

The World According to Amaranth: Interspecies Memory in Tehuacán Valley

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*Indians had come to recognize that their fate
and the fate of amaranth was one and the same.*

—John N. Cole, *Amaranth: From the Past for the Future*

Tehuacán Valley lies between the neovolcanic mountain ranges that divide it from Oaxaca to the south and Veracruz to the east. The mountains stop the clouds coming from the oceans and, as a result, Tehuacán Valley is very dry. The clouds only manage to rise high enough to get through to the valley when hurricanes hit from the Gulf of Mexico or the Pacific Ocean. Then it rains. Several of the volcanos are active and provoke little earthquakes, especially in the summer. There is a great variety of cacti on the horizon in the south, and beyond the mountain range in the east. In the west, the mountains are closer, and the slopes climbing up to the Pico de Orizaba are covered with snow all year round.

Some people know that Tehuacán Valley is the place of origin of maize, where the oldest maize samples were found by Richard MacNeish. Very few know, however, that along with maize, this was also a place from which a bio-cultural empire of amaranth extended that was decisive for the prosperity and health of pre-Hispanic communities. Amaranth's biological qualities and indigenous peoples' cultural and political arrangements were so closely interrelated that, as it turned out later, they could not prosper without each other. After the conquest, amaranth disappeared from this place for many centuries only to return relatively recently. Maize and amaranth are now two of the main crops in Tehuacán Valley, but when it does not rain, maize withers and amaranth survives.

Amaranth, like quinoa, is a very high-maintenance plant. It demands a slower rhythm of life adjusted to its needs and, in crucial moments of planting, replanting, and harvesting, a great deal of direct attention. Even if it can survive for a month without water, it is sensitive to various pests, and it withers without light. Amaranth prefers a minifundio rather than latifundio because it requires human handling at various moments: for example, it does best when harvested by hand. It likes to be touched. Indigenous people like to work with amaranth. The human population of Tehuacán Valley includes mixed-race Mexicans, those who José Vasconcelos called almost one hundred years ago “a cosmic race,” along with relatively homogenous indigenous villages of Mixteca, Popolocas—whom Aztecs (or Nahuas) used to (and still) consider inferior—and Nahuas themselves.¹ Popolocas are the poorest ethnic group in the dry region of La Mixteca surrounding the town of Tehuacán (see Figures 1 and 2).



Figure 1. Drought at the Valley of Tehuacán (La Mixteca Region).
Photograph by Kata Beilin

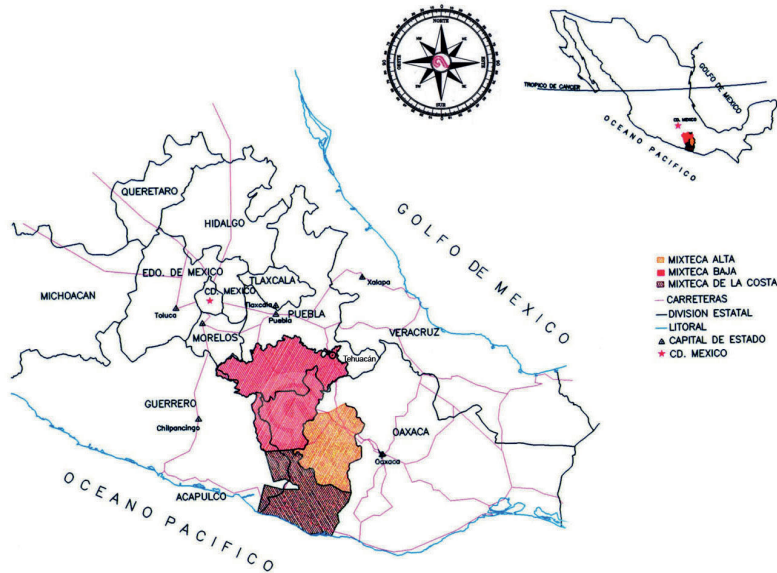


Figure 2. La Mixteca – Map. Grupo Cooperativo Quali.

