. In order to end the destructive dynamic of this age of "capitalist realism" and open up perspectives for sustainable, post-capitalist, post-profit maximizing future societies, as advocated by the Japanese neo-marxist Kohei Saito¹⁰, we must once again turn to the agrarian sphere and its modes of (re)production as a main source of inspiration, energy, and revolutionary dynamics.

This text is an overworked and extended version of the initial concept for the Werkleitz festival 2025 exhibition *Planetary Peasants* by Daniel Herrmann, artistic director of Werkleitz, and Alexander Klose at Kunstmuseum Moritzburg, Halle. For more information on the exhibition see: <https://werkleitz.de/en/planetarische-bauern-ausstellung>. It is part of the state exhibition of Saxony-Anhalt/Germany in 2025, titled *Gerechtigkeyt – Thomas Müntzer & 500 Jahre Bauernkrieg (Justice – Thomas Müntzer & 500 years of Peasants' War)*.

(1) Manfred Bachmann, „Zum Geleit“, in: Staatliche Kunstsammlungen Dresden (ed.), *Der Bauer und seine Befreiung. Ausstellung aus Anlaß des 450. Jahrestages des deutschen Bauernkrieges und des 30. Jahrestages der Bodenreform [The peasant and his liberation. Exhibition on the occasion of the 450th anniversary of the German Peasants' War and the 30th anniversary of the land reform]*, Dresden 1975, p.7; translation by authors.

(2) The idea was to show an ascending line of important individuals in a revolutionary history, starting with Müntzer on the 5 Mark note and culminating in Lenin on the 500 Mark bill.

(3) For an analysis of agriculture as the initial force that led into today's anthropocenic condition, see: David R. Montgomery, *Dirt: The Erosion of Civilizations*, Oakland 2012.

(4) From the concept of the Committee of the Council of Ministers of the GDR for the 1975 exhibition on the German Peasants' War and land reform in Dresden, quoted after Bachmann, *ibid.*; translation by author.

(5) see Ramona Bunkus and Insa Theesfeld, *Land Grabbing in Europe? Socio-Cultural Externalities of Large-Scale Land Acquisitions in East Germany*, in: *Land* 2018, 7, 98.

(6) Silvia Federici, *Caliban and the Witch. Women, the Body, and Primitive Accumulation*, Brooklyn/New York 2004; Eva von Redecker, *Revolution für das Leben. Philosophie der neuen Protestformen*, Frankfurt/Main 2023.

(7) „Chemisierung“ is the German neologism used to describe the application of chemically produced substances to enhance productivity and reliability in agricultural production.

(8) His books *Anilin* (1936) and *Bei IG Farben* (1951), about the advent of the German chemical industry, sold a million copies during the NS-time and in post-war West Germany.

(9) see Maan Barua, *Plantationocene: A Vegetal Geography*, in: *Annals of the American Association of Geographers*, 0(0) 2022, pp. 1-17.

(10) See Kohei Saito, *Marx in the Anthropocene. Towards the Idea of Degrowth Communism*, Cambridge, New York, Melbourne 2022.

Plantation Planet

FEDERICO LUISETTI

The most enduring planetary laboratory is the Plantation, an institution and mode of existence that took hold of the Earth during colonial times and is still shaping soils, bodies, and minds across continents. As of today, the planet – in particular the Global South – is occupied by large-scale industrial monocrops for agro-fuels, animal feed and textiles, by palm oil and eucalyptus plantations, by tropical cash crops and monocultures of corn, soybeans, wheat, rice of a limited variety of genotypes, farmed by heavy machinery on chemically-engineered soils¹.

We may not live in the Anthropocene, as recently decided by the Subcommittee on Quaternary Stratigraphy of The International Union of Geological Sciences², but we certainly inhabit the Plantationocene, a neologism introduced in 2015 by Donna Haraway³, at the culmination of decades of postcolonial histories of the agro-political world-order of plantation societies, which spread across the Atlantic and then in the rest of the world through a combination of monocultures and slavery⁴. The source of the Earth's "colonial inhabitation"⁵ is the coerced labor of humans, plants, animals, and microbes in the plantations, the radical simplification of living natures, and the relocation of the genomes of breeding plants and animals across continents. Forced labor in the plantation has designed a planetary matrix of land grabs, massacres, land clearing, and the exploitation of reproductive forces of the living – instead of regenerative practices of farming and forestry, accelerated and forced reproduction of some species and the extermination of others⁶.

Terricide

The Spanish term used by activists of the *Movimiento de Mujeres Indígenas por el Buen Vivir* (Indigenous Women's Movement for Good Living) to describe the effects of the Plantationocene is *terricidio* ("terricide"), a constellation of "epistemicides, genocides, ecocides, culturicides, femicides that have occurred throughout the history and the colonial present": "With the word terricide we name our pain and the devastation suffered by the territories, our spirituality and our bodies, because in it all the ways of murdering life that the Western system has are encrypted."⁷ For the ecofeminist activist Vandana Shiva, agribusiness and knowledge-



Slaves cutting cane in the French colonies, engraving published in 1842. From *Les français peints par eux-mêmes: le Nègre* (Page 321).

based monocultures are one and the same, since ecocides and epistemicides go hand in hand, and "dominant knowledge destroys the very 'conditions' for existence of alternatives, just as the introduction of monocultures destroys the very conditions for existence of different species."⁸ The plantation economy is inseparable from a "monoculture of the mind," a one-dimensional system of thought based on Western principles of human exceptionalism and psycho-biological individuality, which the Jamaican philosopher Sylvia Wynter calls a "monohumanist conception of the human."⁹

At the origin of the Plantationocene's monohumanism is the ancient separation of persons and things, a poisonous gift of Greek philosophy, Roman law, and Christianity, ingrained in the fabric of European slave societies¹⁰. Western personhood has detached the *persona* from the *res*, with the goal of conflating humanity and ownership, personhood and mastery over slaves and their bodies, reduced to objecthood. Appropriation of something – that thus becomes a *res* – by someone who claims to be a subject – a *persona* – is the foundation of modern Western legal and political thought. In the Americas, the proprietorial *persona* has stripped Black, Native, and non-white people of their land and humanity, reducing an entire continent into *terra nullius*.

The legal history of the Western *persona* reinforces the analytics of New World slavery laid out by Black and decolonial studies. For Saidiya Hartman, the order of knowledge to which personhood belongs is "enabled by proprietorial notions of the self: humanity and individuality acted to tether, bind, and oppress."¹¹ The archetype of this view is John Locke's theory of property. A beneficiary of the slave trade and the founding father of liberalism, Locke co-au-

thored *The Fundamental Constitutions for the Government of Carolina* (1669) as secretary to the Earl of Shaftesbury, one of the Lords Proprietors of Carolina, and he actively justified the link between individual personhood and private ownership. According to Locke, land cultivated in common by Amerindians cannot be considered appropriated until it is enclosed by the individual¹². Personhood as a center of experience is inseparable from the juridico-political connotations of being an individual possessor who alienates other humans and non-humans from this essential freedom. In his *Essay Concerning Human Understanding* (1689), Locke is straightforward: "Person ... is a Forensic Term appropriating Actions and their Merit; and so belongs to intelligent Agents capable of Law, and Happiness and Misery."¹³ Where decolonial activists see terricides, Locke perceives intelligent legal persons capable of law and happiness for themselves, and misery for others.

Soil Insurgency

Over the course of the nineteenth century, the monohumanist conception of personhood denounced by Sylvia Wynter has produced a biologized and economized account of the human, a bio-economic compound. Framed within Malthusian resource scarcity and Darwinian natural selection, "Western and Westernized global selves"¹⁴ functioned simultaneously as subjects of natural history and political economy. Through "biological liberalism," a colonial constellation of scientific, legal, and cultural practices managed to produce what Maurizio Meloni portrays as an "unprecedented technology of isolation, privatization and protection of the body that makes of its inner milieu a source of freedom and

individuality in the face of mutating external environments."¹⁵ The biological rearticulation of liberal political philosophy has constituted a "threshold of biological individuality"¹⁶ that separates the modern Western body and its internal regulating system from an Outside that has become the Environment, the Non-Body of the Earth.

Against this monoculture of the mind, Sylvia Wynter advocates for a return to the teachings of Frantz Fanon, who contested "liberal humanism's biocentric premise of the human as a natural organism and autonomous subject."¹⁷ Fanon's decolonial overcoming of Western humanism converges with multispecies ecologies, which politicize the awareness that biological life is not an autonomous kingdom of competing species surrounded by dull matter. Biologically, we have never been individuals. As Anna Tsing puts it, "human nature is an interspecies relationship," life is animated by subtle relations that cross the inorganic conditions of human existence, soils, fungi, plants, and animals. Geochemical processes, co-evolution, and multiple involutions of species constantly dissolve biological boundaries and individualities.

Despite centuries of monohumanism and plantations, the body-territory of the Earth has not been fully reduced to bioeconomic units. As an alternative to the Plantationocene, decolonial activists embrace the forces harboured in the pluriversal bodies of the Earth, the modes of existence of non-human subjects, of earth-beings unencumbered by the biocentric normativity of monohumanism¹⁸.

The protagonist of the decisive struggle for re-existence in the Plantationocene is soil, the cradle and grave of organic life, where bodies and inorganic matter meet and exchange their properties, nurturing and destroying each other in a restless process of decay and regeneration¹⁹. Populated by beings of all kinds – stones and leaves, insects, roots, water, air – soil is the stage on which the planetary drama of life and nonlife has been unfolding for the last 450 million years.

When soil is not destroyed by chemical agriculture and plantations, earthworms act as geo-activists and earth-designers, as was already clear to Charles Darwin, who dedicated his last published work to these crawling, digging, and swallowing earth-beings: "All the vegetable mould over the whole country has passed many times through, and will again pass many times through, the intestinal canals of worms."²⁰ Thanks to the digestion of earthworms and their "mental power"²¹, the planet is not a pure geological being of crystalline rocks. Organic matter and stones flow downwards, decomposed by earthworms into nutrients for life. Whereas Charles Darwin celebrated the subjectivity of earthworms after observing pots that he kept in his home near London, Vandana Shiva places soil care at the core of Navdanya farm, an agroecological research and activism hub in Uttarakhand in the foothills of the Himalayas. In her decades-long battle against the Green Revolution, Vandana Shiva has allied with a "soil community" of "over one thousand species of invertebrates that may be found in a single m2 of forest soils" and "millions of individuals



Credit: Movimiento de Mujeres Indígenas por el buen vivir

and several thousand species of bacteria" that dwell in a single gram of lively soil²². In Karl Marx's reflections on the colonization of Irish soil²³ and Amílcar Cabral's political agronomy in Guinea-Bissau²⁴, in contemporary agroecologies and food sovereignty movements, it is a soil insurgency that liberates the Earth from Western and Westernized global selves.

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- (1) Monocultures cover 80% of the world's 1.5 billion hectares of arable land.
- (2) quaternary.stratigraphy.org/working-groups/anthropocene/
- (3) D. Haraway, N. Ishikawa, S. F. Gilbert, K. Olwig, A. L. Tsing & N. Bubandt, "Anthropologists Are Talking - About the Anthropocene" *Ethnos*, 2015.
- (4) See E. Williams, *Capitalism and Slavery*, University of North Carolina Press, 1944 and G. Beckford, *Persistent Poverty: Underdevelopment in Plantation Economies of the Third World*, Oxford University Press, 1972.
- (5) M. Ferdinand, *Decolonial Ecology: Thinking from the Caribbean World*, Polity, 2022.
- (6) A. Hopes & L. Perry, *Reflections on the Plantationocene: A Conversation with Donna Haraway and Anna Tsing*, *Edge Effects Magazine*, Nelson Institute, University of Wisconsin-Madison, 2019.
- (7) *Campamento Climático: Pueblos contra el Terricidio organizado por el Movimiento de Mujeres Indígenas por el Buen Vivir*, in "Deliberó en el Lof Mapuche Pillán Mahuiza el Campamento Climático Pueblos contra el Terricidio", *Revista Resistencias*, 18 feb 2020 (translation by Arturo Escobar), Latin American indigenous and feminist movements speak of *Cuerpo-territorio* ("body-territory"), an indissoluble assemblage of individual and collective, physico-affective bodies.
- (8) V. Shiva, *Monocultures of the Mind: Perspectives on Biodiversity and Biotechnology*, Zed Books, 1993.
- (9) Sylvia Wynter: *On Being Human as Praxis*, ed. K. McKittrick, Duke University Press, 2015, 21. My understanding of the connection between monohumanism, terricide, and pluriversal ontologies owes to the work of Arturo Escobar, in particular to his forthcoming article entitled *Planetary Universalisms / Planetary Terricide: A Pluriversal Perspective*.
- (10) R. Esposito, *Persons and Things: From the Body's Point of View*, John Wiley & Sons, 2015.
- (11) S. Hartman, *Scenes of Subjections. Terror, Slavery, and Self-Making in Nineteenth-Century America*, Oxford University Press, 1997, 5-6.
- (12) B. Arneil, "John Locke and America: The Defence of English Colonialism", Oxford University Press, 1996, 141.
- (13) J. Locke, *An Essay Concerning Human Understanding*, Thomas Basset, 1690, II. Xxvii, 26.
- (14) Sylvia Wynter: *On Being Human as Praxis*, 67
- (15) M. Meloni, "Provincializing Metabolism", *Somatosphere*, January 18, 2020.
- (16) *Ibid.*
- (17) S. Wynter, 1492: *A New World View*. In V. Lawrence Hyatt and R. Nettleford, eds., *Race, Discourse and the Origins of the Americas*, Smithsonian Institution Press, 1996, 44.
- (18) See F. Luisetti, *Nonhuman Subjects. An Ecology of Earth-Beings*, Cambridge University Press, 2023.
- (19) See J. F. Salazar, C. Granjou, M. Kearne, A. Krzywoszyńska, M. Tironi, eds. *Thinking with Soils: Material Politics and Social Theory*, Bloomsbury Academic, 2020.
- (20) C. Darwin, *The Formation of Vegetable Mould through the Action of Worms, with Observations on their Habits*, John Murray, 1881, 4.
- (21) *Ibid.* 3.
- (22) V. Shiva, *Agroecology and Regenerative Agriculture: Sustainable Solutions for Hunger, Poverty, and Climate Change*, Synergetic Press, 2022, 105.
- (23) E. Slater, "Marx on the Colonization of Irish soil" (MUSSI Working Paper No. 3), Maynooth University Social Sciences Institute, 2018.
- (24) F.M. Carreira da Silva & M. Brito Vieira, "Amílcar Cabral, Colonial Soil and the Politics of Insubordination," *Theory, Culture & Society*, 2024.

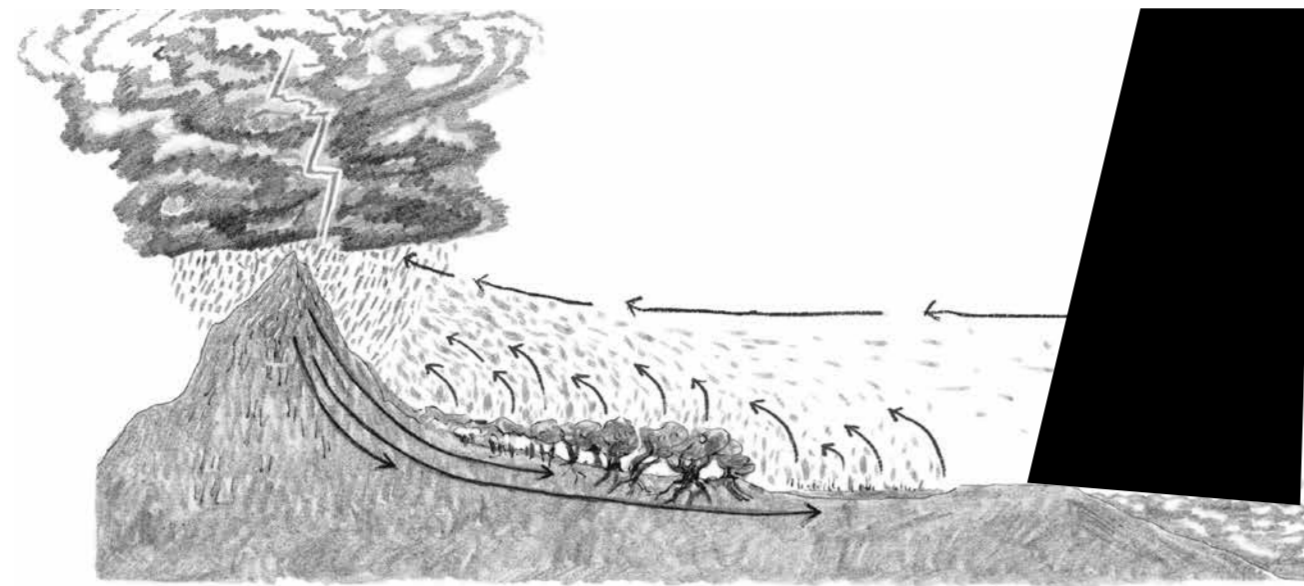
Soil, Plants and Thunderstorms

JULIAN CHOLLET

Soil is not only the foundation of life for all land-based organisms, it has an astounding influence on the climate. The general narrative on climate change is slowly transitioning from an almost exclusive focus on greenhouse gasses, to a more holistic perspective that includes the active role of ecosystems. Millán M. Millán's in-depth research into changes in land use on water cycles in the western Mediterranean encourages us to not only transform agricultural practices, but to regenerate landscapes and reimagine society.

