

Contributions to Neganthropology: Agroforestry and Syntropic Agriculture

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Abstract

The present text aims to discuss the proximity between two central concepts in the works of two authors: “syntropic agriculture” and the “Neganthropocene,” respectively in the works of Ernst Götsch and Bernard Stiegler. First, a review of the terminology of the terms “syntropy” and “negentropy” is carried out, establishing that the terms are quasi-synonymous. Secondly, a succinct explanation of syntropic agriculture as an “epistemological key” is offered, one very similar to that of Isabelle Stengers and Ilya Prigogine from *Order out of Chaos*. Second, an explanation of its origin in indigenous cosmology, as expressed by Viveiros de Castro in *Cannibal Metaphysics*, is outlined. Syntropic agriculture is one of the ramifications of techniques carried out in agroforestry systems and, therefore, is also called “successional agroforestry systems” (SAFs). It has been used not only for reforestation, but also for small and large-scale agricultural production. The big differences between syntropic agriculture and other agroforestry systems are how the biodiversity of cultivated species is emphasized and how ecological succession is used as a guide to cultivation. That is, syntropic agriculture mimics the processes carried out by ecological succession. The role of human beings is also great, given that the farmer needs to act constantly, intervening in cultivation, sowing, and pruning. Thus, syntropic agriculture establishes the height of syntropy when there is an organization similar to that of a forest, but above all similar to a forest in which man is properly equated. At this point, a parallel is drawn between this model of agriculture and that carried out by Amazonian indigenous peoples, which most likely gave rise to the Amazon Forest.

Keywords: Neganthropocene; anthropocene; cosmotechnics; syntropic agriculture; successional agroforestry; negentropy.

Introduction: Stiegler and Götsch

This text aims to discuss the proximity between two central concepts—“syntropy” and the “Neganthropocene”—present, respectively, in the works of Ernst Götsch and Bernard Stiegler. It seeks to demonstrate how “Syntropic Agriculture” can contribute to the study of “Neganthropology” as encouraged by Stiegler in his last writings. Through the shared study of such approaches, the article also intends, inversely, to contribute to the expansion of the theoretical basis in the study of syntropic agriculture, bringing up a potentially relevant perspective. Since this form of agriculture, practiced mainly in Brazil, is very similar to that practiced by indigenous communities in the Amazon, so-called “agroforestry,” the article will, through the use of concepts present in the works of Eduardo Viveiros de Castro, Donna Haraway, and Isabelle Stengers and Ilya Prigogine, draw a coherent parallel between such agriculture, its indigenous heritage, and ways of bifurcating away from,¹ as Stiegler demands, the Anthropocene, (A)entropocene, and, most specifically, the Plantationocene.² Before starting these comparisons, a summary of the authors’ work and the use of the referred to concepts is necessary both to theoretically contextualize the article and to better understand the theme at stake.

Syntropic Agriculture and the Plantationocene

Ernst Götsch, a Swiss farmer, researcher, and theoretical agriculturist working mostly in Brazil, is the inventor of “syntropic agriculture.” Its main concepts, theory, and techniques are outlined in his pioneering articles “O Renascer na Agricultura,”³ from 1996, “Homem e Natureza,”⁴ from 1995, and in the book “Agricultura Sintrópica Segundo Ernst Götsch”⁵ from 2021.

The fundamental concepts of syntropic agriculture are developments of the ancestral technique of agroforestry, which aim to emulate a forest system in anthropic crops, that is, in agriculture. These systems are called SAFs (Successional Agroforestry Systems). Agroforestry systems are modes of agriculture that value the existence or preservation of trees amid cultivated crops, or simply an integration between native and foreign

1 Bernard Stiegler, *Bifurcate: There is No Alternative* (London: Open Humanities Press, 2021), 270.

2 Donna J. Haraway, *Staying with the trouble: Making Kin in the Chthulucene* (Durham: Duke University Press, 2016), 99.

3 Ernst Götsch, *O renascer da agricultura* (AS-PTA-Assessoria e Serviços a Projetos em Agricultura Alternativa, 1996).

4 Ernst Götsch, *Homem e natureza: cultura na agricultura* (Centro de Desenvolvimento Agroecológico, 1995).

5 José F. Dos Santos Rebello and Daniela Ghiringhelo Sakamoto, *Agricultura Sintrópica Segundo Ernst Götsch* (Editora Reviver, 2021), 85.

forest species, planted with the sole purpose of human consumption. Generally, its main objective is to maintain the sustainability of the cultivated soil.⁶ Many other examples demonstrating the applicability of agroforestry in different parts of the world have been shown in studies in the Americas, as well as in Asia and Africa.