In the 1980s, Raúl Hernández Garciadiego and Gisela Herrerías arrived in Tehuacán Valley in order to think of poverty remediation strategies. In a lengthy conversation with me in his office in Tehuacán, Raúl, a philosopher who wrote his dissertation in dialogue with the “difference principle” of John Rawls’s theory of justice, insisted that even if a certain level of inequality may be unavoidable, justice can only be achieved by a systematic effort to decrease it. By becoming an activist rather than academic, he rebelled against philosophy as representing the interests of the class in power, and let himself be led by his dreams of a more equal society. Gisela, his wife, has developed similar ideals while pursuing her doctorate in education. But in La Mixteca, their belief that poverty could be remedied encountered dry earth. Soon they realized that suffering in Tehuacán Valley was not due to the lack of money as much as it was to the lack of water. The area’s geological formation does not allow for the drilling of wells, and the people could not cover the cost of deep drilling and pumping. Very little can be harvested from dry-farming due to scarce and irregular rains during the four-month rainy season. The couple knew that helping others is a dangerous enterprise that can result in the imposition of one’s own visions and needs, thereby worsening rather than improving the lives of those one is trying to help. In order to really help, one should begin by understanding and this understanding must be as little subjective as possible.

In order to achieve this goal, Raúl and Gisela used the method they learned in workshops led by José Luis Brito, who advocated a form of participative observation that required participant-observers to write notes in the exact words of the people with whom they interacted in an effort to exclude their own impressions. According to Brito, this practice decreased the possibility of projecting one's own ideals onto interviewed subjects. Researchers had to respect the time of the communities they wanted to understand, which was often ruled by different rhythms and cycles. Years passed, and Gisela and Raúl did not achieve anything until, one day, amaranth helped them to move forward.

Someone mentioned amaranth to Gisela and Raúl as a very nutritious grain that does well in the drought conditions and that used to be an essential crop centuries ago. In the midst of doubts, determined to move forward somehow, they decided to try. In 1982, Eduardo Espitia, a seed collector, gave them seeds of *Amaranthus hypochondriacus*, *Amaranthus caudatus*, and *Amaranthus cruentus* so that they could see which one would grow best. Not surprisingly, *Amaranthus hypochondriacus*, the variety that had grown in Mexico in precolonial times, outgrew its competitors and thus opened the way to the fields of Tehuacán Valley again.

Planted in a small parcel in a Popoloca village, the amaranth grew fast. After six weeks, it was forty centimeters tall, green and beautiful. But the next time that Raúl went to see it, it was no longer there. Not a single leaf was left. It had all disappeared, leaving no trace, as if it had never been planted. Perplexed, Raúl knocked on the door of the closest Popoloca house to ask the people living there if they knew what happened to the field that they had planted and that was now shining black soil. "Se enquelitó," was the answer, "y lo desenquelitamos." Aztecs used to classify plants into *zacates*, those which were inedible, and *quelites*, the name given to all wild plants that could be eaten. What local people told Raúl was that they noticed the field suddenly covered with yummy greens and ate them. Raúl returned home depressed, but Gisela told him that this was their first success, that in this way "amaranth told them" (this was the way she put it) that it would grow well in the valley and the Popoloca people told them that they would eat it because, somehow, they remembered it. It is hard to tell how amaranth reminded Popoloca people that it was edible. It could have been similar to some other *quelites* that they ate.² Or, maybe, it was the smell exhaled by the leaves after one of those extremely rare rains that attracted the humans, awakening in them the *biocultural memory* (Toledo and Barrera-Bassols) from centuries past, memories passed through genes and interactions from the ancestors who often ate green leaves of amaranth in a stew. In the beautiful chapter on "The Language of the Trees," Peter Wohlleben argues that trees and other plants communicate with other species through scent.³ The bottom line is that indigenous people in

the Tehuacán Valley liked to grow and eat amaranth and they accepted white activists from the outside as amaranth's allies.



Figure 3. Ripe Amaranth. Grupo Cooperativo Quali.



Figure 4. Maturing Amaranth. Photograph by Felix Beilin.