Today, most of the Iberian Peninsula is severely threatened by desertification, and especially its southern regions are extremely dry. But it has not always been like that. The eastern coastal lowlands were once characterized by swamps, the hills and mountain ridges by open forest. Let's look at the formation of summer storms in such a landscape: with a gentle morning breeze, moist air sweeps in from the sea, rises on the slopes of the mountains and forms dark clouds that eventually give birth to a thunderstorm. Yet, this meteorological ballet is not solely orchestrated by physics and geology - biology also plays a pivotal role. "Soil is the womb and the vegetation the midwife," Millán Millán said about his decades-long research on these water cycles. The generation of rain clouds depends on the vitality of the land. First of all, additional water is needed. It is pumped up from the soil by the plants and evaporates on the surface of their leaves. A single tree can charge the clouds with several hundred liters of water per day. The other ingredients for a proper thunderstorm are 'seed crystals': tiny organic particles such as pollen, fungal spores and bacteria that allow water vapor to form droplets or ice crystals. Energetically speaking, it's an open system - heat can escape into higher strata of the atmosphere - but when it comes to the water, it is cyclical, meaning that most of it returns to the soil and sea.

Although the Romans had already started draining swamps and cutting trees, the land stayed green and lush until the advent of large-scale "development" in the 20th century. Nowadays, the shorelines of Spain are crowded with cities, towns and beach resorts, while further inland, the native woodland and most of the traditional farming systems have been replaced by industrial agriculture. As a direct consequence of this shift in land use, thunderstorms have become rare. When they occur, the sudden deluge poses a significant challenge. Because sparse vegetation is unable to absorb sufficient water and already degraded soil is vulnerable to erosion, the



Depiction of a typical western Mediterranean water cycle. The arrows show the evaporation of water from the sea, swamps and forests, the wind carrying the vapor into the mountains and the returning flow of water back into the soils and swamps.

(Illustration by Akvilė Paukštytė based on a drawing by Millán M. Millán)

impacts are profound. This "second leg of human-induced climate change", as Millán calls it, should not be underestimated. Changes in land use lead to major disruptions of local weather patterns, but they also exaggerate climate anomalies elsewhere. While the Iberian Peninsula dries out, the water vapor travels far into the continent and can eventually induce floods in central Europe. Lack of sweet-water influx furthermore increases ocean salinity and affects the so-called "Atlantic- Mediterranean salinity valve" at the Strait of Gibraltar, which in turn can change the formation of low-pressure systems and storms on a much larger scale.

The western Mediterranean water cycle is a great example of the interconnectedness of soil, ecosystems and climate. Similar dynamics unfold across the globe, from central Chile to California and western Australia. All these regions are severely affected by land degradation - catalyzed by urbanization and industrial agriculture - which leads to a downward spiral of erosion, desertification and extreme weather events. Millán's research shows how the current focus on greenhouse gasses limits our understanding of climate change. Even if we could stop all emissions today and restore the atmosphere to pre-industrial CO2 levels, this would not revive previous water cycles and climate systems. It's not enough to transition to 'green' energy and organic agriculture. What we really need is to regenerate landscapes on a large-scale. Then as a side effect, these ecosystems would absorb CO2 and store it in the soil.

Fortunately, powerful strategies and methods already exist - especially agroforestry in all its forms. Adapted to the local soil and climate, integrating trees within fields and meadows creates some of the most productive and ecologically valuable landscapes worldwide. Silvopastoral systems, which

utilize livestock grazing between trees, were developed thousands of years ago, and in some places they are still around. In Spain these mosaic landscapes are known as Dehesa (in Portugal as Montado) and although in decline, they still occupy around 3.5 - 4 million hectares of land in the southern Iberian Peninsula. Most styles of agroforestry not only provide food and wildlife habitat, but also wood for construction and heating. At the same time, they stop erosion, retain humidity in the soil, increase humus and fuel local water cycles. Instead of degrading the land, these systems grow more productive and resilient every year. With each new millimeter of humus, the soil's capacity to absorb and store water increases; microorganisms build their complex networks of nutrient recycling and distribution; fungal hyphae weave their webs between plants and extend their tentacles into the depths.

This shift requires policies that support and protect small-scale local agrarianism, access to land and resources for people who are willing to build these systems. It requires an education that teaches us to cultivate the necessary skills. And above all, it requires a different way of thinking, new virtues and values. Imagine a society where almost everyone is involved in growing food. Humans once again become a part of the ecosystem, and nature transcends the confines of designated conservation areas. Such a society gives rise to entirely different landscapes - where monocultures fade into obscurity, trees and shrubs proliferate, and the soil recovers. These landscapes create a livable climate, birth their own thunderstorms, cycle the water, and at the same time nourish their inhabitants.

"A common argument against agroforestry is that it requires more manual work than industrial agriculture. This might be true for all sustainable food systems, especially for the most productive and ecologically

valuable. But once established, a food forest needs less maintenance than almost all other types of farming. Indeed, the meaning of 'work' changes: from performing externally determined tasks to a creative flow that synchronizes your activities with those of your family, friends, neighbors and the larger community. This kind of work can help us find meaning in our lives. It might even catalyze profound societal change. Food forests, community-supported agriculture and local distribution networks have the potential to transform not only our landscapes, but our relationship with the natural world, with our food, and with one another.

Julian Chollet is a (no)mad scientist, curious student and informal teacher with a background in molecular biology.

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Projects

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The Longhorn, from Spanish Colonists to Texan Cowboys

Using extensive pasture as a biotechnology of conquest

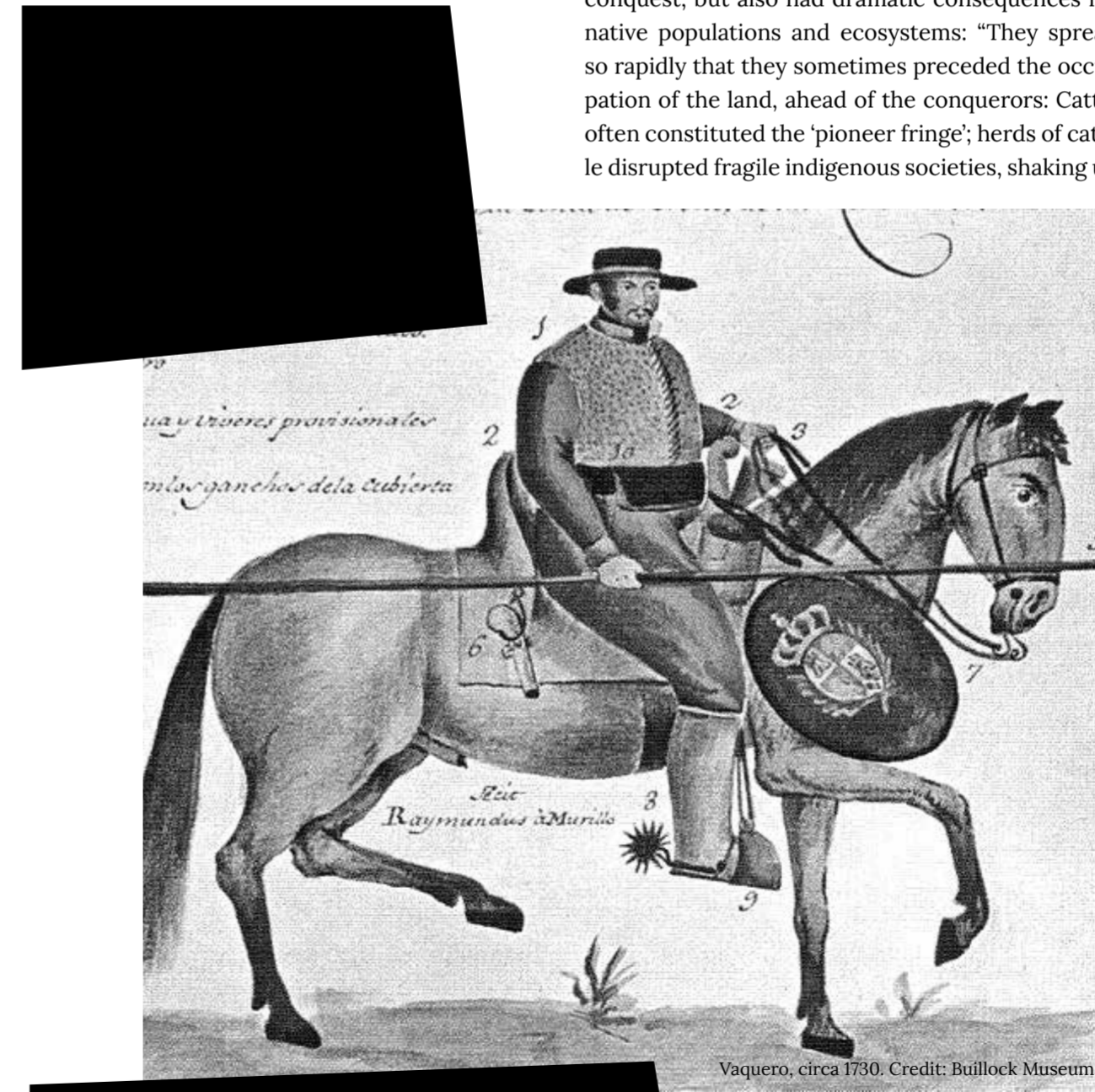
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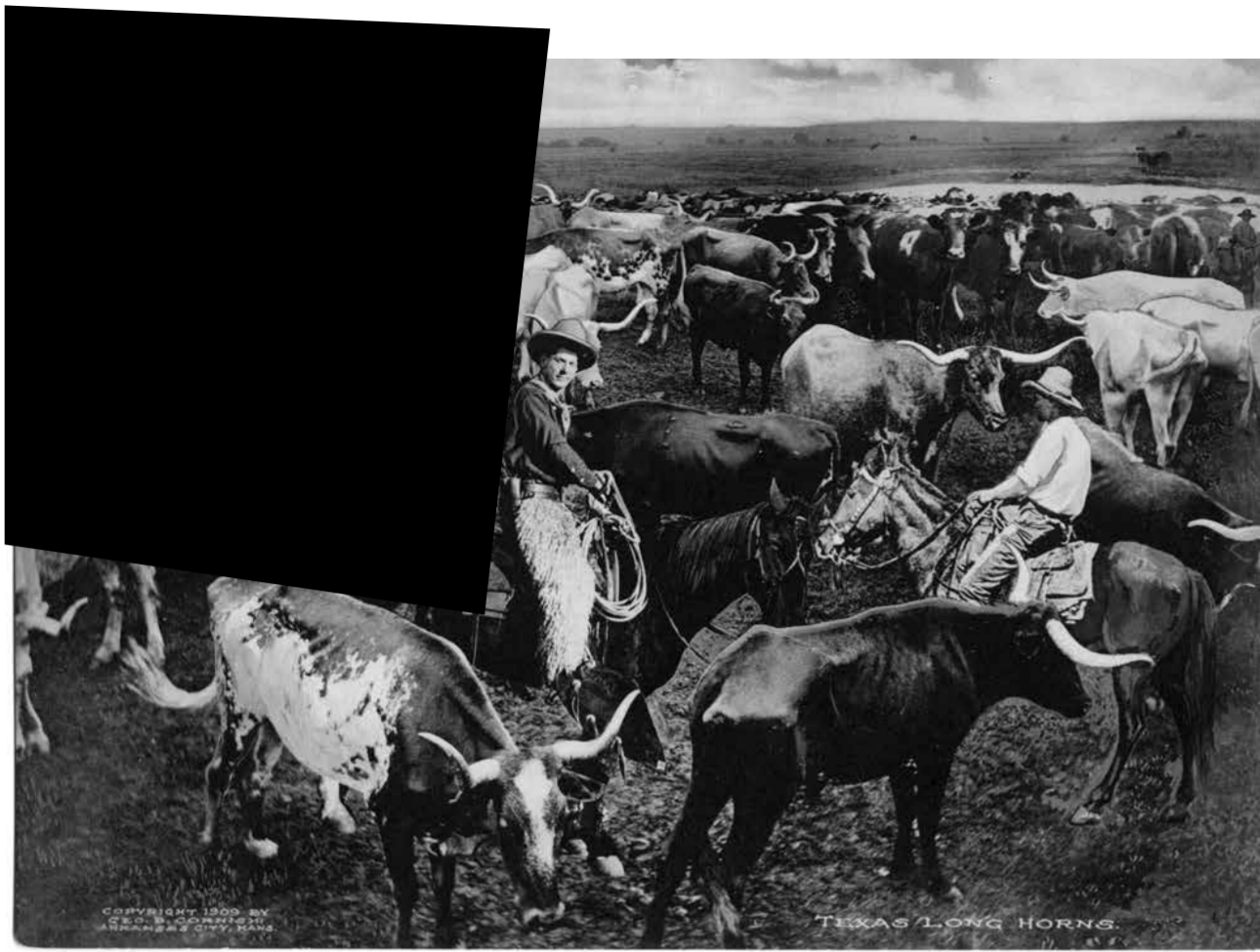
Texas Longhorn cattle, whose trophies are displayed as a state symbol, originated from Spanish colonization¹. Gradually colonizing the Americas from Patagonia to Missouri with the help of horses and oxen, Spain practiced "cattle release" to the feral state and then implemented its extensive farming methods in territories that had never before known livestock. Cattle, in particular, provided invaluable assistance to the European conquest, but also had dramatic consequences for native populations and ecosystems: "They spread so rapidly that they sometimes preceded the occupation of the land, ahead of the conquerors: Cattle often constituted the 'pioneer fringe'; herds of cattle disrupted fragile indigenous societies, shaking up

their way of life and their ancient economy, which was purely agricultural or based on simple gathering; above all, they provided inexpensive food for the new arrivals, who would have had difficulty finding sufficient and suitable food in these empty lands. Sometimes cattle were the decisive factor in the conquest; in certain regions, they were released to repel the natives, as was done against the barbaric Chichimecas of northern Mexico."²

In the 16th century, as Spanish colonies expanded in Mexico, Iberian cattle arrived in greater numbers and multiplied. The Spaniards moved to the far north of the territory, motivated in particular by their quest for the legendary Cities of Gold. They reached present-day California, then the Grand Canyon and Zuñi territories, the Rio Grande, and even the Wichita territories near present-day Kansas City in the 1540s. In 1598, Don Juan de Oñate led a new expedition north of the Rio Grande, this time claiming the territory in the name of the Spanish Crown as New Mexico. Sadly remembered for having massacred some 1,000 Pueblo Acoma Indians (Áak'u in the Keres language) a few months later, he also allowed 7,000 heads of Iberian cattle to cross the Rio Grande.