In addition, agroforestry has been used as a technique for regenerating cultivated areas.⁷ This is because, when the process of deforestation for the installation of plantations begins (the agricultural system that is more common in those countries on the periphery of capitalism), a cycle of desertification also begins. Such desertification occurs gradually, and mainly in countries with an agricultural economy, given the need for the hyper-production of commodities.

The process of installing plantations begins when an area of forest is cleared, the land is ploughed, and a single species is planted in the deforested area. As a result of this process, all biodiversity is eliminated and, in addition, some very specific nutrients are introduced into the area in large quantities. A soil that used to feed a forest that was highly integrated in terms of its exchange of nutrients, now finds only one species, which demands only one type of nutrient. This process will now demand inputs (fertilizers) external to the original soil; or, it will become unproductive since all the nutrients that were present in the forest soil initially derived from the decomposition of those species present in that forest (species now removed through deforestation).

A recent example of how monoculture agriculture depends on extremely specific inputs external to the planting environment is the “fertilizer crisis” that occurred as a result of the war in Ukraine. Brazil, the country with the largest tropical forest in the world, became so dependent on Russian agricultural inputs that its agricultural production was seriously hampered by the unavailability of Russian fertilizers (especially the most basic ones, such as Potassium, Phosphorus, and Nitrogen).⁸

This same process goes through other phases after the inputs are exhausted: first, the species used in that monoculture is replaced by another species, which better supports the absence of nutrients; then, with the total depletion of nutrients, the monoculture is transformed into pasture, for raising cattle; and finally, when such cattle have already

6 Maria Teresa Vilela Nogueira Abdo, Sérgio Valiengo Valeri, Antônio Lúcio Mello Martins, *Sistemas agroflorestais e agricultura familiar: uma parceria interessante*. *Revista Tecnologia & Inovação Agropecuária* 1, no. 2 (2008).

7 Nair Ramachandran, *An Introduction to Agroforestry* (Springer Science & Business Media, 1993), 55.

8 Fabrício Gomes de Melo, “Efeitos Sobre o Agronegócio: uma análise da comercialização de fertilizantes a partir das relações bilaterais entre Brasil e Rússia,” *EmpíricaBR-Revista Brasileira de Gestão Negócio e Tecnologia da Informação* 4 (2024), 10.

made the soil unusable even for the growth of grasses, desertification will be complete. This process may seem incoherent (which it is), but even so, it is the main method of carrying out agriculture, mainly in underdeveloped countries in Africa and Latin America.

The consequences of the use of plantation techniques as the main mode of Western agriculture in the colonized world, and that these techniques are so dominant, leads Donna Haraway in *Staying with the Trouble*, to employ the term the “Plantationocene” as an approximation for the overlapping nature of the Anthropocene and the Capitalocene. Drawing on discussions⁹ carried out primarily by Anna Tsing and Scott Gilbert, Haraway produces a leading diagnosis that “the world is collapsing” as a result of the ubiquity of this technique:

In a recorded conversation for Ethnos at the University of Aarhus in October 2014, the participants collectively generated the name Plantationocene for the devastating transformation of diverse kinds of human-tended farms, pastures, and forests into extractive and enclosed plantations, relying on slave labor and other forms of exploited, alienated, and usually spatially transported labor.¹⁰

Wolford confirms the social, political and economic motivations behind maintaining plantations as the main mode of agricultural production. Using the example of countries colonized by Portugal, such as Angola and Mozambique, the author demonstrates that plantations generate a configuration of permanent land ownership (few landowners own most of the land, with their production mostly destined for export).¹¹ That is, even after the decolonization or relative independence of colonized countries, the plantation system remains and, with it, this configuration of land ownership that maintains social and economic inequalities. However, in Brazil, where this method seems to have intensified even more with the use of new technologies (something which has allowed for the “plantationification” of the Midwest of Brazil), alternatives to the agricultural *status quo* have also been proposed. These alternatives seek ecological solutions in indigenous techniques from the riverside and *quilombola* communities, techniques which have resulted in subsistence agriculture for centuries and centuries.

Knowing that monoculture (which can be translated, then, as the dominant mode of

9 Donna Haraway et al., *Anthropologists are Talking—About the Anthropocene*, *Ethnos* 81, no. 3 (2016), 537.

10 Haraway, *Staying with the Trouble*, 206.

11 Wendy Wolford, *The Plantationocene: A Lusotropical Contribution to the Theory*, *Annals of the American Association of Geographers* 111, no. 6 (2021), 1627.

industrial agriculture, that is, as the plantation model) tends to deplete the nutrients present in a soil very quickly, agroecology gave rise to SAFs as a way of systematizing a coherent alternative to the monoculture model. Its strengths are greater water retention in cultivated soils, disease prevention, product diversity, and a reduction in the need to use chemical products such as chemical fertilizers, pesticides, and herbicides. Around the world many different agroforestry systems have been developed, with adaptations according to the environment and the techniques of native populations. Results have been found in all the populated continents: in Malawi, India, Germany, Kiribati, and even near to Antarctica (in Southern Patagonia).¹² One of these types of agroforestry is the one elaborated by Götsch, biodiverse successional agroforestry, also called “syntropic agriculture.”