According to Toledo and Barrera-Bassols, *biocultural memory* is a knowledge of the environment with its multiple forms of life relevant to human survival that allows us to continue inhabiting the planet. The concept involves human

subjective perception of the environment as a space of life where we establish relationships with different creatures that help us satisfy our needs. In this essay, I stretch this concept to see memory as an inter- and intra-active hybrid material and semiotic process occurring between humans and certain elements of the nonhuman environment.⁴ According to Karen Barad, nothing exists except through intra-action with others, and all agency is distributed. I argue that this is also true for environmental memories, which are not just human subjective phenomena, but rather intra-active phenomena. For that reason, I call them *interspecies memories*.

I work through the history of human relations with amaranth attempting to see it also as a history of amaranth's relations with humans. For this purpose, I connect the concept of *biocultural memory* with Eduardo Kohn's concept of "living thoughts" (78). In his multispecies ethnography of the Amazon forest, Kohn coined the concept of "living thoughts" to describe live organisms reacting to each other, not only within the life span of an individual, but also in the deep time of evolution where the shape of an anteater's mouth transforms to fit the corridors of the anthill. This adjustment, in Kohn's view, reflects species' learning by experience, which is the sign of life's thoughtfulness. For the author, life has its own way of thinking through time, its changes are not only and simply accidental. While Kohn interprets a thinking forest, this project searches for meaning in the stories of amaranth's agri-cultural interventions, interpreting the living thoughts of amaranth spreading through the fields of Tehuacán Valley since the time of the Aztecs, as if it followed what Uexküll calls a "Plan" (qtd. in Berthoz 21). Following the subtle understanding of a plant memory by Michael Marder that, based on plant biology, attempts to imagine plant experience as Uexküll imagined that of a tick, this essay explores alliances and agendas of amaranth through time to focus on its present rebirth in *Proyecto Alternativas* initiated by Raúl Hernández Garciadiego and Gisela Herreras.⁵

Interspecies Memory

For both humans and nonhumans, in the words of Eduardo Kohn, "adaptation constitutes a guess about what the world is like" (49), and that guess is a kind of thought. In this sense, the living world is full of thought: a world of sensorial perceptions that go beyond what humans can grasp as "thought," but that is not governed by human languages or their logics. To transform extraction of resources into interspecies partnerships, we need to imagine how different forms of life "think." Or, as Libby Robin puts it, invoking Ursula Heise's vision of biodiversity, "environmental justice demands 'multi-species justice,'"

(6) which in turn requires a deeper understanding of other species' interactions. Following Michael Marder's work, I reflect on the possibility that plants are not only *actants* in Bruno Latour's meaning of significant catalyzers of socioeconomic processes, but as Kohn and some indigenous peoples believe, that they indeed have their own species "thinking" and "agendas." I place these words in quotation marks because they are not human-like thinking and agendas, but, due to a lack of better concepts, I use them as a bridge toward a less objectifying understanding of nature. Anthropomorphism is, in this case, a strategy to conquer anthropocentrism because it reminds us that we are part of the environment, perhaps not so different, exceptional, and separated as modern epistemology suggests. I argue that both human and plant interests are interconnected through deep and long-lasting alliances. For example, various peoples of Mexico say that maize is their mother who protects them, but also demands protection from them. In this case, the plant's agenda is realized through an alliance with human groups with whom they grow together over very long spans of time. In the processes of co-evolution of different species and their mutual entanglements, agency and memory are distributed among partners in a fight for survival and betterment. The stories of transformations of nonhuman life forms and their interactions have their own meaning similar to human history.

According to plant philosopher Marder, vegetal beings, while devoid of consciousness, nonetheless possess memories (126). This imageless memory is an inscription of the diverse stimuli of the environment on the cells of the plant. Marder writes that "Whereas humans remember whatever has phenomenally appeared in the light, plants keep the memory of light itself" (127). This is how matter remembers matter. Marder defines plants' rumination as "thinking before thinking": that is, a thinking independent from the instinctual need to adapt and formal intelligence to abstract. In Marder's words, plant thinking, however, has a "nonconscious intentionality" that "fuses with milieu" and does not have to return to the self (125). How have amaranth cells registered the times of expansion under the Aztecs and the European conquest when amaranth was almost totally eradicated through burning, cutting, shading, and uprooting?