The Longhorn's Iberian ancestors adapted particularly well to the harsh climate of Texas's vast drylands. The species had the great advantage of being very self-sufficient for extensive breeding, with little or no need for human intervention. They reproduced in a quasi-feral state, caring for their young themselves in the pastures. They could use their long horns to defend themselves from wolves. Ranchers approved - and even encouraged - cross-breeding and adaptations of the Longhorn, seeing the species as a kind of technology (or biotechnology, in evolutionary terms) ideally suited to the territory for its assigned function of transforming grass into beef³, the staple diet of the settlers. Thus, it continued to assume its role as a technology of conquest, providing food security for the European colonies that were progressively encroaching on native lands. In 1680, Texas officially became a Spanish colony - at least on paper. The colonized territory remained





George Bancroft Cornish (1867-1946), Texas Long Horns, 1909, 101 Ranch and Burroum Ranch, Del Rio, Val Verde County, Texas. Source: DeGolyer Library, Southern Methodist University

that of the Apaches, Comanche, Tonkawas or Karankawas, and the colonial settlement served more as a large buffer zone between the Spaniards and the French of Louisiana. Barely 1,000 Tejanos lived there in 1762, when Louisiana was annexed by Spain. By the end of the century, Spain had claimed the current western half of the United States, from the Canadian border to Baja California, from St. Louis to New Orleans. However, seeking to populate the vast drylands of Texas, Spain encouraged new settlers by offering them the title of *hidalgo* or financial benefits, and also allowed Anglo-Saxons to settle there as well. The latter were recruited by agents known as *empresarios*, such as Moses Austin and his son Stephen, who later gave their name to the capital of Texas.

In 1821, when Mexico gained independence from Spain, there were nearly 3.5 million long-horned oxen in what is now Texas. The species had adapted into what can be considered the Texas Longhorn we know today. After Spanish rule ended and ranchers had departed the land, the herds were left in a feral state. The territory attracted even more English-speakers seeking fortune by capturing this neglected manna, which could then be considered game. Texas Ranger, Texas Senate member and Confederate Colonel John Salmon Ford described the country between Laredo and Corpus Christi as inhabited by “innumerable herds of mustangs and ... of wild cattle ... abandoned by the Mexicans when they were ordered to evacuate the country between the Nueces and the Rio Grande by General Valentin Canalizo ... the abandoned horses and cattle caused

the Texans to raid this territory.”⁴ The Anglo-Saxons became the majority in the territory, and after ten years of latent conflict with Mexico, the Anglo-Saxon settlers and their Tejano allies rose up and won independence in 1836. Another ten years later, Texas was finally annexed by the United States in 1845. During this period, Longhorns continued to roam the land. By the 1860s, an estimated 5 to 6 million feral cattle were roaming the state of Texas.

After the Civil War, many discharged soldiers turned to Texas Longhorn cattle to earn a living. War veterans rounded up unbranded cattle and branded them as their own. Thus was born another Texas breed: the Texas cowboy. The ensuing cattle drives helped revive the state’s economy and became the driving force behind the legend of Anglo-Saxon cowboys and the trails they followed, which in turn served to consolidate the new American hold on these territories. And yet, contrary to popular belief, Tejano and Mexican vaqueros made up a good quarter of these cowboys, and Black cowboys - usually former slaves or children of former slaves - also accounted for another quarter of cattle workers between the 1860s and 1880s.

Cattle also existed in the eastern U.S., but they were relatively few, and their meat was expensive. Land and fodder were expensive, and during the Civil War, the Union army had greatly depleted the region’s agricultural resources. By contrast, Texas cattle had spent the war doing what they had been doing for centuries - fending for themselves and reproducing.

The herd had exploded. But the federal blockade of the Mississippi River during the war had prohibited exporting cattle to the North, where prices were much more attractive than in the South⁵.

In the post-war years, Longhorns, which could endure long journeys without water, were rounded up and driven by cowboys along various Texas trails to Kansas City, where they were loaded onto railcars and shipped to Chicago. This soon gave way to a vast mass-slaughtering industry, correlated with a distribution system allowing refrigerated beef to be sold throughout the nation. Between 1867 and 1880, an estimated 10 million cattle were driven north. They were sometimes fattened for a winter in Colorado or Wyoming, then marketed, loaded onto trains and shipped to St. Louis and Chicago. In 1884 alone, for example, 625,000 Longhorns were shipped to markets in Chicago, St. Louis and elsewhere, while a further 300,000 were taken directly to northern ranchers for fattening⁶. The species played a crucial role in Texas’ recovery from the Civil War. After reaching its peak in the late 1880s, the Longhorn population nearly became extinct. The barbed-wire enclosure of ranches encouraged ranchers to turn to European breeds that were more suited to supervised breeding and the market. Breeds such as the Angus, Hereford and Shorthorn replaced the species that had made the pre-industrial livestock market such a success. What remained of the Longhorn was exploited for leather until the species almost disappeared from the Texas plains. It was restored in the 1920s, however, as an icon of Texan culture.

Ewen Chardonnet is a journalist, author, curator and artist, co-founder of The Laboratory Planet.

(1) A study of the species’ genetic heritage conducted by the University of Texas in Austin in 2013, shows that they are direct descendants of the first cattle brought by Christopher Columbus on his second voyage in 1493. The study also describes the complex ancestry of the descendants of cattle from the Iberian Peninsula. Around 85% of the Longhorn genome is “taurine”, i.e. derived from the ancient domestication of wild aurochs that took place in the Middle East between 8,000 and 10,000 years ago. The remaining 15% of the genome is inherited from zebu, which come from the other ancient domestication of aurochs, in India. These *bos taurus indicus*, which often feature a characteristic hump on the back of the neck, spread to Africa and from there to the Iberian Peninsula during the Al-Andalus period between the 8th and 13th centuries. Emily Jane McTavish et al., *New World cattle show ancestry from multiple independent domestication events*. PNAS, March 25, 2013.

(2) Pierre Deffontaines, “L’introduction du bétail en Amérique Latine”, *Cahiers d’outre-mer*. N° 37 - 10e année, Janvier-mars 1957, p. 11

(3) Joshua Specht, *The Rise, Fall, and Rebirth of the Texas Longhorn: An Evolutionary History*, *Environmental History* 2016, 21:2, 343-363

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The Nutmeg’s Curse, a story of biopolitical wars, terraformation and extermination

Interview with Amitav Ghosh

PAULINE BRIAND

Amitav Ghosh is a fiction and non-fiction writer from India. In his *Ibis* trilogy, he used opium trade and opium war to address the worldwide impact of colonialism and globalization. He revisits this topic in his latest essay *Smoke and Ashes, Opium’s Hidden Histories* (2024), in which the opium poppy is granted its own agency. Ghosh’s work focuses on capitalism in the common narrative about climate change and the extinction crisis, in order to delve into their often less visible and more pervasive causes - colonialism and imperialism. From book to book, since *The Great Derangement: Climate Change and the Unthinkable* (2016), Ghosh has created new narratives that provoke readers to think about these crises from a radically different perspective. With *The Nutmeg’s Curse, Parable for a Planet in Crisis* (2021), the author examines the resource curse, anchoring it in the 17th century Banda Islands and retracing its path from the Indian Ocean to the Americas and Europe.

Pauline Briand: How would you define the resource curse?

Amitav Ghosh: To understand this we must first ask ourselves what is a ‘resource’? This is a conception that grows out of a certain kind of extractive economy. Before the 16th and 17th centuries, even in Europe people didn’t think of their products as mere resources that existed only to be bought and sold. Everything was deeply connected to ways of life, and they were invested with meaning. Even today, products are not necessarily regarded as mere ‘resources’ that can be reproduced everywhere, as was the case in the colonial world. The Dutch, for example, would never have said to themselves: ‘Well, down in Tuscany they make some nice wines, which could be very profitable. So why don’t we just go down there and kill all the people and grab their land and their grapes?’ This would not have occurred to them because they would have understood that the wines of Tuscany would not have been what they were if not for the specific properties of the land, and the technical knowledge of the people who lived on and cultivated the terrain.

It is important to recall that many, if not most of the Earth’s products were once thought of in the way that we now think of the wines of Tuscany or the cheeses of Parma. Take the nutmeg tree, which produces both nutmeg and mace. Historically the nutmeg tree was found only on the Banda archipelago, which is tiny and very remote. But nutmegs and mace had been circulating around Eurasia and Africa since antiquity, and they had made the Bandanese a prosperous and flourishing community.

Over millennia the Banda Islands attracted traders from many distant places: China, India, the Arab world and Africa. Many of those traders spent years living in the Bandas, and they would have been perfectly familiar with the techniques for cultivating nutmeg trees; nor would it have been at all difficult for them to smuggle out seeds and seedlings, to grow in their own countries. Yet none of them ever did that. Instead, for centuries, they undertook the difficult and dangerous journey across the Indian Ocean to the Banda Islands. The reason for this was simply that a nutmeg wasn’t a nutmeg unless it was from the vicinity of the Banda Islands, grown or processed by the Bandanese, just as the wines of Tuscany cannot be considered Chianti unless they are grown by people who are intimately connected with the land and its products.

It is exactly these connections that came to be ruptured by colonialism, as it evolved after the conquest of the Americas. Suddenly everything in the world was up for grabs - botanical species, minerals, and, of course, people as well. So the Dutch decided that they could simply kill or enslave all the Bandanese and take over the nutmeg trade, which is what they proceeded to do in 1621. This was conceivable for them because similar things were happening at the other end of the Dutch Empire, in North-eastern America, where indigenous populations were also being subjected to exterminatory violence. It is in this context that everything in the world is suddenly available for extraction - botanical species, minerals, and, of course, people as well. The nutmeg tree becomes a profit-generating machine to be planted wherever the colonizer pleases, and the people who

have nurtured it over centuries become completely expendable. So the nutmeg tree, which had brought great blessings on the people of the Bandas, ultimately became a curse, leading to their elimination from the land. In that sense, the Bandanese were among the first to suffer the ‘resource curse’, and today’s planetary crisis is nothing other than the unfolding of that curse on a planetary scale. In the Andes, millions of indigenous people were killed in silver mines; in the Amazon, similarly thousands died in order to produce rubber for European colonizers. Today many parts of the world that produce oil or gas have been virtually destroyed because they possessed resources - this has happened in the Middle East and in West Africa. In a way, they have all been through the process that destroyed the Banda Islands hundreds of years ago. That was why I centered the book on the nutmeg tree: because this story condenses a much wider history.

Why is it important to give voice to the agencies of the nutmeg tree, nutmeg and mace?

Over the last few years, I have come to be more and more interested in the idea of ‘botanical agency’. My most recent book, *Smoke and Ashes* is about the history of the opium poppy. With this plant especially it is difficult to completely ignore the feeling that a certain kind of intelligence is at work. In fact, the opium poppy has managed to evade every human attempt to contain and limit it. In Afghanistan, the American army - the mightiest military machine in human history - was essentially defeated by a very humble-looking flower. And of course, fossil fuels, which are nothing other than

fossilized botanical matter, have also established a stranglehold on human societies. Stories are quintessentially the domain of human imaginative life in which non-humans once had voices, and where non-human agency was fully recognized and even celebrated. To make this leap may be difficult in other, more prosaic domains of thought, but it was by no means a stretch in the world of storytelling, where anything is possible. We cannot, after all, expect economists or historians to tell stories in which non-humans are accorded personhood or agency; this is simply not possible within the framework of their disciplines – or, indeed, any academic discipline. But, storytellers uniquely have since antiquity been given a license by society to imagine non-human agency. *The Odyssey*, *Iliad*, *Ramayana* and so on are all replete with many forms of non-human agency. This license has continued into modern times. Melville's *Moby Dick* is a story of non-human agency. Similarly, Carlo Collodi's *Pinocchio* is basically an imagining of diverse forms of non-human agency. In *The Nutmeg's Curse*, I describe how the Dutch writer Louis Couperus represents all kinds of non-human 'hidden forces' in his novel. Considering that he was writing for a readership which was, even then, extremely rationalist and materialist, you would imagine that his book would not have been taken seriously. But instead, his novel was celebrated and came to be regarded as a clas-

sic. This is one example of how the license to represent non-human agency enables storytellers to imagine various forms of agency. Something similar is at work in popular culture even today. If you look at bestselling books and popular movies, you will see that many of them are about zombies, extraterrestrials, vampires etc. – all kinds of non-humans. However, in the course of the 20th century, the literary world essentially rejected the amazing license it had been given and came to focus almost exclusively on human subjectivity. The consequent erasure of non-human voices from 'serious' literature has played no small part in creating that blindness to other beings that is so marked a feature of official modernity. It follows, then, that if those non-human voices are to be restored to their proper place, then it must be, in the first instance, through the medium of stories.

You establish a continuity between the spice trade routes in the Indian Ocean of the 17th century and the "carbon-capitalism" world that we now live in. Do you think this dimension is overlooked by social-science analysts?

As I see it, the central idea of Anthropocentrism – that the Earth is an inert repository of resources that exists primarily to be exploited by (some) humans – had its origins neither in 'Nature', nor in mechanis-

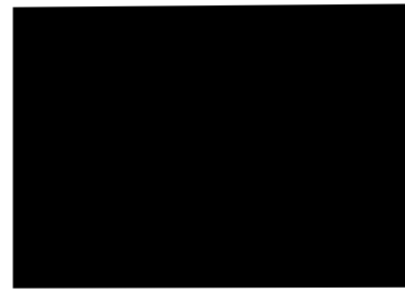
tic philosophies, nor in certain scriptural traditions, as is sometimes argued. Its origins lie, in my view, in the apocalyptic violence that was unleashed by Europeans against their human Others in the Americas and Africa. In particular, it was the violent 'subduing' of the people of the Americas that made it possible for elite Europeans to think of everything on the planet as being available for conquest, enslavement and even extermination, as happened in the Banda Islands. In other words, the same violence that made it possible for elite Europeans to think of their human Others as purely material beings, lacking in reason, thought and agency ('half-devil and half-child' in Kipling's words) also made it possible for them to think of the Earth and its gifts in the same way. Both non-humans and human Others were represented as being fit to be 'subdued' (a word that recurs often in colonial texts). It is important to remember that this kind of violence was also directed at European peasants, who, like farmers everywhere, had many kinds of vitalist beliefs. These ideas were as repugnant to elite European men as the so-called 'paganism' that they encountered outside Europe, and they waged a very bloody war against these beliefs in the form of the crusade against witches (who were, of course, overwhelmingly women). The same kind of repression continued for centuries, being directed at various peasant movements that insisted upon the sacrality of the land and of the rural communities

that lived on it. Nor have these vitalist currents disappeared from Europe. As scholars such as Ernesto di Martino and Jeanne Favret-Saada have shown, they are still very much alive in rural communities – it's just that they are now carefully hidden.

In your book, the concept of terraformation is central to the colonial project. Why is it still relevant today?

'Terraforming' was a very important aspect of the colonization of the 'New World'. When the Europeans saw North America, especially in the beginning, the forests, the swamps, were perceived as hideous. They thought of this land as ugly and unkempt, and they wanted to transform it completely. Very early on, ecological transformation became a very important part of colonialism.

From the 17th century onwards, the English, especially, wanted to transform American landscapes. Within two generations, they managed to make this land into a kind of second England. But what we are seeing today is the unraveling of landscapes that have been terraformed. It's the parts of North America that have been most extensively engineered to resemble European models that are the worst affected by climate change. If you look at California, or southern Texas around Houston and most of the



Mississippi River Delta, these are the places where the landscape is literally unraveling. It's clear from the fires sweeping through California that what was done to that land was in fact a sort of profound provocation of the landscape. The same could be said of the southeastern Australian state of Victoria. Many places that were subjected to colonial terraforming are now being devastated by terrible heatwaves and wildfires.

Your book introduced me to the concepts of "slow violence" and "biopolitical wars". Can you tell us about these processes and the many non-obvious actors who play a part in them?

Ah, yes, welcome to the messy, intricate web of our world. It's thrilling, isn't it, to discover these new ways of seeing? Let's untangle the threads a bit. Slow violence is a concept invented by Rob Nixon. It refers to the insidious kind of violence that creeps in almost unnoticed, like rising sea levels or the slow poisoning of a landscape by industrial waste. It's the violence of neglect, of a system that prioritizes profit over people and planet. We often miss it because it unfolds over decades, even centuries. But the damage it inflicts is profound. Biopolitical warfare is the kind of conflict that occurred during the European colonization of the Americas. A lot of

the conquest was actually done through livestock and pathogens, which were sometimes propagated quite deliberately. And that whole thing is very far from over. Those wars of ecological transformation are still going on in Amazonia, because what is at stake is the attempt to turn all of Amazonia into a kind of Midwest. In a sense, climate change can be seen as an extension of the colonial biopolitical wars – it's now a war of the rich against the poor. It's very striking how American billionaires seem to believe that climate change will work in much the same way that terraforming did – that is, it will destroy the lands and livelihoods of non-Westerners. But I think they are mistaken. In an earlier era, colonists were able to control various forces, but this is no longer the case. The atmosphere and the Earth itself isn't taking sides any more – they are striking out against everyone, across the planet.

You quote Ben Ehrenreich: "Only once we imagined the world as dead could we dedicate ourselves to making it so." Could vitalism be a viable response to the crises we are now facing?