The big difference between conventional agroforestry systems and syntropic agriculture is the emphasis on the practice of techniques that reproduce natural succession and biodiversity: frequent pruning, diversity of species in cultivation, stratification, planting of grass and the different systems, namely colonization, accumulation, and abundance. In addition, syntropic agriculture exclusively uses fertilizer from biogeochemical processes (i.e., fertilizers and micronutrients produced by the local environment), instead of external inputs, as, for example, in conventional organic agriculture.

Syntropy in Thermodynamic Terms

According to Götsch,¹³ after many years of research and through the development of specific techniques (such as periodic pruning, stratification according to each plant’s need for sunlight, and understanding how the rhizospheres of planted crops affect each other if planted together), his model of agriculture could no longer be included into the term “agroforest,” preferring the use of “syntropic agriculture.” “Syntropy,” and what is meant by syntropy, thus becomes the operative concept that distinguishes Götsch’s techniques from other forms of agroforestry. However, to facilitate understanding, in academic works that address the techniques used by Götsch, the use of “Sucessional

12 See Jeanne Y. Coulibaly et al., “Adoption of Agroforestry and the Impact on Household Food Security among Farmers in Malawi,” *Agricultural Systems* 155 (2017); Jyotish Prakash Basu, “Agroforestry, Climate Change Mitigation and Livelihood Security in India,” *New Zealand Journal of Forestry Science* 44 (2014); Nerlich, K., Simone Graeff-Hönniger, and W. Claupein, “Agroforestry in Europe: a review of the disappearance of traditional systems and development of modern agroforestry practices, with emphasis on experiences in Germany” *Agroforestry Systems* 87 (2013); R.R. Thaman, “Kiribati Agroforestry: Trees, People and the Atoll Environment,” *Atoll Research Bulletin* 333 (1990); and N. Oro Castro et al., “Effects of Alternative Silvicultural Systems on Litter Decomposition and Nutrients Dynamics in Sub-Antarctic Forests,” *Agroforestry Systems* 93 (2019).

13 Rebello and Sakamoto, *Agricultura Sintrópica Segundo Ernst Götsch*, 51.

Biodiverse Agroforestry” is also used instead of “syntropy.” To understand what is at stake in Götsch’s mode of agriculture, it is necessary to grasp what is meant specifically by “syntropy,” especially its relation to thermodynamic notions such as “entropy” and “negentropy.”

According to Andrade et al., the first author to use the concept of “syntropy” was Luigi Fantappiè in 1942, in the publication “The Unitary Theory of the Physical and Biological World.”¹⁴ Its etymology conveys its meaning, as being the inverse of entropy. The concept of “entropy” is directly related to the second law of thermodynamics and was adopted by Ludwig Boltzmann from classical thermodynamics (originally being coined by Rudolf Clausius) to define the degree of energetic disorder in a system. The more the entropy of a system increases, the closer that system will be to thermodynamic equilibrium; that is, the more the system has moved from an ordered particle distribution (say hot on one side of the system and cold on the other) to a disordered particle distribution at a microscopic level, the more the system is at thermal equilibrium with itself (the more homogenous the distribution of particle energy is). Fantappiè thus used the term “syntropy” to describe certain biological events that seemed to go the opposite way to entropy, producing diversity and complexity, instead of dissipation and simplification.

Beyond the use of “syntropy” by Fantappiè, other comparable terms and theorizations of the *inverse of entropy* occurred around the same time, being used concomitantly by other authors from other fields; for example, in his 1944 theoretical work on life, *What is Life?*,¹⁵ Schrödinger coined the term “negentropy” to mean something similar to the inverse of entropy, and in biochemistry, in 1974, Albert Szent-Györgyi suggested that “syntropy,” in fact, replaces “negentropy.” The reason for the terminological variation by Schrodinger will be seen later. One might want to also note the use of the term “negentropy” as theorized and used by Norbert Weiner and Léon Brillouin to account for the relation that entropy has to information and signal noise. Crucially, both negentropy and syntropy denote an elementary character in their meaning: a merit of perspective, that is, both concepts are only perceptible, considerable, or applicable to an integrated system, a “whole,” more than to particular or specific phenomena. The next section will discuss how such a notion of “perspectivism” is important for syntropic agriculture. Before that, an overview of what Götsch means by “syntropy” is needed.