In 1961, in Coxcatlán Cave, Richard MacNeish found tightly closed pottery dishes holding various plant species from many thousands of years ago. In an interview we held in Tehuacán, Raúl told me about one of MacNeish's later visits to Tehuacán Valley during the 1990s. He explained that outside of the caves, there were holes naturally formed by rock dissolution, where cave-dwellers threw all kinds of daily waste from food, tools, and stools, which formed bottom-up building strata that were easy to date. MacNeish called this a "time capsule" that gives a clear picture of the evolution of the

sequence of human groups that occupied the cave. In the strata, amaranth was present along with maize, beans, chile, tomatoes, avocados, and other food remains. Raúl understood that amaranth played a crucial role in agriculture and diet in Mesoamerican cultures, but then it was suppressed and silenced. Amaranth's domestication in Tehuacán Valley began around the same time as corn, but, according to myth and history, they occurred differently.⁶ While grains of corn were brought to the people by Quetzalcoatl, who turned into an ant to teach his people how to find food, amaranth is portrayed as more active, as it is thought to have come to the ancient people by itself. Cole states that certain wild plants, such as amaranth, were “superbly adapted to become weedy camp followers of ancient hunters and gatherers. They would have been quick and prolific weedy colonists” (36). People tasted and tried the newcomers, welcomed them, and a symbiosis between them developed. Centuries later, when people become more numerous, these weeds that followed them became their first crops. It is plausible that attribution of magical qualities to amaranth has been due to its particularly active nature, it being a plant that “spreads as ants” (Cole 37).

The metaphor of “time capsule” opens a deep-time level of analysis in which concepts of memory, agency, and causality need to be readjusted. The oldest corn cobs preserved in ceramic vases dated back to 5000–3400 B.C. (MacNeish). These and other discoveries of MacNeish in Tehuacán Valley pushed the beginning of agriculture to 7000 B.C. (Flannery and Marcus 213). This is a time dimension beyond a single human experience that shapes our understanding of memory, agency, and causality as human attributes. In the *long durée*, measured in the slow-paced rhythms of centuries, individuals get lost. Nations expand and conquer territories of others as if they were weeds taking over agricultural plantations. We devise a direction and purpose in the developments of alliances or antagonisms between cultures and between species. After periods of triumphant expansion, however, civilizations and ecosystems may similarly shrink and sometimes disappear for good or for few centuries, after which they resurface as if from the seeds of a burnt forest. In this sense, Earth is seeded with human and nonhuman memories. The dynamics of human species in the *long durée* might be similar to those of plants' and other nonhuman species. In this kind of long-term contemplation of human life on the planet, individual human agency dissolves, giving visibility to processes in which species' agency or strategy can be attributed. Each form of life has its ways of triumphing. It is debatable whether 600,000 seeds of an amaranth plant in the wind can guarantee survival better, in the long run, than a human brain.



Figure 5. Amaranth Agriculture in Prehispanic Times *Florentine Codex* Sheet 99. Instituto Nacional de Antropología e Historia, Creative Commons.

Sixteenth-century codices, such as Mendoza (1534–42; Frances) and *Florentine* (seventeenth century; Sahagún 2018c; see Figure 5) attest that amaranth was among the four most important crops of the Aztecs, together with maize, beans, and chia, but also show that it had even greater hidden significance, both material and symbolic, because it was magical. It was the grain of gods.⁷ If the ancient Mexican people have conceived of themselves as made of maize (“hombres de maíz”), they have made their gods’ bodies out of amaranth. Although consumed by everyone in precolonial times, amaranth grain was associated with the rulers and priests. It was then called “mystical grains of the Aztecs,” “supergrain of the Aztecs,” and the “golden grain of the Gods” (Stallknecht and Schulz-Schaffer). Due to its high content of easy-to-digest protein, lysine, and other important amino acids, amaranth made people strong and resistant to illness. It was the grain that not only allowed people to live, like corn did, but also to perform better, to be superior. The grain was considered nourishing to infants and provided energy and strength to soldiers on extended trips (Stallknecht and Schulz-Schaffer). It was cherished for its hardiness because it withstood prolonged droughts and provided nutrition during the months of so-called *canicula*, July and August, when other foods were not available (Hernández and Herrerías). Apart from growing it themselves on Tenochtitlán’s *chinampas*, Aztecs demanded as much amaranth grain as they could get as a tribute from conquered cities.⁸ They appreciated amaranth so much for its qualities that they made it sacred and built their idols (mainly Huichilopochtli), larger than human bodies, from amaranth flour mixed