All around the world today we see the emergence of movements that reject mechanistic and extractivist conceptions of the relationship between humans and other living beings. It has even been said that the fastest growing religions of today are 'Earth-centered' faiths and practices. As the historian Prasenjit Duara has shown in his book *The Crisis of Global Modernity: Asian Traditions and a Sustainable Future*, there are countless such movements in the Global South, and especially in Asia. Yet, it is probably true that many, if not most earth-centered movements are based in the West, and the reason for that is that things have, in a sense, come full-circle: while the elites of formerly colonized countries such as India and Indonesia are racing to embrace settler-colonial practices and policies (which is none other than neoliberalism shorn of the fancy language), many younger Westerners have come to understand that those practices are leading the world – and especially their generation – to disaster.

This awakening owes a great deal, of course, to the activism of those who have historically borne the brunt of the suffering inflicted by European colonialism – that is, Indigenous and Black people. It is heartening to see what a tremendous effect the Standing Rock movement has had, for instance. Particularly heartening for me is that these movements are not just narrowly political; they also advocate different ways of thinking about humanity's relationship to the Earth. They envision the non-human world as being filled with vitality and agency. There is, I think, increasingly a recognition that the mechanistic philosophies that reigned in the West during the centuries of colonization are really nothing other than ideologies of conquest.

The Nutmeg's Curse reminds me of the economist Joan Martinez Allier's book *The Environmentalism of the Poor*, in which he shows how in the Global South, social conflicts often come with environmental conflicts, and that social and environmental justice are intertwined. Is reducing inequality a key priority to address the climate crisis?

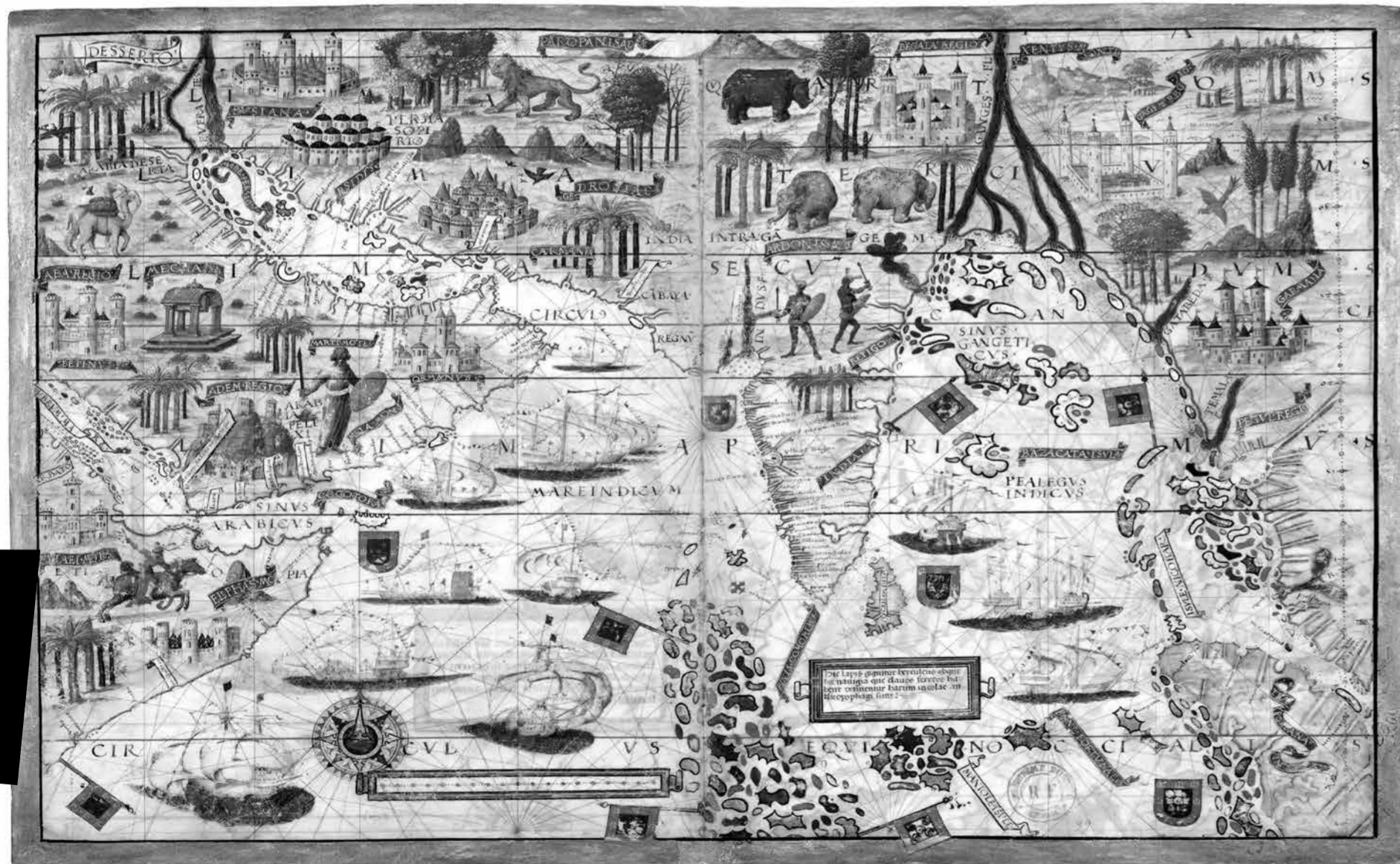
Reducing inequality is not just a priority, it's the cornerstone of addressing the climate crisis. As you point out, Joan Martinez Allier brilliantly illuminates this connection in *The Environmentalism of the Poor*. The truth is, the brunt of the climate crisis isn't borne equally. The wealthy, who've profited most from the very systems causing ecological devastation, often escape the worst consequences. Meanwhile, the most vulnerable – indigenous communities, subsistence farmers in the Global South – face the very real threat of displacement, food insecurity, and rising sea levels.

This isn't simply a matter of geography. It's about power. Inequality creates a system where the wealthy have a stranglehold on resources and decision-making. They exploit environments with impunity, leaving the poorest to grapple with the fallout. Think of it like a house built on a crumbling foundation. The cracks might first appear in the most neglected rooms, but eventually, the whole structure weakens. Environmental degradation and social injustice are not separate issues; they're two sides of the same coin. When those most affected by environmental destruction fight back, they're not just fighting for clean water or fertile land. They're fighting for a more just and equitable world. The Chipko movement in India, where villagers hugged trees to prevent deforestation, is a powerful example.

These are the voices we need to amplify. Reducing inequality doesn't just mean evening the economic playing field. It means recognizing the inherent value of those who've been marginalized – the knowledge systems of indigenous communities, the sustainable practices of small-scale farmers. We need a fundamental shift in perspective, a move away from the exploitative, extractive model of development that has gotten us here.

So, yes, reducing inequality is absolutely key. It's about building a more resilient world, one where everyone has a stake in its well-being. It's about recognizing the interconnectedness of all things, and understanding that a future ravaged by climate change will leave no one unscathed. The fight for climate justice is, at its core, a fight for a more equitable world.

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The Miller Atlas was created in 1519 for the Portuguese King Manuel, the same year that Ferdinand Magellan and his Armada de Moluccas set off on their voyage around the world. These were the first maps to depict the Spice Routes. The atlas is the joint work of cartographers Pedro and Jorge Reinel, Lopo Homem and the miniaturist António de Holanda. It was acquired by the Bibliothèque nationale de France in 1897 by the librarian Emmanuel Miller, and has been named after him ever since.

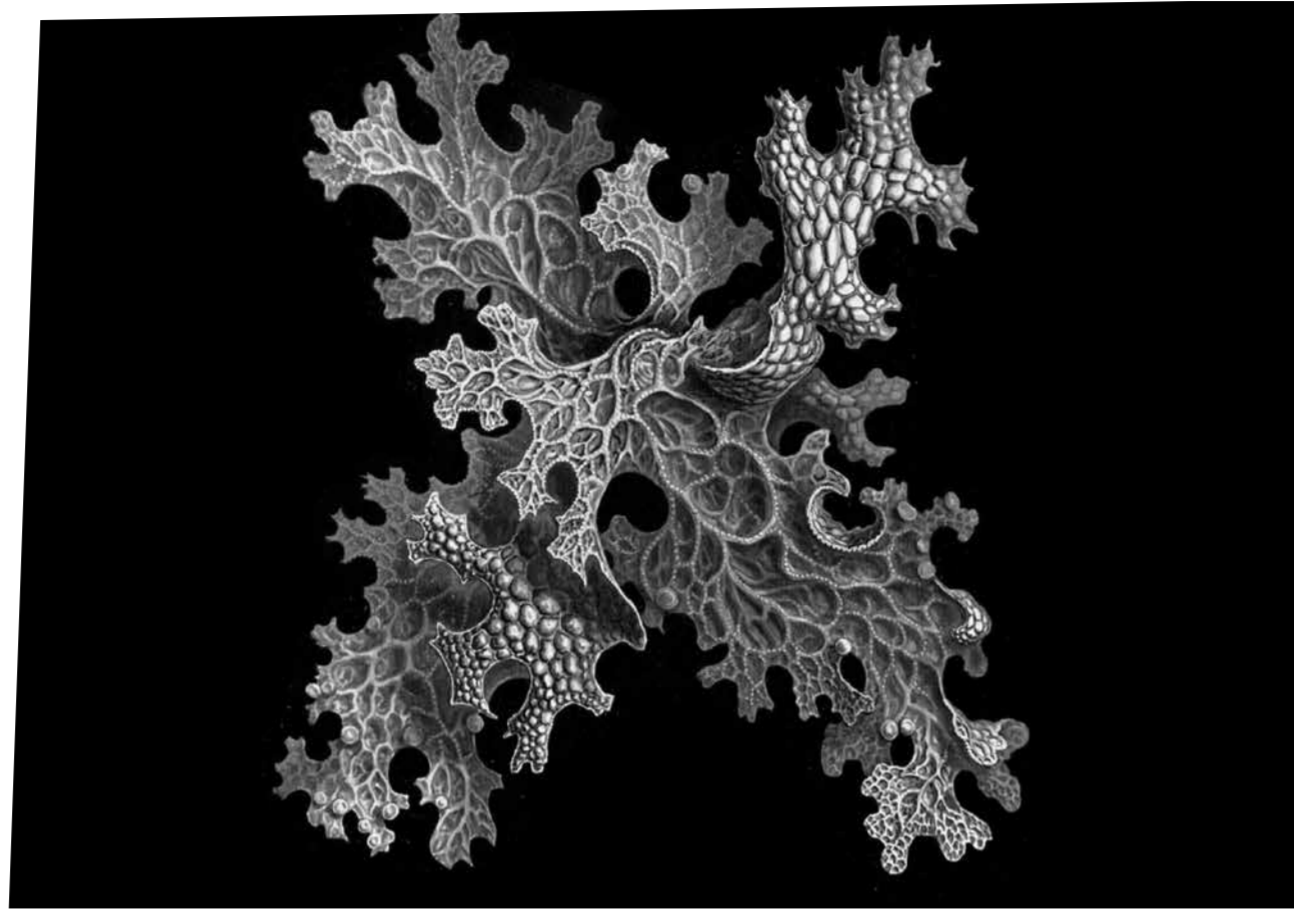
The Politics of Symbiosis

EWEN CHARDRONNET

Under Carl von Linné and up until the 19th century, certain so-called lower animal species were still placed in a special category called “zoophytes” (etymologically, animal-plants). In his 1802 classification, Gottfried Treviranus distinguished two classes: the *Zoophyta* class, including corals, jellyfish, sea anemones, hydras, sea urchins and starfish; and the *Phytozoa* class for “plant-animals”, including fungi, lichens, moss, ferns and water plants, filamentous algae and fucus, and so on. Things gradually evolved in the 19th century. Christian Ehrenberg coined the word bacterium in 1838¹, examined euglena, diatoms, radiolarians and identified corals. Henri Lacaze-Duthiers studied corals in Algeria and published a “natural history” of them in 1864². In 1865, Addison Verrill created the phylum of cnidarians (corals, anemones, jellyfish, etc). In 1866, Ernst Haeckel proposed the kingdom of protists to categorize unclassifiable species with both animal and plant characteristics.

The description of these species already hinted at animal-plant symbiotic relationships, but it was the study of the dual fungus-algae nature of lichen³ that really opened up new perspectives and established the vocabulary⁴. Several biologists went on to describe lichen: Heinrich Anton de Bary from the University of Halle in Germany, the Swiss Simon Schwendener⁵, and the Russians Andrei Famintsyn and Ósip Baranetsky, who in 1867 succeeded in cultivating algae outside the thallus, or body, of the lichen⁶. But the relationship was initially understood in terms of parasitism, notably for Schwendener, for whom the fungus was a parasite of the algae and the lichen association “a community between a master fungus and a colony of slave algae that the fungus holds in perpetual captivity, in order to provide it with food”⁷. The notion was challenged, however, by De Bary, Famintsyn and Baranetsky, as well as by the Belgian zoologist Pierre-Joseph van Beneden, who in 1875 referred to other interspecific relationships as “commensalism” and “mutualism”: “The commensal does not live at the expense of its host in the sense that this dependence would create an unfavorable situation for the host, a diminution of its life, but it depends on it all the same to keep itself alive.”⁸ The commensal “is received at his neighbor’s table”⁹.

In 1877, Karl Möbius published in Berlin *Die Austern und die Austernwirtschaft* (the oyster and its industry), in which he introduced the term “biocenosis” in order to “account for all species living in the same environment”¹⁰. That same year, Albert-Bernhardt



Kunstformen der Natur (1904), plate 83: Lichenes - Ernst Haeckel

Frank, another lichen specialist from the University of Leipzig, proposed the word “symbiotismus” to move away from analysis centered on parasitism, which carried an anthropocentric bias: “Wherever there is a common internal or external habitat between two separate species, we need a broader term; whatever role the two partners play, we still don’t take it into account. In any case, we will base our observation on them simply ‘living together’, and this is why we can recommend designating these cases under the term *symbiotismus*.”¹¹ Finally in 1878, following Franck and in a now-famous presentation, De Bary proposed the general word “symbiosis” to describe different organisms living together¹². As epistemologist Olivier Perru points out, “in defining symbiosis, the aim is neither to privilege mutualism nor to emphasize antagonism. Furthermore, unity aims for a common economy, which does not necessarily mean mutual benefit”¹³.

Consociation

It’s interesting to note that the use of the term symbiotic in the organization of social relations predates its use in the field of biology. Indeed, as Frédéric Lordon remarked in 2015 in his *Imperium, Structures et affects des corps politiques*¹⁴, “symbiotic” appears as early as the 17th century in the work of jurist and political philosopher Johannes Althusius. As Lordon points out, Althusius is often mentioned as a precursor of confederalism or libertarian anarchism. In his *Politica me-*

thodice digesta et exemplis sacris et profanis illustrata, published in 1603, this Calvinist trained in civil and ecclesiastical law in Basel considers that “before being subjects of any sovereign, individuals are ‘symbiotes’”. Lordon stresses that “it is the immanence of their common life that must be the starting point of all political thought,” referring us to works written a decade ago by Gaëlle Demelemestre, which helped disseminate Althusius’s thoughts in France¹⁵. In the first paragraph of his *Politica*, Althusius writes: “Politics is the art of establishing, cultivating and preserving among men the social life that must unite them. This is called symbiotics. The subject of politics is thus consociation¹⁶, by intentional or tacit pact, by which symbionts reciprocally bind each other to the mutual communication of things that are useful and necessary for participating in social life. The objective of the symbiotic policy developed by mankind is sacred, just, appropriate and happy symbiosis, ensuring that nothing necessarily or useful to life is missing.”¹⁷

Note that Althusius’s *Politica methodice digesta* was published 40 years before British philosopher Thomas Hobbes’s *De Cive* (On the Citizen), which introduces the notion of *bellum omnium contra omnes* (war of all against all), based on the age-old motto of homo homini lupus, man is a wolf to man¹⁸. So it seems that it was Hobbes’s image of man as inherently violent in his natural state, an individualist with an insatiable desire for power, that endured right up to the 19th century. This image informed

the poet Lord Tennyson’s “nature red in tooth and claw”¹⁹, as well as Herbert Spencer’s²⁰ and Charles Darwin’s “survival of the fittest”. Hobbes repeatedly proclaimed that he was the first to establish – with Leviathan in particular – an authentic and scientifically founded doctrine of human affairs, the first to make a science of morality and politics. We prefer Althusius, who before Hobbes described the human being as a “civil animal ardently aspiring to association”. For Althusius, symbiosis (living together) implies more than mere common existence; it “indicates a quality of mutual sharing and communication”²¹ without which society is not possible.