Ernst Götsch chose the term “syntropy” because it has the same Greek etymology as the word “entropy,” making clear, from the beginning, its dialectical relationship. Most people

14 Dayana Andrade, Felipe Pasini, and Fabio Rubio Scarano, “Syntropy and Innovation in Agriculture,” *Current Opinion in Environmental Sustainability* 45 (2020), 22.

15 Erwin Schrödinger, *What is Life?: With Mind and Matter and Autobiographical Sketches* (Cambridge University Press, 1992), 70.

are more familiar with the concept of entropy, which, within thermodynamics, refers to the function related to the disorder of a given system, associated with energy degradation. Everything that refers to the consumption and degradation of energy is, therefore, explained by the Law of Entropy. On the other hand, living systems have the ability to overcome the tendency to entropy through, for example, growth and reproduction. Even more evident is the tendency of natural systems to evolve towards increasingly complex organizational structures. In a macroorganism, the participants act synergistically and, through their metabolism, carry out the task of optimizing life processes, increasing the organization and complexity of the system as a whole. The translation of this logic into productive agricultural systems is what makes agriculture syntropic being an information agriculture and processes, not inputs.

In a simplified way, for Götsch, syntropy refers to the organization of particles in a given system. While entropy is the measure of disorder and unpredictability, syntropy is the function that represents the degree of order and predictability that exists in that system (in this case, the system of a forest). Throughout Götsch's work, syntropy is seen as the function that represents the degree of order and predictability existing in that system. When the system goes from simple to complex, verging and concentrating energy, it is a syntropic system.

It is important to state, therefore, that, while syntropy is understood as the inverse of entropy, given that the second law of thermodynamics is an end in itself, there could be no such thing as syntropy qua a realizable general reversal of entropy, as entropy is a universally encompassing concept. But as an epistemological resource or as a usable method to acquire a new perspective on the use of energy, syntropy is certainly fruitful. Bernard Stiegler, in his book *The Neganthropocene*, refers to the same idea that the difference between entropy and negentropy is always one of perspective:

Referred to as negative entropy by Erwin Schrödinger and as anti-entropy by Francis Bailly and Giuseppe Longo, negentropy is always defined in relation to an observer (see the work of Henri Atlan and of Edgar Morin) – that is, it is always described in relation to a locality that it, as such, produces, and that it differentiates within a more or less homogeneous space (and this is why a neganthropology is always also a geography). What appears entropic from one angle is negentropic from another angle.¹⁶

Götsch, like Stiegler, when he talks about making the availability of energy more complex,

16 Bernard Stiegler, *The Neganthropocene* (London: Open Humanities Press, 2018), 54.

maximizing the functioning of the agroforestry system, and using the minimum possible for the maximum results, is treating the term “energy” in the *stricto sensu*, that is, considering all the energy spent in the whole cycle of production, i.e., not just locally but also broadly. Not only the water and sunlight used as nutrients are accounted for, but also the energy that is spent in the production of insecticides, chemical fertilizers, and herbicides. An example can help illustrate: every crop needs some basic nutrients to produce. Suppose that a crop uses a certain amount of chemical fertilizers to supply these nutrients. These fertilizers were probably taken from some phosphate or potash mine in a remote location and used in this crop. Therefore, to carry out the general calculation of the energy used to produce this crop, it would be necessary to include the energy expenditure spent on the extraction and commercialization of these fertilizers.

Syntropic Agriculture as a Perspectivism

Götsch, in his experiences in Brazil, “syncretized” his technique in conventional agronomy with indigenous knowledge, or rather, with the closest thing to what can be considered an indigenous epistemology.¹⁷ The difference between Götsch’s method and, for example, the Fukuoka method, is the active role of the farmer in generating feedback through pruning. If in Fukuoka, nature does the work alone, in Götsch’s method the farmer is not the one who plows the soil, sows, and waits, but an agent who is always pruning, because he himself also makes up nature; pruning is within the “natural” equation. The biomass pruned by the farmer is left in the soil and ends up decomposing. Consequently, it fertilizes and regulates soil temperature. Fabiana Mongeli Peneireiro¹⁸ has already stated how such an exchange of knowledge (of the relation between pruning, decomposing, and fertilizing) was already in practice, and, for this very reason, Götsch never applied for patents on his technique. This is because the “epistemology” with which Götsch allied himself is nothing more than the “perspectivism” demonstrated by Viveiros de Castro in his work,¹⁹ applied to agriculture. Indeed, such an epistemological perspectivism is also an “ontological multinaturalism” since no “transcendental” differentiation is made between man and nature, man and animal, man and forest. The indigenous (those studied by Viveiros de Castro include the Yanomamis, the Tukanos, the Arawetes, and the

17 Research indicates that agroforestry (and its disambiguation, syntropic agriculture) as a technique was formed in a very “syncretic” historical process, with a huge contribution from indigenous peoples. See Walker, D. H., F. L. Sinclair, and B. Thapa, “Incorporation of Indigenous Knowledge and Perspectives in Agroforestry Development,” in *Agroforestry: Science, Policy and Practice*, ed. F.L. Sinclair (Dordrecht: Springer, 1995) https://link.springer.com/chapter/10.1007/978-94-017-0681-0_12.