with maguey cactus syrup (Sahagún, vol. 3, 212–14). The Aztecs' search for strength and endurance, which they believed the amaranth grain could provide, created favorable conditions for amaranth's expansion. The Aztecs' power and amaranth plantations grew together and then collapsed together with the arrival of Spaniards who were determined to substitute amaranth with wheat, because of its biocultural significance.

Amaranth was very intimately connected to a number of cultural forms of pre-Columbian societies. Even if the majority of the information we have is related to its significance for the Aztecs, we know from archeological discoveries that it was similarly cherished in other Mesoamerican communities. It was built into structures of pleasure, hierarchy, sociability, and sacrifice, often constituting their essential ingredient. Amaranth was part of those religious festivities in which people and even children were sacrificed. According to Sahagún, ground amaranth was mixed with corn and maguey syrup or human blood and formed into little figures of the god Huitchilopochtli and other divinities, to be offered at the temple where sacrifices were performed (vol.1, book 2). Ultimately, figures made of amaranth paste were broken to pieces and distributed among priests and all the people to be eaten as “flesh and bones of gods” as if in communion. Spaniards thought that this mocked the Christian Eucharist, which was one of the reasons for the conquerors' animosity toward amaranth. They began to systematically destroy amaranth plantations both in Nueva España and Peru. The deeper reason might have been, however, different. Spaniards may have learned that without the consumption of amaranth, native Americans would be weakened and easier to control. If corn survived while amaranth disappeared, it was because corn sustained life while amaranth sustained a civilization both materially and, in the Aztecs' case, as an important symbol. Allied with elites and gods, amaranth disappeared altogether with them. Maize, allied with the poor, survived.

In Nahuatl, amaranth is called *huautli*, and it appears as a main ingredient of most gourmet Aztec dishes described by Daniel Early (21–22): special kinds of tamales made from mixed amaranth and maize flour, the *huauquilt-amalli*, *cauhquilmolli*, a sauce from amaranth leaves, *tzoallaxcalli*, popped amaranth combined with a syrup made from maguey cactus, three varieties of tortillas made from amaranth, and two drinks from popped and ground amaranth seeds.⁹ Breastfeeding mothers were given those drinks as tonics and soldiers and travelers took with them amaranth treats to keep strong and resistant to tiredness and illness. According to *tlamatinime*, Aztec wise men, three elements maintained people's lives: “in tonacaiotl, in tlaolli, in etl, in oauhtli,” or maize, beans, and amaranth (Hernández and Herrerías 71).¹⁰ Regular people's diets consisted of maize and amaranth tortillas, amaranth

and chia *atole*, and amaranth and maize tamales, as well as beans and forest plants, among which forest amaranth's (*Amaranthus hybridus*) leaves cooked into a stew were one of the most appreciated together with insects. In terms of amounts of protein, fats, calcium, phosphorus, and vitamins considered as necessary for the human body by today's medicine, that nutrition was ideally balanced.