From symbiosis to mutual aid

The expression “survival of the fittest” was first introduced by Herbert Spencer in his *Principles of Biology* published in 1864, five years after Darwin’s *Origin of Species*. A rare best-selling author of his time, Spencer significantly contributed to developing a social Darwinism that paved the way for scientific racism. This reading of Darwinism had already been roundly mocked by Karl Marx and Friedrich Engels. But in the late 1870s, when symbiosis theories were emerging, anarchist authors were keen to nurture a perspective of mutual aid between living beings to counter the conservative appropriation of Darwin’s theses. Such was the case of Elisée Reclus in Geneva, with his article “Evolution and Revolution” in Piotr Kropotkin’s journal *Le Révolté* in 1880, and of Emile Gautier with his pamphlet *Social Darwinism*²², published in Paris the same year. For Gautier, the permanent “struggle for life” implied by the “law of natural selection” becomes less intense as social institutions develop. Mutual assistance and social solidarity are the motors of human progress, and constitute the true content of “social Darwinism”, much more than the struggle and victory of the “fittest”. In 1883, Gautier was sentenced to five years of prison alongside Kropotkin and others in the famous trial of the 66 anarchists in Lyon.

After being released from prison in 1886, Kropotkin went to Edinburgh to meet the biologist and urban planner Patrick Geddes – a close associate of Reclus and specialized in marine animal-algae symbioses, Roscoff worms, anemones and sea hydras, which he had studied under Lacaze-Duthiers. Geddes believed that natural selection was not the primary force of evolution, the result of survival of the fittest, but rather a brake on evolutionary tendencies, the pruning tool that enabled a better development of the plant or organism; he considered cooperation to be more important for the evolution of all life forms and saw the Earth as a cooperative planet²³. Geddes inspired Kropotkin to write “Mutual aid among animals”, the first in a series of articles originally published between 1890 and 1896 in the British periodical *The Nineteenth Century*,

exploring the role of cooperation and mutual aid in the animal kingdom and in human societies past and present²⁴. In it, Kropotkin shows – in Darwin’s own playing field – that mutual aid has pragmatic advantages for the survival of human and animal communities, and that it has been favored by natural selection in the same way as consciousness.

In Russia, Famintsyn worked tirelessly to describe the acquisition of symbionts by the host and to demonstrate the new (advantageous) characteristics that this acquisition conferred on the host from an evolutionary point of view. In probing the various connections between symbiotic theory and Darwinist theory, his first objective was to identify the real causes of change from one species to another, in interaction with the environment. Indeed, while Darwin was the first to base evolution on the postulate of the struggle for life, he was also the first to give a scientific account of the development of harmony between living beings and the natural environment. For Famintsyn, due to both the efficient nature of natural selection (of the fittest individuals) and the variation of the fittest (in the case of symbiosis), it is not possible to consider evolution in terms of finalism. Famintsyn locates the unification of living things in the interaction and complementarity of elementary forms. His re-reading of Darwin led him to emphasize the driving role of mutualistic and symbiotic interactions as sources of innovations that selection will retain throughout the course of evolution²⁵.



Stencil of Lynn Margulis. With her endosymbiotic theory of evolution, Margulis opposed competition-oriented views of evolution, stressing the importance of symbiotic or cooperative relationships between species.

(1) Christian Gottfried Ehrenberg, *Die Infusionsthierchen als vollkommene Organismen*, Verlag L. Loss, Leipzig, 1838, p. 75.

(2) Henri Lacaze-Duthiers, *Histoire naturelle du corail*, Baillière et fils, Académie impériale de médecine, 1864.

(3) Heinrich Anton de Bary, *Morphologie und Physiologie der Pilze, Flechten und Myxomyceten* (Morphology and physiology of fungi, lichens and myxomycetes), Verlag W. Engelmann, Leipzig, 1866.

(4) Olivier Perru, “Aux origines des recherches sur la symbiose vers 1868-1883”, *Revue d’histoire des sciences*, 2006/1 (Tome 59), p. 5-27. Olivier Perru is the author of *De la société à la symbiose. Une histoire des découvertes sur les associations chez les êtres vivants* published by the Interdisciplinary Institute of Epistemological Studies (2003 and 2007).

(5) Simon Schwendener, *Untersuchungen über den Flechtenthallus, Beiträge zur wissenschaftliche Botanik*, VI (1868), 195-207 & *Die Algentypen der Flechten Gonidien*, Programm für die Rektorsfeier der Universität Basel, IV (1869), 1-42. ; Perru, op. cit. in n.4.

(6) Dans Liya Nikolaïevna Khakhina, *Concepts of symbiogenesis* (Yale : Yale Univ. Press, 1992) ; Perru, op. cit. in n.4.

(7) Margalith Galun, *Lichen research : An overview with somemphases*, in *Endocytobiology IV* (Paris :inra,1990), 161-168 ; Perru, op. cit. in n.4.

(8) Perru, op. cit. in n.4.

(9) Pierre-Joseph Van Beneden, *Les Commensaux et les parasites dans le règne animal*, 2nde éd. (Paris : Baillière, 1878 ; Ire éd., 1875) ; Perru, op. cit. in n.4.

(10) Jean-Marc Drouin, *L’Écologie et son histoire* (Paris: Flammarion, 1991), 87 ; Perru, op. cit. in n.4.

(11) Albert-Bernhardt Frank, “Über die biologischen Verhältnisse des Thallus einiger Krustenflechten” (On the biological conditions of the thallus of some crustaceous lichens), *Beiträge zur Biologie der Pflanzen*, II (1877), 123-200. Frank is also credited with the term *mycorrhiza* in 1885.

(12) “Die Erscheinung der Symbiose”, published in French as “De la symbiose”, *Revue internationale des sciences*, Paris, O. Doin, (1878-1879) , pp. 301-309.

(13) Perru, op. cit. in n.4.

(14) Frédéric Lordon, *Imperium, Structures et affects des corps politiques*, La Fabrique, 2015.

(15) See Gaëlle Demelemestre, *Les Deux Souverainetés et leur destin. Le tournant Bodin-Althusius*, Éditions du Cerf, 2011; and *Introduction à la “Politica methodice digesta” de Johannes Althusius*, Éditions du Cerf, 2012. Cité par Lordon, n.15.

(16) Consociationalism or democracy of concordance of governance is studied since the 1960s in countries such as Switzerland, Belgium and Lebanon.

(17) Gaëlle Demelemestre, op. cit., p. 51, *Politica* 1, paragraph 1.

(18) Its first known occurrence is in *La Comédie des ânes* by Plautus in 3 B.C.

(19) The expression comes from the “Dinosaur cantos” or “dinosaur sections” of Alfred Lord Tennyson’s *In Memoriam A. H. H.* (1850).

(20) Herbert Spencer, *Principles of Biology*, 1864, vol. 1, p. 444.

(21) Althusius, *Politica*, 1.3, 1.6 and Althusius, *Politica*, 3.33. Cited by Nico Vorster, “Symbiotic Anthropology and Politics in a Postmodern Age: Rethinking the Political Philosophy of Johannes Althusius (1557-1638)”, North-West University, South Africa, *Renaissance and Reformation* 38.2, spring 2015, p.27.

(22) Emile Gautier, *Le Darwinisme social*, Derveaux, Paris, 1880.

(23) Helen Meller, Patrick Geddes, *Social Evolutionist and City Planner*, Routledge, 1990, p.27.

(24) Piotr Kropotkine, *Mutual Aid: A Factor of Evolution*, London, 1902.

(25) Perru, op. cit. in n.4., p.24 In general, this text owes a lot to Olivier Perru’s work.

Feral Living through Poetic Immersion in the Satoyama

LEILA CHAKROUN

It's 6:30 a.m. A Japanese voice crackles out of the loudspeakers, intermingling with the morning songs of cicadas and bush warblers, and with the metal clang of pots and pans in the kitchen. Sunlight warms the walls of the house, which had remained cool all night, thanks to an informed choice of materials: raw earth, bales of straw and charred wood. A dense forest of Japanese cypress (*hinoki*) invaded by bamboo surrounds the dwellings, leaving part of the rooms in shade.

The smell of curry announces the start of breakfast. The small community, a sort of chosen family, sits down and chants a little prayer addressed to the Earth and earthly creatures, human and non-human, who together have made possible this savory blend of flavors and textures, being present here this morning, allowing our bodies to remain in motion. Almost everything is produced on site: vegetables, rice and spices (coriander, ginger, turmeric). Rapeseed oil and cheese were exchanged with a neighboring farm, located further down the valley, not far from a former metropolis, now depopulated.

Each person speaks in turn, sketching out the plan for the day little by little. There is no fixed leader here, as we experiment with horizontal governance and fluid work management by temporary leaders. Today is the day we harvest the rice. In addition to planning the different stages, equipment and storage, we also need to organize our work to include the people from a neighboring village who will come to lend a helping hand. We experience this seasonal repetition of common gestures as a celebration of a way of life that is still possible, despite everything. Despite the demographic decline, where some houses no longer light up after nightfall. Despite the exhaustion from working on steep terrain and during increasingly frequent heatwaves, even in early autumn. Despite the large population of monkeys, wild boars and deer, with whom farmers must share the harvest, whether they like it or not. Despite the soil, which, even after being cultivated for decades using natural farming practices, still retains traces of toxic clouds and excessive chemical fertilizers. But each morning, the rural soundscape reminds us that it's possible to resist and survive the cacophonous frenzy of the big cities. If rurality persists, it will surely be through perpetuated and reinvented "musical scores" of gestures¹.



Musical scores of common gestures and multispecies landscapes

These multi-sensory and multi-species scores are at the heart of the Japanese philosophy of satoyama. The now-ecological term "satoyama" originally designated mixed landscapes, composed of small mountain village communities and the adjacent forest that they cultivated for subsistence. The Japanese concept 里山 is composed of the kanji 山 *yama* (mountain), and 里 *sato* (village). The play on words dates back to the 18th century Edo period, when the kanji for 山里 *yamazato* (mountain village) were inverted.

Satoyama literally designates the mountain of the village, or perhaps more poetically, "the village mountain" – thus reversing the proprietary logic by subsuming the human settlement to the ecosystem that hosts it. It's a forested mountain that lives through and with "its" humans. In a progressive semantic shift, satoyama now designates forested farmlands on the outskirts of villages in the mountains or countryside. The concept wasn't a part of common Japanese vocabulary until the early 1960s, when it was proposed by Shidei Tsunahide, a forestry ecologist who wanted to give a name to these landscapes that he saw "silently" disappearing.

Satoyama landscapes have been deeply affected by the social, territorial and economic dynamics that followed Japan's modernization – beginning with the Meiji restoration in 1861, then even more dramatically after World War II. The nation became largely urban, structured around metropolises, to the point

that today, 92% of Japan's population of 126 million lives in cities (2024). With fewer people living in rural areas, there are also fewer farmers – only 2% of the working population is involved in agricultural production. This net loss of the workforce and of the community ties that once maintained satoyama is exacerbated by the lack of renewal and subsequent aging population of rural regions.

The disintegration of satoyama highlights a particular understanding of agrarian and agroforestry landscapes, which diverges from the patrimonial and backward-looking vision that has underlain discourses on environmental protection. It is indeed the collapse of community dynamics and the absence of human residents that has accelerated the demise of these landscapes and many of the non-human creatures that populated them. Satoyama have become the symbol of a possible coexistence between humans and non-humans, in Japan and internationally², the living proof of a terrestrial future that does not exclude humanity, but rather carries it through an ethos and praxis of care. Several studies have identified the biocenosis that constitutes the satoyama, i.e., the multi-species agroforestry community, which includes 350 species of trees and plants living in forests, rivers and fields, fungi such as the (too) much-loved matsutake, fish, frogs, ducks and herons, as well as small rodents and their predators (hawks, sparrowhawks)³.

Today, satoyama stand to benefit not only from their traditional countryside esthetics – dense forest, village hamlet, terraced rice paddies – but as physical and territorialized manifestations of what some have called the "bioregional hypothesis"⁴. Etymologically, the bioregion refers to a "territo-

ry of life" – not only the place that we occupy during our lives, but a place that hosts various forms of life and interactions among them.

These manifestations are buried in the interstices of territories, whose liminality allows room for experimentation and divergence. Satoyama can be seen as these interstices in a number of ways: they are located on the edges, far from major urban centers, intermingle the essences of plant and animal, forest and farm, thus blurring the boundaries between wild, cultivated and inhabited spaces. The abandonment of these landscapes and the lack of human intervention have only reinforced the fluidity of these boundaries. Currently in the process of being de-domesticated and re-wilded, satoyama have become living examples of feral life, which we must urgently learn to inhabit⁵. They teach us that, in the face of extractivism and desertification, becoming feral is the best thing that can happen to us, if not the only possible condition for our humanity. It is precisely because these socio-agro-ecosystemic dynamics are partially "liberated" from industrial farming practices and culturally dominant esthetic standards, that they support budding precious liminal spaces to imagine, collectively and corporeally, novel lifestyles and renewed connections with ourselves and with others, human and non-human.

Becoming feral opens, even forces, new possibilities. As daily gestures are performed in a multi-species community⁶, new landscapes emerge, and with them existential and political nourishment to subsist and resist within the en-



tanglements and sympoieses of the Chthulucene⁷. In the shadows of these depopulated countrysides, we can see the light of other cosmologies.

Toward a neo-peasant, agroecological, bioregional and multispecies future

In Japan, satoyama have spearheaded a form of sustainability that embraces human existence, along with the landscapes that accompany it and give it meaning. Considering the plethora of actors, permaculture and natural agriculture movements are among the few to venture beyond the discourse of coexistence to truly experiment with possible ways of inhabiting these landscapes – by allowing themselves to transform them, and perhaps taint some of their romanticized clichés.

In addition to re-inhabiting the spaces, these actors rehabilitate them through public events. In 2019, Permaculture Center Pamimomi and Satoken Association organized a public meeting under the slogan "Satoyama Repair" to discuss potential methods for repairing and caring for satoyama using permaculture design and natural farming techniques. Among the proposed social and ecological innovations was a workshop given by Pamimomi on their rice fields. The paddies are entirely cultivated – or precisely "not cultivated" (耕さない田んぼ *tagayasanai tanbo*) – according to Fukuoka Masanobu's principles of non-action: the soil is not turned over or limed dry, no fertilizers or chemicals are applied, the rice grains come from the previous year's harvests, transplanting is done by hand, submersion of the rice fields is limited in time to encourage tillering, harvesting is done

collectively and with a sickle, bunches are tied with straw and dried on structures made of local bamboo, then the grains are separated from the ears of rice using a pedal threshing machine (千把扱き *senbokoki*), activated by continuous foot movement. Through these gestures, which resonate with both tradition and new ecological demands, it becomes possible to "repair" the satoyama. This is less about returning it to a previous state than a novel experiment in neo-peasant, multi-species and agro-ecological subsistence.

If only the nurturing, landscape-based philosophy of the satoyama could infuse our imaginations and narratives, it could set in motion the impetus for a neo-peasant future. Instead of patrimonializing and replicating traditional Japanese agrarian landscapes, we could irrigate contemporary agro-ecological gestures and landscapes with the past, infra-, intra-, inter- and trans-species convivialities that have enabled earthly creatures, including humans, to subsist until now.

Satoyama teach us what it can mean to "coexist" in the context of imminent collapses and limited resources, while at the same time urging humility and creativity, stratagems and poetry. A haiku written by a woman from the Pamimomi collective sets the tone:

パミモミは (*pamimomi wa*)
世界を変える (*sekai o kaeru*)
秘密其地 (*himitsu kichi*)

Pamimomi is
a secret hideaway
that changes the world

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(1) The idea of using a musical "score" to qualify a succession of gardening gestures is borrowed from Joanne Clavel and Lucile Wittersheim (2023), *Gestes sonores: enquête au cœur de la récolte maraîchère*, Galaad Edizioni, pp.121-134.

(2) As demonstrated by the *International Partnership for Satoyama Initiative* in 2010, which aimed to increase the value of "socio-ecological production landscapes".