18 Fabiana Mongeli Peneireiro, *Fundamentos da agrofloresta sucessional*, Artigo apresentado no II Simpósio sobre Agrofloresta Sucessionais em Sergipe (2003), 203.

19 Eduardo Viveiros De Castro, “Cosmological Deixis and Amerindian Perspectivism,” *Journal of the Royal Anthropological Institute* (1998), 471.

Sateré-Mawé) see no ontological difference between a jaguar and a man, they share the same spiritual category, the same type of “soul.” The only difference between the two is the body they inhabit, the corporeal nature in which they come into existence. According to Viveiros de Castro, in these Amerindian cosmologies, all beings—humans, animals, and even supernatural entities—are essentially endowed with the same subjectivity. Everyone shares a common “inside,” which can be understood as a soul or spirit. However, although they share this subjectivity, each being sees the world differently, depending on their specific body.

Things could not be otherwise, since nonhumans, being humans in their own domain, see things as humans do, but differently. What humans take for blood, jaguars see as beer; the souls of the dead find a rotten cadaver, when humans see fermenting manioc; what humans perceive as a mud puddle becomes a grand ceremonial house when viewed by tapirs.²⁰

In Amerindian perspectivism, culture is something that all beings possess from their own perspectives. To humans, other species are seen as part of “nature,” while from the jaguar’s point of view, jaguars are the “cultural” beings and humans can be seen as “animals.” Such Amerindian cosmologies also emphasize transformation between beings. The idea that, under certain ritual or shamanic circumstances, humans can become jaguars or other beings, and vice versa, reinforces the notion that identity is fluid and defined by the bodily perspective one temporarily adopts.

Amerindian perspectivism produces, therefore, a truly interspecific (among different species) relationship between the inhabitants of the world. There is a kind of “respect” for nature, precisely because one does not see a difference between culture and this “other thing” that is nature. All the relationships that develop depend on the perspective, all the activities that the beings of the forest carry out are done in such a way exclusively because of the perspective of that being. When a person catches a fish, this person is no different from a jaguar hunting another animal (or even a man). When the earth (with the worms) feeds on a corpse, it is no different from a man harvesting *cassava*.²¹

Here, *technique* acquires a totally different meaning from the Western one, because the very concept of nature changes. “Western modernity” views animals, plants, and men as components of the same nature, where the difference between them is only in the category of their spirits. The bodies that exist in nature are formed exclusively by the elements of the periodic table in different rearrangements, but they still share the same nature. Therefore, the only possible differentiation would be transcendent to matter.²²

20 Eduardo Viveiros De Castro, *Cannibal Metaphysics* (University of Minnesota Press 2015), 71.

21 De Castro, *Cannibal Metaphysics*, 58.

22 De Castro, *Cannibal Metaphysics*, 59.

In certain respects, perspectivism is diametrically opposed to the objectivist epistemology encouraged by Western modernity. The latter's *telos* is provided by the category of the object: to know is to objectify by distinguishing between what is intrinsic to the object and what instead belongs to the knowing subject, which has been inevitably and illegitimately projected onto the object. To know is thus to desubjectify, to render explicit the part of the subject present in the object to reduce it to an ideal minimum (and/or to amplify it with a view to obtaining spectacular critical effects). Subjects, just like objects, are regarded as the results of a process of objectification: the subject constitutes or recognizes itself in the object it produces and knows itself objectively when it succeeds in seeing itself "from the outside" as a thing. Our epistemological game, then, is objectification; what has not been objectified simply remains abstract or unreal.²³

The epistemological key to understanding the complexity in using the concepts of syntropy and synergy is right on the border of the concept of nature. Indigenous Amazon peoples (those mentioned above) are in a symbiosis (or a non-separation, a non-othering) with respect to the forest, and as such, are able to produce an agriculture that is integrated with that same forest. At this point, even the concept of agriculture begins to dissolve, since the symbiotic "agriculture" produced by the indigenous people is nothing more than the forest itself, intact, since they are not "something else;" being part of the forest, they can only produce more forest.