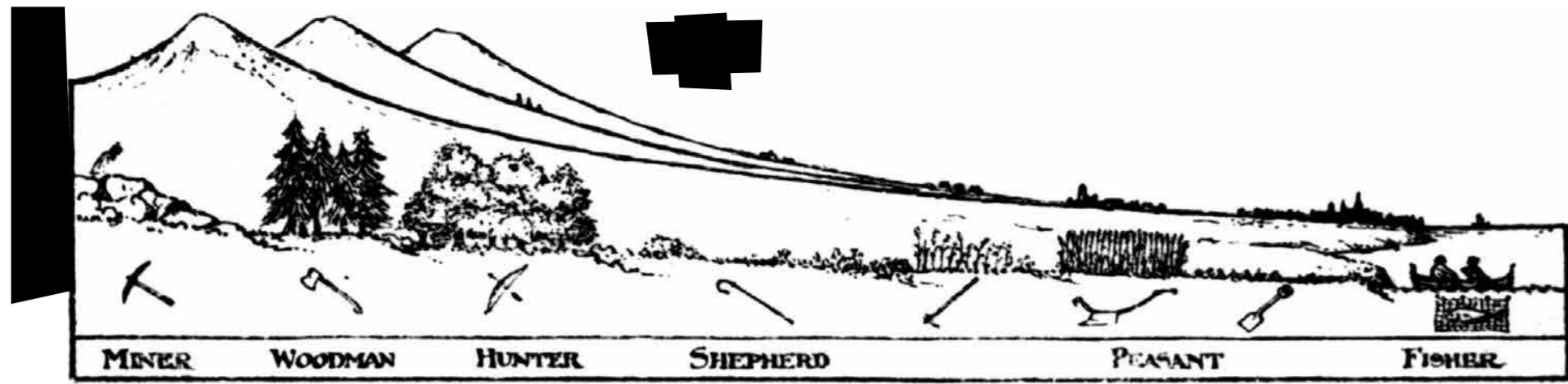
(3) Kuramoto N, Sonoda Y. 2003. "Biological diversity in satoyama landscapes". In: Takeuchi K, Brown RD, Washitani I, Tsunekawa A, Yokohari M, editors. *Satoyama: the traditional rural landscape of Japan*. Tokyo: Springer-Verlag ; p. 81-109

(4) Mathias Rollot, (2018), *Les territoires du vivant: un manifeste bioregionaliste*.

(5) Anna L. Tsing, Jennifer Deger, Alder Keleman Saxena and Feifei Zhou, (2021), *Feral Atlas, The More-Than-Human Anthropocene*, Stanford University.

(6) Centemeri, L. (2018). *Commons and the new environmentalism of everyday life. Alternative value practices and multispecies commoning in the permaculture movement*. *Rassegna italiana di Sociologia*, 64(2), 289-313.

(7) Donna Haraway, (2016), *Le Manifeste Chthulucène de Santa Cruz*, La Planète Laboratoire N°5, 2015.



Valley Section, 1909 version

“It takes the whole region to make the city”

EWEN CHARDRONNET

As battles for water converge (the Soulèvements de la Terre ecological resistance network¹, indigenous uprisings against the appropriation of water for lithium extraction in the region of South American salars²), as rivers obtain the status of “legal person” (Whanganui River in New Zealand and Rio Atrato in Colombia in 2017, Magpie in Quebec in 2021), and as official bodies associated with watersheds have since been established (Loire Parliament³, Diplomatic Watershed Council in Geneva⁴), calls to create new spaces for bioregional knowledge are increasing. In this respect, biologist and urbanist Patrick Geddes has attracted new interest as a precursor in educating about the relationships between regions, ecosystems and human societies. He tackles it from a historical perspective that differs from the more recent American school of bioregionalism, which is often criticized for its essentialist misanthropy⁵.

Geddes is also cited in the *Dictionnaire de la pensée écologique* by Dominique Bourg and Alain Papaux, who describe him as one of the pioneers of regional planning and, along with Elisée Reclus and Piotr Kropotkin, someone who has consistently promoted reintroducing the countryside in the heart of cities (through outdoor and indoor gardens)⁶. Geddes's most famous contribution to the city-countryside conflict is the simple diagram of the *Valley Section*, presented for the first time in 1905 at a meeting of the London Sociological Society⁷. The diagram unites city and countryside through the idea of a “regional valley”. The *Valley Section* is a longitudinal section that follows a river from its source in the mountains to where it flows into the sea. For Bourg & Paillot, it’s “an intellectual tool for regional studies, which should take into account the concept of river basins, from the viewpoint of the relationship between environmental and human history, as well as the relationship between the city and its surrounding region”⁸. In

his first study, Geddes writes: “By descending from source to sea we follow the development of civilisation from its simple origins to its complex results; nor can any element of this be omitted. (...) In short, then, it takes the whole region to make the city. As the river carries down contributions from its whole course, so each complex community, as we descend, is modified by its predecessors. The converse is no doubt true also, but commonly in less degree.”⁹ The version of the *Valley Section* published in 1909 combines physical conditions, represented in the drawing by plants, with so-called natural or basic occupations, represented by tools, and social organizations represented by the silhouettes of cities, villages and individual houses. Moreover, in reality the “regional valley” includes several valleys and an agricultural plain that extends from the base of the mountains to the coast. The *Valley Section* shows how the physical conditions of the environment influence plant life and determine human occupations and their societal organization. It helps us understand “how far nature can be shown to have determined man” and “how far the given type of man has reacted, or may yet react, upon his environment.”¹⁰.

Thinking Machines

Geddes's diagram was part of his series of “thinking machines”, a visual method of presenting and correlating facts and ideas in order to facilitate reflection and teaching. In conceiving and deploying the *Valley Section*, he took inspiration from great researchers in biogeography, such as Alexander von Humboldt and Aimé Bonpland. But he was also inspired, perhaps more specifically, by the methodology he learned from Thomas Huxley - under whom he studied biology in the late 1870s - and by the phytogeography research on the relationships between plant species done by his friend Charles Flahault - whom he met during his studies and a residency at the Biological Station in Roscoff, France. Nicknamed Darwin's bulldog, Huxley had little appreciation for Darwinism applied to human societies, as promoted by Herbert Spencer, who used it to justify the social exploitation and oppression of

marginalized classes. He emphasized the importance of science to elucidate social issues, but he opposed using biology to justify inequitable social policies. He therefore taught lucidity to counter excessive simplifications in describing the relationships between organisms and their environment, between biology and physiography, and in revealing the complex factors leading to natural evolution. Two of his most famous manuals, *Elementary Instruction in Practical Biology* (1875) and *Physiography: an Introduction to the Study of Nature* (1877) were published during the time that Geddes was his student. In *Physiography*, he introduces the book by studying a particular region, the Thames watershed. And in the republications near the end of his life, he expanded the theme of watershed beyond the Thames to any river.

Since the years when Geddes and Flahault studied in Roscoff, Flahault had founded the Botanical Institute in Montpellier¹¹ and was studying phytosociology, or plant associations that were cooperative and mutually beneficial, in a way the premises for permaculture¹². By crossing phytogeography and Flahault's phytosociology using Huxley's strict methodology, Geddes's *Valley Section* also falls in line with the hydrographic basin model as developed by Elisée Reclus in his *History of a Stream*¹³. Reclus systematically used the hydrographic basin as a criterion for regional division, most notably in his *Nouvelle Géographie Universelle*. He was one of the first to recognize the intrinsic link between the geographical characteristics of a region and the lifestyles of its inhabitants.

Summer Meetings of Art and Science

Geddes had read extensively and developed a friendship with Elisée Reclus, 25 years his senior. He had hosted him twice in Edinburgh during the Summer Meetings of Art and Science, which he organized with his wife Anna from 1883 to 1899. This summer school, inspired by the Arts & Crafts movement and

John Ruskin, combined educational programs in natural sciences, botanical or vegetable gardening, observing biodiversity, arts and crafts, biology, geography, economics and politics, based on Geddes's own “thinking machines”: “Starting from the familiar idea of working from the concrete to the abstract, from the senses toward the intellect, it is attempted in each subject of study (1) to freshen the student's mind by a wealth of impressions; (2) to introduce him to the advancing literature of the subject; (3) to supply him with the means of summarizing, arranging and more clearly thinking out these accumulations of observation and reading. Hence (1) the insistence on demonstrations, experiment and field excursions; (2) the introduction in several subjects of the seminar, which, with its guidance to the world of books and activity in using them, is so marked a strength of the German university; (3) the extended use of graphic methods.”¹⁴ Geddes sought to mobilize “hand, heart and head”. He was also behind the slogans “learning by doing” and “think global, act local”. Many students, artists, as well as famous theorists and researchers from various countries participated in the Summer Meetings, from the biologist Ernst Haeckel to Piotr Kropotkin.

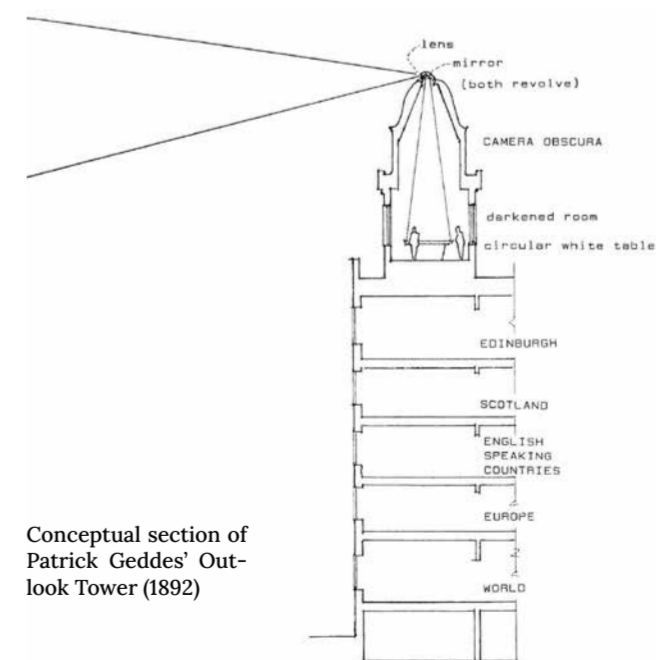
Reclus came to the Summer Meetings in 1893 and in 1895. It was in this context that he published “The Evolution of Cities” in *The Contemporary Review*¹⁵. The article advocated reconciling constantly expanding cities, which were “engulfing year by year fresh colonies of immigrants, and running out their suckers, like giant octopuses, into the surrounding country”, with the countrymen, which could come to cities to amuse and educate themselves. He concludes: “Thus this type of the ancient town, sharply outlined by walls and fosses, tends more and more to disappear. While the countryman becomes more and more a citizen in thought and mode of life, the citizen turns his face to the country and aspires to be a countryman. By virtue of its very growth, the modern town loses its isolated existence and tends to merge itself with other towns, and to recover the original relation that united the rising market-place with the country from which it sprang. Man must have the double advantage of access to the delights of the town, with its solidarity of thought and interest, its opportunities of study and the pursuit of art, and, with this, the liberty that lives in the liberty of nature and finds scope in the range of her ample horizon.”

For Geddes, every “town arises and renews itself from country; and this not only in blood and in temperament but in tendencies, aptitudes, activities, in qualities and defects; in short in character, individual and social.”¹⁶ Thus, he defines the idea that both conurbation and the constantly expanding city emerge from the countryside and return to it as the highest expression of the country's inherent possibilities. He gives a lot of importance to artisa-

nal occupations, inspired in particular by the notion of mutual aid advanced by Kropotkin, who saw medieval Europe as the best example of human cooperative society, culminating in the medieval city structured around occupational guilds. Geddes had hosted Kropotkin in Edinburgh in 1886, just after he was released from three years of prison in Lyon. In *Fields, Factories and Workshops* published in London in 1898, Kropotkin imagined the future city-countryside relationship made up of decentralized units - either in “the factory in the middle of the fields” or in industrial villages. He projected that new, small power plants could make his decentralized, self-determined mode of production possible, even in existing large industrial cities.

Bioregional Learning Centers

In conclusion, we are reminded that in order to study the “city region”, it was necessary for Geddes to begin with an associated Regional Survey; hence, establishing stable and permanent learning centers was essential. Such was his intention in founding his Outlook Tower museum-school in Edinburgh, as well as his Collège des Ecosais in Montpellier: “Hence Education, if real, begins with a Regional Survey, as action with a regional usefulness. Hence such a regional type-museum and school of reference has to be not only geographic, but geotechnical. In the very difficulties of coping with the vast and perplexing division of labour, alike in science and in practical life, it finds its necessity and its justification as at least an attempted clearing-house of education, in which all specialists may again meet.”¹⁷ These same ideas can be found in the principle of Bioregional Learning Centers proposed in 1982 by Donella Meadows, principal author of *The Limits to Growth* for the Club de Rome in 1972, which were later developed: “Out of that combination came a vision of a number of centers where information and models about resources and the environment are housed. There would need to be many of these centers, all over the world, each one responsible for a



Conceptual section of Patrick Geddes' Outlook Tower (1892)

discrete bioregion. They would contain people with excellent minds and tools, but they would not be walled off, as scientific centers so often are, either from the lives of ordinary people or

from the realities of political processes. The people in these centers would be at home with farmers, miners, planners, and heads of state and they would be able both to listen to and talk to all of them. The job of these centers is basically to enhance that capacity... to solve problems in ways that are consistent with the culture and the environment. The centers collect, make sense of, and disseminate information about the resources of their bioregions, and about the welfare of the people and of the ecosystems. They are partly data repositories, partly publishing and broadcasting and teaching centers, partly experiment stations and extension agents. They know about the latest technologies, and the traditional ones, and about which ones work best under what conditions. They are able, insofar as the state of knowledge permits, to see things whole, to look at long-term consequences, and to tell the truth. They are also able to perceive and admit freely where the boundaries of the state of knowledge are and what is not known.”¹⁸

- (1) <https://lessoulevementsdelaterre.org>
- (2) Alfarcito Gathering, January 14-15, 2023, in San Francisco del Alfarcito, Jujuy, Argentina: <https://aerocene.org/salinas-grandes-eng>
- (3) <https://www.parlementdeloire.org>
- (4) David gé Bartoli, Sophie Gosselin, Marin Schaffner and Stefan Kristensen, “Pour un Conseil Diplomatique des Bassins Versants”, on *Terrestres.org*, April 12, 2024.
- (5) Antoine Dubiau, “Faire l'histoire intellectuelle du biorégionalisme”, 28 février 2022, *métropolitiques.eu*. Antoine Dubiau is the author of *Écofascismes* published by Grevis (2023).
- (6) Lewis Mumford referenced and further extended the research initiated by Patrick Geddes in *La Cité à travers l'Histoire* (1961).
- (7) P.Geddes (1905), “Civics: as applied sociology”, Part I, *Sociological papers*, (ed.) V.V.Branford London: Macmillan, pp. 105-6.
- (8) Dominique Bourg and Alain Papaux, under “Patrick Geddes (1854-1932)” in *Dictionnaire de la pensée écologique*, PUF, 2015, pp. 462-464.
- (9) *Ibid.* note 7.
- (10) Patrick Geddes, “The Influence of Geographical Conditions on Social Development”, *Geographical Journal* 12 (1898), p. 581. Cited in Volker M. Welter, *Biopolis*, MIT Press, 2002, p.62.
- (11) Geddes settled in Montpellier in 1924, where he founded the Collège des Ecosais and lived the rest of his life.
- (12) The notion of “permanent agriculture” appears around the same time, in 1910, in Cyril G. Hopkins's *Soil Fertility and Permanent Agriculture*.
- (13) Elisée Reclus, *Histoire d'une montagne. Histoire d'un ruisseau*, Libertalia, 2023.
- (14) Cited in Helen Meller, Patrick Geddes, *Social Evolutionist and City Planner*, Routledge, 1990, p.67.
- (15) Elisée Reclus, “The Evolution of Cities”, *The Contemporary Review*, v. 67, January-June 1895, Isbister and Company Ltd.
- (16) Patrick Geddes, *City Surveys for Town Planning* (Edinburgh and Chelsea: Geddes and Colleagues, 1911). Cited in *Biopolis*, p. 75
- (17) *Ibid.* note 10.
- (18) Bioregional Essays: Bioregional Centres - Donella Meadows' Vision for Deep Local Change. Statement to the Belaton Group, 1982.

For \mathbb{E} growth

A growth that tends to produce more energy-matter¹ than it consumes

RICHARD LOIRET

A good government must be based, as Phyllozoism emphasized in its time, on the recognized utility, managed as such, of the humus (an energy-matter complex) accumulated in fertile soils, the true engine of the economic machine. But, as Marx will observe, throughout the industrial revolution, the liberal classes would instead engage in the "plunder" of this humus, the secret of their primitive capital accumulation. And their unquenchable thirst continues to this day, through the ever-increasing extraction of new, ever more productive energies, drawn more widely and deeply from the Earth (fossil fuels, ...), in ever greater quantities, to power ever more machines². But the corollary was inevitable: the more these energy stocks transformed into capital, the more the carbon it contains dissipates into CO₂, giving us this curious and all too real "chemiconomic" equation: Carbon = Capital + CO₂

Of course, we would be tempted to simply reverse the terms of the equation³, to see the emergence of a form of economy in which we would accumulate "carbon-energy"⁴ by recycling both CO₂ and capital. This, as suggested by this model of non-punitive ecology, an Eco-tax "allocated" to CO₂ recycling⁵, which, among other virtues, financed organic agriculture. But this alternative to growth, while initiating the concept of "Carbon balance," collided head-on with the logic of the system and ignored the question of Life, which itself encounters, as we will see later, a conceptual and radical barrier.

\mathbb{E} growth aims to address this question. This term, because its prefix "œ" refers us to œconomia, the

Greek economy of the ecumene (οἰκουμένη)⁶, from a time when the City was not separated from the Oikos by a radical political barrier, which transformed it into chrematistics, the monetary economy at the origin of capitalism. In French, the two short words, "œuf" and "œil" (egg and eye) stem from it, not to mention "œuvre" (work), and potentially "cœur" (heart). So this prefix also refers to the notions of organic sphere, gestation, inner growth, and the full expression of life. It is finally found in the French term "œcuménisme", (ecumenism) which directs us toward a common action engaged by various currents of thought, despite their doctrinal differences. Furthermore, as it is pronounced "eu", this prefix is also full of promises. It comes from the Greek "eú" which means good, well, true, and is represented by the letter "ø" (phi, the golden ratio). In common language, we have eukaryote (true nucleus), euphony (related to harmony), eutrophy (good nutrition), euphoria (of the well-being), etc., although eugenics, which aims to improve human existence, may lend itself to interpretations. Thus, this term can be written indifferently as " \mathbb{E} growth" or "Eugrowth"⁷.

Simply defined, and for any territory of determined perimeter where there exists a comparable relationship between the production and consumption of carbon-energy (from family property to national economy until the entire Earth), \mathbb{E} growth results from a joint Human-Nature work whose net yield (production minus consumption) under the "Ecological Balance"⁸ of this territory (Ecological Assets minus Ecological Liabilities), tends to become greater than 0.

Conceived in this way, this principle was long applied, at least intuitively, in the local economy of ancient communities' ecumene, such as the cultivated forests of the Amazon (domesticated landscapes), which an increasing number of researchers are studying (William Balée, Clark L. Erickson,...). \mathbb{E} growth would be increasingly applied today in territories adopting organic farming, permaculture, edible forests, etc.

However, \mathbb{E} growth becomes more complex when, beginning with carbon-energy and its well-established measurement, its scope of intervention expands to the question of Life, to biodiversity and the biological processes associated with it. This then becomes what is called "biogeochemical" energy, which raises the question of an entropy of life that is said to be "negative", and opposite to entropy, typically understood as positive. Here, with the "ther-

modynamic" version of the ecological balance⁹, we encounter a notion of "fertility," of ecological regeneration, far more extensive than just the recycling of CO₂. This production-consumption system, from the most local scale to the entire planet, seeks to accumulate, jointly with Nature, and through its overall metabolism, at least as much if not more negative entropy (in the form of energy-matter) than it consumes.

Nevertheless, this concept of growth faces a fundamental barrier in the history of sciences.

An "impossible" energy accumulation

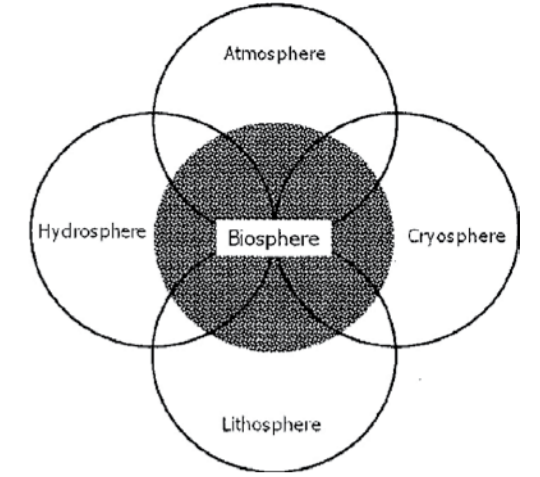
Around 1880, the Ukrainian scientist Sergei Podolinsky's "Theory of Energy Accumulation" drew a lot of attention with its "seminal" concept of synergies from a "joint work" of Man and Nature, and his luminous demonstration of its cumulative surplus effects, based on the translation of agricultural resources into energy (see below).

Engels and Marx greatly appreciated this theory. But more recently, it was challenged by the underlying threat of the "second principle" of thermodynamics, which Arthur Eddington universalized in his "Arrow of Time". Here, he marries Darwin's randomness with Clausius' entropy to translate the irreversibly entropic nature of evolution, adding that: "The law that entropy always increases - the second law of thermodynamics - holds, I believe, the supreme position among the laws of nature. If one discovers that any of your theories are in conflict with the second law of thermodynamics, I can offer you no hope; there is nothing for it but to collapse in deepest humiliation. Such a powerful threat to the intelligentsia, that since then, throughout the physics of the 20th century, it has implicitly assumed that negative entropy does not exist¹⁰." For Marx and Engels, even if it was the implicit assertion that life and all its expressions did not exist, or at best, that they were meaningless and uninteresting in the grand scheme of the universe, and even if Marx had decrypted the secret of capital accumulation, it was feared that the increasing entropy of industrial metabolism would contradict Podolinsky's theory.

Energy accumulation and productivity of joint labor between nature, humans, and machines						
Comparative evolution, between 1870 and 1970, of production and energy productivity in French agriculture	Yield Qtl/ha	kcal/ha			kcal prod. / kcal conso.	
		A - Energy production	(b) Energy surplus compared to natural grassland	(c) Energy consumption (human - animal - machine)	B - Energy productivity	
		(a) Total harvest (hay or grain + straw)			(a)/(c) Total productivity	(b)/(c) Surplus productivity
1870 Source : <i>Theory of energy accumulation, Sergueï Podolinsky (1880)</i>						
1 - Natural grassland	25	6 375 000	0	0	∞	∞
2 - Traditional artificial grassland	31	7 905 000	1 530 000	37 450	211,08	40,85
3 - Traditional wheat cultivation	8	8 100 000	1 725 000	77 500	104,52	22,26
1970 Sources : <i>Leach (1973), Bel et al. (1978), CNEEMA (1979)</i>						
4 - Mechano-chemical artificial grassland	50	12 660 000	6 285 000	2 260 000	5,60	2,78
5 - Mechano-chemical wheat cultivation	50	32 750 000	26 375 000	4 000 000	8,19	6,59
6 - Mechano-biological wheat cultivation	40	26 200 000	19 825 000	1 330 000	19,70	14,91

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Commentary: In 1870, the energy production of a natural area (A1) is enhanced by human and animal labor (A2,3). It is significantly improved by 1970 with the introduction of mechano-chemical methods (A4,5,6). However, only energy productivity (production / consumption) is capable of generating energy accumulation in the biosphere. It is entirely positive for natural areas (B1), and remains very high in 1870 with human and animal labor (B2,3), at the same time that production (A2,3) increased. But by 1970, while energy production has greatly increased, mechano-chemical methods have simultaneously generated more entropy, causing energy productivity to drastically decrease (B4,5), although organic farming has marginally improved it (B6).



(4) Carbon energy refers to the energy contained solely within the organic carbon of wood, crops, fossil fuels, etc. It is now accurately measured in the "carbon balance sheets" proposed by the ADEME.

(5) Loiret, R., Une écotaxe "affectée" au développement durable de l'agriculture et des territoires (Un principe d'écologie non punitive), 1994. <https://hal.science/hal-04488636>

(6) Berque, A. ÉCOUMÈNE. Introduction à l'étude des milieux humains. Ed. Belin, Paris, 1987.

(7) The two novel terms, \mathbb{E} growth and Eugrowth (in their French translation), along with their shared definition, have been trademarked. This is not to prevent you from freely sharing the concept, but primarily to prevent individuals with malicious intent from appropriating and/or misusing, whether knowingly or ignorantly, both their names and their associated definitions and content for their own gain or otherwise. This is a precaution we take due to frequent observations of such occurrences.

(8) Loiret, R. Le Bilan écologique. 2016 (NNT : 2016SACL001) <https://hal.science/tel-01306180>, Doctoral thesis in which all concepts related to \mathbb{E} growth are extensively studied and explained.

(9) In its thermodynamic version, this balance (8) provides us with the Distance to Equilibrium (negentropy minus entropy) of life, which specialists will note that it represents the other possible facet of Clausius balance when, in his 1865 article ("Sur diverses formes facilement applicables qu'on peut donner aux équations fondamentales de la théorie mécanique de la chaleur"), he deduced, in the pure logic of the dominant paradigm of the time, that the entropy (positive) of the universe tends towards a maximum.

(10) This was as big a mistake as Einstein's when, introducing the cosmological constant into his equations of general relativity, he "neglected" a remark in 1918 by Erwin Schrödinger, who considered that this constant implied the existence of negative pressure contrary to gravity, and that therefore an "additional component" had to be added to the content of the universe. Einstein had missed the expansion of the universe (Françoise Combes, Collège de France, La constante cosmologique : la plus grande erreur d'Einstein). Schrödinger later added another layer to this remark in "What is Life?", where he extensively discusses negentropy, this "component" of the universe, and at least of Earth, which was "neglected" by Arthur Eddington. Moreover, would this component, seen from a different angle, be of the same nature as the first?

(11) Georgescu-Roegen, N. La décroissance. Entropie-Écologie-Economie. 1979. Electronic edition.

(12) Wackernagel, M. Thesis. Ecological Footprint and Appropriated Carrying Capacity: A tool for planning toward sustainability. The University of British Columbia, 1994.

(13) Loiret, R., La Biosphère selon Vernadsky. Contradiction du principe de Carnot. 2012: <https://hal.science/hal-00911684>

(14) While the concepts of Biosphere and Ecosphere are often confused, their semantic distinction (see (13)), which notably distinguishes carbon energy from the energy of life, proves fundamental for the proper functional understanding of planetary ecology.

Which indeed proved to be the case in the 20th century (see above).

As they couldn't measure this entropy, and moreover considered that there was no bridge between use and exchange values, Engels and Marx feared collapsing, as Eddington would say, "in deepest humiliation," and rejected this theory, sending Podolinsky back to his origins. This same principle has since influenced all ideas about alternatives to growth. Examples include Nicholas Georgescu Roegen (The Entropy Law and the Economic Process, 1971) with "Degrowth"¹¹, as well as its radical counterpart, which could be called "Overgrowth" because it seeks to push the dissipative expression of the economy to the apex of its "cosmic" direction (Raine, Foster, and Potts, The new entropy law and the economic process, 2007). To the extent that Ignacy Sachs, co-designer with Maurice Strong of "Ecodevelopment," this beautiful promise from the time when they jointly led the 1972 UNCED, could be confused with "Sustainable Development," which they would later champion while directing the 1992 UNCED. This continues today with the concept of "Ecological Footprint," which has not been able to resolve this issue, as its creators have acknowledged¹².

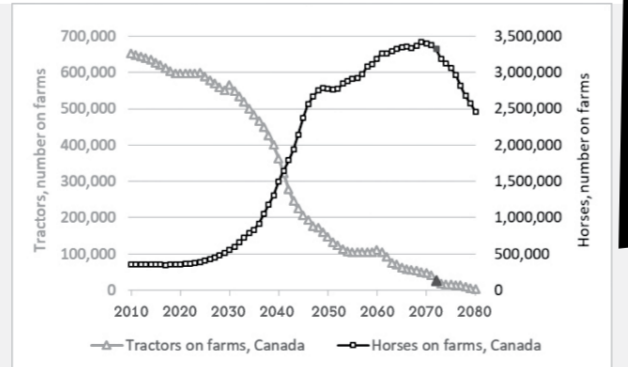
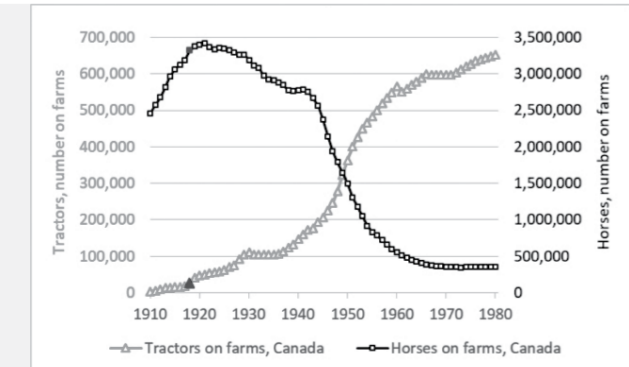
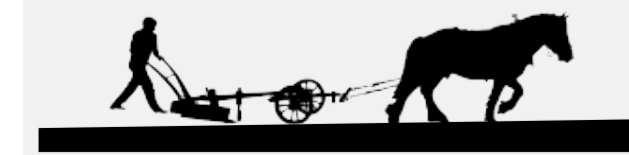
The "Ecological Balance" initially addressed this question of entropy, drawing in particular on the work of W. Vernadsky, the father of the Biosphere (13), and further that of biodiversity and the measurement of living energy, with the crucial problem of Information Theory, which measures only positive entropy. The concept of \mathbb{E} growth could therefore be envisaged; it implied an economy that would reverse both the effects of negentropic pillaging of the Biosphere and the Ecosphere (14), as well as those of the Anthroposphere. This would occur through a "biogrowth" (see note 2) that would

(1) Here, "energy-matter" bears some similarities to the mass-energy "E" of Einstein's equation (E=MC²), in the sense that it relates energy to mass. However, here it is a "living" mass, illustrating the essential participation of life in the biosphere's energy accumulation function, when it transforms free energy into energy mass. Throughout its transformations, the variation in energy density (or pressure, in joules/m³) of living matter and its variation in mass density (in kg/m³) are indeed strictly correlated (See (8), Table No.7, p 195). Energy-matter thus refers, like the notion of "exergy," but in a more (thermo)dynamical way, to the energy embodied in all forms of matter produced by the action of autotrophic organisms. This includes living matter (and organisms) as well as inert matter, known as biogenic matter, directly derived from life (dead wood, humus, limestone, etc.), or indirectly (oxygen, spring water, sediments, etc.) - see (13) for more details - and as found everywhere in the biosphere "and" the ecosphere (14). Thus, the economy is nourished almost entirely by energy-matter, with a scope much broader than carbon-energy (4).

(2) From this, we can deduce that current growth (of global GDP) is nothing but "necrogrowth," or even better, "abiogrowth," as opposed to "biogrowth," because it certainly feeds on life and its energy (as living beings do), but in a system that does not regenerate it and gradually suffocates it, resulting in ever-widening destruction of the planet, beyond just climate change. Note: The concepts above in quotation marks were conceived by Paul-Emmanuel Loiret, to juxtapose financial growth of a materialistic economy with living growth.

(3) Of course, this refers to the well-known chemical equation concerning the transformation of carbon : CH₂O + O₂ = energy + CO₂ + H₂O

a projection into
the future of draught power



Far from the State: a Peasant Notion of Public Order

XAVIER FORT

Democracy, the republic and the public exercise of reason are neither urban phenomena, nor phenomena whose necessary corollary is the development of trade or the spirit of the Enlightenment. Peasants precociously developed systems of self-government¹. German philosopher and sociologist Jürgen Habermas admits to having underestimated rural public space². In the Middle Ages and during the European Renaissance, thousands of villages had an assembly of inhabitants where collective decisions were made concerning the community.

Historically, peasant culture established a certain type of public order, a way of forming society, a certain way of establishing the future. This rural peasant public order, located far from towns and cities, was transformed with the intrusion of the modern nation-state. Thus, a peasant public order (peasant republics of peasant public spaces) and an urban public space became separate. But the separation of one from the other was not so marked, because, as historian Georges Lefebvre points out, the exodus of rural communities, gradually deserting the countryside to concentrate in towns from 1850 onwards, transferred peasant communalist culture to urban and industrial areas. It was a transfer of peasant ethics to the new urban working class world, with the rural community providing the roots of the urban socialist demand for equality³.