That is, this indigenous epistemology of perspectivism comes from an ontology in which there is no metaphysical difference between man and the rest of life in the forest. In this logic, man is part of the forest, he is an organ of Gaia that acts in favor of its existence. The issue here is that we were never a body. We have always been organs of Gaia. Our yearning for becoming a Body-Without-Organs, as demonstrated by Deleuze and Guattari,²⁴ is a desire to become only and just an organ.

Because of this completely different attribution in the sense of the society-nature relationship, the indigenous peoples of the Amazon knew how to deal with the forest, knowing that ontologically they "were it." Cultivating it is also cultivating yourself. This is how these peoples "cultivated" what can be called the largest edible forest in the world. This species of "forest-orchard" was evidenced after conclusive studies in the Amazon. Patrick Pardini demonstrated that the Amazon, the largest forest in the world, is anthropic in part, meaning that it has been caused by the action of human beings.²⁵ It has, therefore,

23 De Castro, *Cannibal Metaphysics*, 60.

24 See Gilles Deleuze and Felix Guattari, *Anti-Oedipus: Capitalism and Schizophrenia Volume 1* (New York City: Viking Press, 1977).

25 Patrick Pardini, "Amazônia indígena: a floresta como sujeito," *Boletim do Museu Paraense Emílio Goeldi. Ciências Humanas* 15, no. 1 (2020).

a significantly greater number of “usable” species than the average for the world’s biomes. A large part of the plants that seem to grow “naturally” (this term, again, not coherent to describe the process) and according to “natural” ecological succession, have, in fact, been selected for centuries by the inhabitants of the forest. The Amazonian indigenous people did (and still do) expand the forest’s biodiversity, contrary to monoculture, which privileges very few species.

Essential for understanding the logic behind indigenous agroforestry, Davi Kopenawa and Bruce Albert in *A Queda do Céu [The Falling Sky]* demonstrate how the Yanomami, for example, were collectors (in the sense of being anthropologically designated as hunter-gatherer) by an imperative of their own. The collection of fruits, nuts, and whatever else was necessary for their subsistence was “planned,” infiltrating useful species into the middle of the forest, which adapted to the ecosystem, generating even more biodiversity. As Kopenawa and Albert write:

What white people call nature, in our language, *urihi-a*, the forest-land [...] The forest is alive, that’s where its beauty comes from. It is she who animates us. It’s very much alive. White people may not hear her cries, but she feels pain, like humans do. Its big trees groan when they fall and it cries in pain when it is burned [...] The forest has a very long breath of life. It’s your breath.²⁶

It is not a question, then, of another thing, but of the same thing. The forest is being directed, solving the problem that Stiegler formulates as follows:

[...] the question is to know if we can predict and, if possible, orient the evolution of technics, that is, of power [*puissance*]. What power [*pouvoir*] do we have over power [*puissance*]?²⁷

An example may clarify the logic: syntropic agriculture has a very interesting nomenclature²⁸ for dealing with “pests,” such as ants and grasshoppers; they are called “optimizing agents.” After all, what does the ant do when it destroys an agricultural crop cultivated by man? Instead of the ant “destroying my farm,” “destroying my money, my bread, and my house,” and above all “costing me time,” we could affirm that there is a natural reason for this to happen. Biologically, the ant is just “pruning” the crop. For

26 Davi Kopenawa and Bruce Albert, *The Falling Sky* (Cambridge: Harvard University Press, 2013), 382-389

27 Bernard Stiegler, *Technics and Time, 1: The Fault of Epimetheus* (Stanford: Stanford University Press, 1998), 21.

28 Rebello and Sakamoto, *Agricultura Sintrópica Segundo Ernst Götsch*, 98.

some reason that the farmer was unable to understand, that particular plant/culture is not optimized to the place where it is located (either due to the incidence of sunlight or too much shade), so the ants “appear” and optimize the environment, pruning and decomposing the leaves, taking them piece by piece to the anthill, where they are digested and decomposed by fungi, accelerating the total decomposition process of the plant. If ants consume a crop, it is because they understand that matter is not well invested within its cycle, and not just to generate food for itself. According to Ernst Götsch, the ants are actually pruning the excess, and taking this excess underground, where it will decompose in the best way possible. By “pruning,” the ants are actually demonstrating that the tree they are cutting should not be there, either because it is not fully healthy or because it is in excess:

[...] someone who receives leaf-cutting ants as messengers of nature and understands them as part of the immune system of the Earth macroorganism will take other measures: he will plant in high density in the areas close to the lookouts, he will cover the soil with a lot of organic matter, helping the ants in their work to bring more life to that agroecosystem, after all, ants do not cut plants indistinctly. What makes an anthill close to dozens of eucalyptus trees (a plant commonly cut by them) travel more than 50 meters to cut a neem tree or a jabuticaba tree? By the logic of western capitalist rationalism, it would be much easier and cheaper to cut down nearby trees. But nature does not work following capitalist logic, nature works all the time to optimize the system, to create systems of abundance.²⁹

And that is why pruning is such a fundamental element in the elaboration of Syntropic Agriculture. According to Gotsch, men are professional pruners produced by nature, but at some point (by becoming just a Body and no longer an Organ) we prefer to favor entropy over syntropy. We are, or should be, giant ants that periodically destabilize the system to boost its stabilization. By pruning, we speed up the process and “play the game” of the forest.

This method, in addition to, as already demonstrated, expressing the cosmology of non-objectification shamanism, also expresses what Stengers and Prigogine, based on Boltzmann’s work, called “active matter”:

The units we use to describe thermodynamic evolution will therefore behave in a chaotic way at equilibrium. In contrast, in near-equilibrium

29 Rebello and Sakamoto, *Agricultura Sintrópica Segundo Ernst Götsch*, 98.

conditions correlations and coherence will appear. We come to one of our main conclusions; At all levels, be it the level of macroscopic physics, the level of fluctuations, or the microscopic level, nonequilibrium is the source of order. Nonequilibrium brings ‘order out of chaos’.³⁰

A momentary and microscopic break in the equilibrium seems to be the key to perpetuating or expanding the general and macroscopic equilibrium. In an entropy paradox, overall entropy depends on certain disruptions to keep itself in order and stay current. Life seems to be the agent that promotes small disorders in the general system, generating even more life.

Perhaps one of the first entropizations accelerated by humanity, monoculture is a highly efficient vector in the consolidation of the Entropocene demonstrated by Stiegler. Not only in the reduction of biodiversity, which is its first preponderant factor, but in all the expenses that its permanence and survival demand. Inputs external to the agricultural system are extremely necessary to maintain production in monoculture. From fertilizers to herbicides, practically nothing that is used as inputs in monoculture is generated by the system itself, everything comes from outside, that is, it causes entropy in external places.

Syntropic Neganthropology

At a grand scale the ecological problem at hand is that man is transforming highly intertwined life that rapidly recycles itself in its cycles, into “dead” matter. This activity is entropization. In the Amazon, for example, forests are burned to raise cattle or to set up plantations. Where did the forest go? It is in the air, in the form of carbon. In a mine, mineral fertilizers are extracted from rock or soil. Where did those minerals go? They are dispersed in soil. Carnot’s heat engine, as Joel White argues, demonstrates how such a process occurs in thermodynamic terms, how entropization is a process of dissipation:

The engine’s endurance is conditioned by the maintenance of the energy difference between a hot body and a cold reservoir. To maintain this energy difference, one is required to ‘feed’ the engine from the global store house of not-yet-dissipated energy—often in the form of chemical energy—to maintain the temperature of the hot body. The entropy of the local system is, therefore, kept from increasing by displacing it to its surroundings. Because the process of ‘feeding’ the engine irreversibly transforms not-yet-dissipated energy into already-dissipated energy, the

30 Isabelle Stengers and Ilya Prigogine, *Order out of Chaos: Man’s New Dialogue with Nature* (New York: Bantam Books, 1984), 286–287.

global store house of not-yet-dissipated energy is depleted or exhausted through the very same process of maintenance. This renders the process finite and explains why all energetic systems, if they are to endure, exhaust their own conditions of possibility.³¹

In an ideal scenario, natural succession proposes the return of the forest, sending “pioneer” species such as grass, which would feed on part of the carbon released into the air. Afterwards, bushes and medium-sized trees begin to integrate such a “colonization” by these pioneer species. Finally, trees cover the ground, and the forest returns in force. But man refuses to play by these terms; shortly after the fire, he sends his cattle to feed on the “pioneer” species. It thus causes a perennial entropy.

But then, how is it possible to play “on the team” of Gaia, and get sustenance from a syntropic relationship? How can we not depend on this “not-yet-dissipated energy” to make our food engine work? That is the question Götsch seeks to answer. His specialty is recreating forests in lands devastated by monoculture and cattle raising. For this, he uses the same techniques as used by the natural forest. He starts his agroforestry by first using the pioneer species, plants often considered “weeds” and only later, with time and ecological succession, does he start reforesting the area. This reforestation, of course, is also efficient for man. The cultivation of food species does not exclude the existence of a forest. It is entirely possible to produce edible forests. According to him, we must syntropize, transform entropy into negentropy, as recommended by Stiegler:

[...] if being-there exists only as being-put-in-question, then it is always organological becoming that puts it into question in the process of a doubly epochal redoubling within which the therapeutic care required by the new organological situation transforms this becoming into a future, that is, transforms this entropy into negentropy.³²