The notion of public order

The confusion surrounding the state's definition of public order is evident in the dual use of the term "police", which refers both to government activity and to the political community (polis). In French law, the term "ordre public" first appeared in the 17th century⁴. But the notion of "ordre public" is coextensive with that of an ordered political community, without judging the mode and regime of ordering. The adjective "public" in "ordre public" refers to the word "people". It should be distinguished from "state" or "public institutions". In Latin, publicus refers first and foremost to the civic function of populus. But the word "public" also designates a structured, discursive, deliberative or dialogical assembly of those with rights (Habermas), a group of people who worry, question, investigate, experiment and discuss in order to define a problem that concerns them (Dewey). A public order

is the institutional realization of a community of humans that sets rules for itself, with or without a state – that orders beings and things to establish peace, in other words, a just order (kosmos). There are public orders without a state, and legal orders without a state, which are not necessarily anti-state, but which seek to circumscribe the state's authority, spheres of action and prerogatives. Nation-states have claimed the right to define what is "public" and "public order", in the name of defensive decisions the general interest.

We can point to the existence of public orders without a state, and move away from the division, inherited from Greek political philosophy, between private (family, tribal) and public. The exercise of public action does not, in principle, presuppose an absence of attachments, particularly in local public spaces. The modern division between private and public makes the public the fundamental basis for legitimizing state sovereignty, and public law a set of legal rules governing the political, administrative and financial organization and functioning of the state. However, public law can exist without a state, as can a local legal order. We won't dwell on these aspects, which would require specific investigations. However, based on the distinction between imperium and dominium, between administration of a territory and possession of a territory, it is conceivable that a cultural territory could establish a social order without a state, accompanied by a local law without a state, a judicial system, fiscal and budgetary authorities, a currency, and appoint civil servants, etc⁵.

Historically, in France, it is not easy to account for this public order far from the state, that is to say, far from the towns, weakly or not constrained by it, as legal writing only appeared later on and only very slowly made its way into the countryside. So, there existed a public order that was not regulated by the written word. This public order was gradually overtaken by the market and the state, which changed social relations and, more generally, the relationship with "invariable matter, such as water, woods, harvests, vines, animals... and everything that the earth bears in its bosom or on its surface"⁶.

Public order in the towns and public order in the fields and woods

Describing this public order without or far from the state implies investigating a culture – peasant culture – which defines it, and which gradually evolved with the intrusion of the market and the state.

At the beginning of the 20th century, the peasant-writer Émile Guillaumin again contrasted the "bounhoummes" or "laborers", and "those of the bourg", the bourgeois⁷. He also distinguishes between those of free peasant or family communities and those of large bourgeois farms with their sharecroppers. But he also contrasts these two with those of the village community: farm boys and village boys. The two communities don't frequent the same inns. The former are quiet, while the latter know how to talk, have been to school, and fare better under questioning by the local town court after a village brawl, because they are less impressionable and express themselves more easily⁸. Another distinction could be made between people from the plains and people from the hills, the "easy" land of the lower country, along the river, and the "difficult" land of the upper country, the land of cereal crops and the land of livestock.

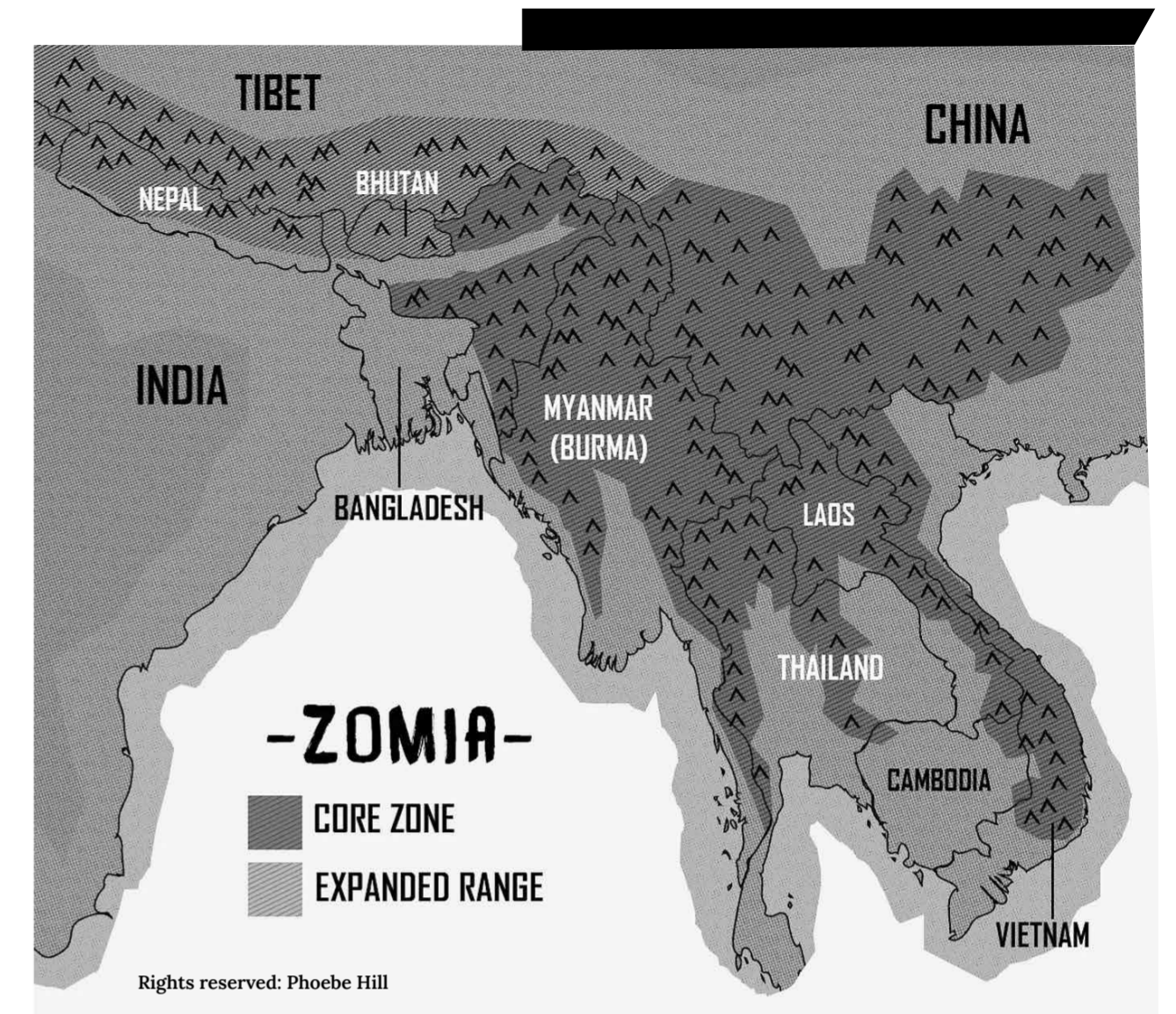
This public order of fields, woods and fallow land, this public order of "sunken paths" accessible only on foot or by mule, is a society far removed from the state. The muddy paths predate the state's paved roads, connecting inhabited islands surrounded by cultivated or grazed areas.

On the prairies, hamlets and farms are "islands of land", each with its own environment, like oases cut off from other lands by deserts. An "island of land" establishes a certain moral economy: each farm is surrounded by a small sea of pastures, fields or woods, which isolates it from its neighbors, singling each one out and developing an agricultural "organism" that is both special and monotonous. But here, the "island of culture" is not, as the geographer Émile Gautier⁹ said of the Saharan oases, a penal colony. Each isolated world is not a prison: "Island peoples are more inclined to freedom than

peoples on the continent," said Montesquieu¹⁰. It's a place conducive to self-government: as Aristotle says, there's a relationship between the size of the population and the system of laws: "The ideal limit for a state is the greatest possible extension of the population compatible with a self-sufficient life, and which can be easily embraced at a single glance."¹¹

By settling on these islands of land, the new urban dwellers who take up permanent residence in the countryside will gradually adapt to the specific culture based on its socio-spatial determinations, embracing these forms and the habits that shape them: a landscape is a culture, a set of values that will gradually impose themselves, reviving rural public orders.

To speak of poor land, unproductive land or a backward region is an economic notion of the territory, an agronomist's notion, or a farmer's notion subject to the constraints of the market. It implies being able to compare the yields of different territories, and wanting to make the most of the land, not depending on it for subsistence. Land must be "of good or bad value", a bourgeois vision that is certainly not that of a peasant subject to the constraints of self-subsistence... Poor lands that nobody wants, that are weakly controlled, weakly productive, serve as a refuge for dissidents and rebels who wish to live without a master, in the manner of the "Zomia" described by anthropologist James C. Scott¹²: poor land is a moral and social fact.



In his book published in 2009, *The Art of Not Being Governed: An Anarchist History of Upland Southeast Asia*, James C. Scott examines how for two thousand years, the disparate groups that now reside in Zomia (a mountainous region of 2.5 million km² that comprises portions of seven Asian countries) have fled the projects—slavery, conscription, taxes, corvée labor, epidemics, and warfare—of the nation-state societies that surround them.

(1) Morigeau, Jean-Marc, *Terres mouvantes. Les campagnes françaises du féodalisme à la mondialisation :1150-1850*, Paris, Fayard, 2002 & Bloch, Marc, *Les caractères originaux de l'histoire rurale française*, Paris, Armand Colin, [1931], 1976.

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(10) Montesquieu cité dans Febvre, Lucien, *La Terre et l'évolution humaine. Introduction géographique à l'histoire*, Albin Michel, Paris, [1922], 1970, p. 224.

(11) Aristote, *Éthique à Nicomaque*, IX, 10, 1326b

(12) James C. Scott, *The Art of Not Being Governed: An Anarchist History of Upland Southeast Asia*, 2009.

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Future Peasants

BUREAU D'ÉTUDES

If one day the Moon becomes a host for agriculture, it will be in containers, managed by robots. The ancestor of these containers is the plantation. Modern plantation agriculture was foreshadowed in the late Middle Ages around the Mediterranean, in Cyprus, Crete, Sicily, southern Spain and Madeira. These were plantations of olives, vineyards, sugar and fruit, run by Arabs, Venetian and Genoese merchants. This plantation system spread around the world with the expansion of trade in the 16th century and the centuries that followed, right up to the present day, proletarianizing living beings – humans, animals, plants, microbes – all over the planet. For better or for worse, this is not the majority story of world agriculture. Peasant farms that are relatively isolated from the growing pressures of capitalism have struggled for centuries to maintain their self-sufficiency. And others have fought and are still fighting to maintain their economic, cultural, social, political and moral independence ⁷.

Capitalist modernism has sought to dismiss these peasant modernities from history. Yet today, hundreds of millions of farms are inventing territories that are very different from the 1% of farms worldwide, which now account for 70% of all arable land ⁸.

In these global laboratories, other futurisms have sprouted and continue to grow, far from international organizations and industrial complexes: laboratories that cooperate on a daily basis with the biocenoses of the planetary holobiont, already establishing a post-urban age: futurisms of peasants, indigenous peoples, migrants and creoles, from continents and islands, in the center and edges of Europe, Africa, South America, Central and East Asia, the Indian peninsula, the North Pole and the far reaches of Canada or Siberia. Socio-ecological commons such as *satoyama* in Japan, rice terraces in China and the Philippines, cultivated forests in South Korea, agroforestry systems in Indonesia (*dunsun*) and the Iberian Peninsula (*dehesa*), mountain pastures in the Alps and Jura, agroforestry crops in southern Germany.

We imagine these living territories scattered, forming the nodes of a mycelium, distributed all around the globe and in space. In this peasant futurism, the Earth is not a globe whose scale relegates localities to insignificance. For there is no separation of scales: the Earth's destiny is the product of tangled local causalities. The Earth we're talking about is not that blue globe photographed by military aircraft from space. It's here, under our feet. It is what we are, as what happens in the ground produces what happens in our own intestines. Today, it is the movement of hundreds of millions of urban dwell-

ers, perhaps billions, who, along with thousands of plant and animal species and torrents of bacteria and viruses, are migrating as the southern heat becomes too arid, soon restoring rural societies, forms of existence and arts to northern spaces. Whereas the European migrations of modern centuries have massively destroyed the populations of colonized territories⁹, we want to work toward a different migration policy for the current century – one that aspires to the cohabitation of species, cultures and imaginations.

This hypothesis of the future, for the 21st century, is not a new Kolyma and its gulags of gold mining. We're not talking about the forced villages imposed in Russia, Tanzania, Cambodia, Ethiopia or Somalia. Nor are we speaking in the name of the great monetary or proprietary regulations that a few impose in the name of the common good. For the terrestrial community does not subordinate the multiplicity of parts to the oneness of the whole, and does not regulate the multiplicity of parts – people, resources, ideas – in the name of governing the whole. Not because it shouldn't, but because it's impossible.

Laboratories for habitable futures

In 1970, in his song *Whitey on the Moon*, the precursor of rap Gil Scott-Heron spoke of the poverty of black plantation workers as white astronauts set foot on the Moon. A little later, in Burkina Faso, President Thomas Sankara proposed that 1% of the space conquest budget be devoted to the preservation of trees and life¹⁰, and imposed that every newcomer to the country plant at least one tree, rather than show a residence permit¹¹. Our terrestrial situation faces the paradox that vehicles have crossed over icy terrain all the way to the planet Mars, but we still don't know how many species exist on Earth. The living worlds on which we depend remain poorly understood, and we have forgotten how the society we form with them is organized.

The planetary laboratories that we have begun to survey here have inherited this interest in living worlds, giving rise to rural, agrarian, peasant, migrant, tropical, queer, indigenous and disabled futurisms, which prefer the analog space of existence to the virtual spaces of the control society.



- 1 Les agriculteurs de la Coordination Rurale manifestent leur colère à Agen en bloquant l'accès de la préfecture avec du foin (2024).
- 2 Agriculture de plantation dans un espace sans humains. Treatment of lunar soil to create fertilizer for growing plants (Credit: Solsys Mining).
- 3 According to the Government of India, out of 141 million hectares of net sown area, 86 million hectares are rainfed. About 90% of landholdings of the country are distributed among the small to semi-medium farm holdings. And talking about power utilization in Indian agriculture, about 70% of the small and semi-medium landholding farmers almost exclusively depend on draught power and animal-drawn implements. (Malraj Shrivastava and Kamna K. Sripurapu, Consultant, WASSAN – RRA Network | September 2, 2020).

Although less productive than mechanical and chemical agriculture, the peasant planetary laboratory is more efficient from an energy point of view, increasing the amount of solar energy accumulated on Earth and reducing the amount dispersed. This laboratory has also been able to cohabit peacefully with microbes, inventing arts and pedagogies of the living. In contrast to the biological universalism of the biopharmaceutical industries, and the biological equivalence of bodies, it has opposed the necessary contextualization of health and nutrition, pointing towards a medicine of territories, where the modalities of health vary according to place and environment¹². Finally, this planetary laboratory has developed, and will need to develop, a culture of hospitality, of hosting, of hybrid spaces and situations, of symbiosis too, as environments leave the relatively stable conditions of the Holocene.

(7) Enrico Dal Lago, *Agrarian Elites: American Slaveholders and Southern Italian Landowners*, 1815 – 1861, LSU Press, 2005.

(8) 475 million farms of less than 2 hectares still exist in the world today (Sarah K. Lowder, Jakob Skoet, Terri Raney, *The Number, Size, and Distribution of Farms, Smallholder Farms, and Family Farms Worldwide*, *World Development*, Volume 87, 2016). In the European Union, 50% of farms have a surface area of less than 2 hectares, but they only exploit 2.4% of farmland.

(9) Between 1750 and 1930, 50 million Europeans migrated, driven from behind, as the European population grew, but arable land did not. Updated United Nations projections show that Africa's population is set to double between 2010 and 2040, from 1 to 2 billion people (four times the population of the EU28). A migration of 200 million climate migrants is predicted for the current century.

(10) Silva, *Actes de la conférence sur l'arbre et la forêt*, Paris, 5 au 7 février 1986.

(11) Speech given on 25 April 1985 in Bobo-Dioulasso.

(12) See Rupa Marya & Raj Patel, *Inflamed: Deep Medicine and the Anatomy of Injustice*, Farrar, Straus and Giroux, 2021.