It would be worth quoting Stiegler again now under the understanding of Amerindian perspectivism: “What appears entropic from one angle is negentropic from another angle.”³³ Indigenous peoples understood this logic very well, and even combined it with their cosmology. As already mentioned, many indigenous peoples seem to have boosted

31 Joel White, “Outline to an Architectonics of Thermodynamics” in *Contingency and Plasticity in Everyday Technologies*, ed. Natasha Lushetich, Iain Campbell, and Dominic Smith (London: Rowman & Littlefield, 2022), 189–190

32 Bernard Stiegler, *The Neganthropocene*, 36.

33 Bernard Stiegler, *The Neganthropocene*, 54.

the Amazon rainforest. Pardini³⁴ makes it clear that the studies are conclusive in finding a landscape and biological configuration highly anthropized for thousands of years. Managed and mainly cultivated, the Amazon was shaped to be an orchard-forest, which gave the indigenous people what they needed. These knew how to “infiltrate” their agriculture in the middle of the forest, without having to deforest it.

The “original affluent society” that Marshall Sahlins³⁵ proposed to explain hunter-gatherer societies was extensively “planned” by Amazonian societies. The collection was the result of an agriculture cultivated for millennia and that was reflected in abundance in the present time. However, as above, even the term “agriculture” should be questioned, because such an accomplishment is far from what the West conceives as “agriculture.” An “agri-nature” is formed on the cosmotechnical horizon. Similar to the butcher Pao Ding, addressed by Yuk Hui in his book *The Question concerning technology in China*,³⁶ who follows the Dao of meat in order not to waste his knife, we must seek the path of an agriculture that boosts the forest, which uses its movement to exist. In fact, we need an agroforestry.

Conclusion

With terms used by Stiegler, we conclude using a “cosmopolitical medicine”: geophysiology is the general practitioner, which diagnoses the disease of Gaia: the Entropocene; and the negantropologist is the scientist who seeks alternatives for its cure. These healing alternatives permeate cosmotechnics other than European ones. Among them would be syntropic agriculture, an example of the “translation” of indigenous cosmology as an agroecological technique, systematized in more conceivable terms for conventional agriculture, making its application possible.

The concept of pharmakon, rescued by Derrida in “Plato’s Pharmacy,” and used by Stiegler,³⁷ is very similar to the agency that man exercises in syntropic agriculture. The pharmakon is at once what enables care to be taken and that of which care must be taken—in the sense that it is necessary to pay attention: its power is curative to the immeasurable

34 Patrick Pardini, “Amazônia indígena: a floresta como sujeito,” *Boletim do Museu Paraense Emílio Goeldi. Ciências Humanas* 15, no. 1 (2020).

35 Marshall Sahlins, “The Original Affluent Society,” in *Limited Wants, Unlimited Means: A Reader on Hunter-Gatherer Economics and the Environment*, ed. John Gowdy (Washington D.C.: Island Press, 1998), 5.

36 Yuk Hui, *The Question Concerning Technology in China: An Essay in Cosmotechnics* (Fallmouth: Urbanomic, 2016): 101–108.

37 Bernard Stiegler, *What Makes Life Worth Living: On Pharmacology* (Cambridge: John Wiley & Sons, 2013), 4.

extent that it is also destructive.

Man, *Homo sapiens*, this machine (because he often behaves as such) that we are used to seeing destroying, razing landscapes, can indeed be a nutrient, a coherent agent within the ecosystem. Not only can this human species choose to change its trajectory, but it has also become an imperative. Stopping much of the ecological harm would be a start, of course, but it is also important to note that humans have an active role to play, that they make up part of the ecosystem. Syntropic agriculture reveals one of those roles in which man can be active, in which he can be coherently “in order” by generating “chaos,” as Prigogine and Stengers suggest.

Acting in the right amount and in a way that boosts agroforestry systems, man can “destroy” the forest: pruning, bringing organic matter to the soil, increasing the vegetation cover of the soil, which fertilizes the flora. Leaves and branches, when covering the soil, protect the microbiota residing in its subsurface, regulate temperature, and conserve moisture. “Hurting” trees in specific amounts and points, man acts like substances that, also in specific amounts and points, act on the human body. The way, intensity, and level of sophistication with which we deal with the forest influences the results, generating impacts that return and return. The pruning carried out is a bifurcation in the system.

Neganthropology can be constituted only within a speculative cosmology, that is, only by conceiving the cosmos as a process within which localities are produced that give rise to various feedback loops.³⁸ That is why, in conclusion, syntropic agriculture can contribute to neganthropology. It is a cosmological (and speculative) perspective that not only opposes monoculture and plantation, but also takes into account general thermodynamics, generating those feedback loops.

38 Bernard Stiegler, *The Neganthropocene*, 239.

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