It makes perfect sense that the abrupt decline of native populations in the thriving areas of Mesoamerica and the Andes, which according to some historians decreased by 90 percent, was not only due to the spread of bacteria and viruses to which native bodies lacked immunity, but also due to the collapse of the traditional sources of nutrition that sustained the strength of their immune systems. One of the most crucial (and now missing) of these ingredients was amaranth. The changes in nutrition followed the transformation of agriculture. According to Susanna Hecht, agrarian cults like that of amaranth regulated pre-discovery land use and constituted archives of agrarian knowledge. They also monitored indigenous nutrition and health practices, constituting a sort of enactment of the population health control system, that anachronistically could be called "ethnic biopolitics." While cult-based agricultures were suppressed by the Spaniards, a new system of food production was rising (2). This new system, introduced together with the evangelical message, expressed the cultural worldview of the Christian world and was increasingly profit-oriented. According to Hecht, the religious conquest of the Americas "interfered with the generational and lateral transfer of local agronomic knowledges," while "restructuring of agricultural base of the rural communities for colonial and market purposes" contributed to abandonment of what she calls "hard technologies" such as irrigation systems and "soft technologies" such as organic pest control and soil care, as well as various important crops, among them amaranth (2).¹¹

Cult agriculture was replaced by cash crops based, with increasing frequency, on slave labor that was brought to plantations from other areas for net-profit increases. Slave laborers lacked agricultural knowledge and the motivation to acquire it, which led to "erosion" in both environmental and human domains as various sustainable technologies and crops were abandoned to the detriment of environment and health. Colonial agriculture was designed not for the benefit of the local populations, but rather for the needs of local and far-flung colonial powers. Cash cropping was less focused on sustainability and minimizing risk and increasingly on multiplying short-term profits. Over the long haul, the most significant factor contributing to the demise of amaranth agriculture has not been the directly destructive practices of the sixteenth century or prohibition, but rather the fact that with the rise of Spaniards, crops stopped serving for just consumption and "became saleable

into gold and silver” (Frank 3).¹² Amaranth was a sustenance crop and it did not have cash value in Spanish colonies so its production was disappearing except in isolated cases of farmers that produced it for their own needs. The fate of amaranth was indeed the same as the fate of the peoples with whom it allied, whose ways of life and knowledges it helped to construct. It would have to wait several centuries for people who would appreciate it again and with whom it could connect.

After the arrival of Spaniards, amaranth disappeared or almost disappeared for many centuries and knowledge of its health qualities became lost. Even though MacNeish mentions it in his report from Coxcatlán Cave (24), most of the subsequent descriptions of his discoveries do not even name amaranth. For example, in a biographical essay about MacNeish, Kent Flannery and Joyce Marcus mention one by one all the plants and animals discovered in Coxcatlán Cave: the oldest maize, squash, beans, tomatoes, avocados, dogs, bees, and turkeys on American continent (213). But amaranth is not mentioned, even though as Raúl insists, it was there. This is likely because the writers were not aware of this plant’s existence and significance. Unfading, as its name suggests, however, amaranth has never died out completely. Perhaps rather than being abandoned, it had been hiding among the indigenous inhabitants of the Americas where the pre-Hispanic gods were still cherished and native ways of life were still practiced for centuries. Sauer writes in 1950: “The crop is practically unknown to everyone except to Indians who grow it” (qtd. in Cole 67). While various indigenous people in Mexico continued planting small quantities of amaranth for food, Edgar Anderson finds amaranth in Honduras where “the family was not growing it for seed, and did not even know it could be used for nourishment. To them, it was a magic plant, whose seeds, wrapped up in little packets and carried close to the chest, had the power to ward off a cold, or cure one after it had started” (45). For these people in Honduras, the knowledge of amaranth as a food crop was forgotten, but they cherished amaranth as a plant with an agency of magic properties.

When the Catholic Church’s sixteenth- and seventeenth-century anti-amaranth campaign (due to the plant’s religious significance in pre-Hispanic rituals) was over, anti-amaranth discourses resurfaced in nineteenth- and twentieth-century Victorian culture. Interestingly, in these white, middle-class discourses, amaranth was again equipped with quasimagical properties such as attracting lightning and poisoning other crops (Cole 33). In the nineteenth century, the white middle class reconceptualized amaranth as a harmful weed invading food and cash crops. With the rise of positivistic methods in the nineteenth century, all nonscientific forms of knowledge about nature began to be treated as superstition. Paradoxically, making

space for the unique rein of scientific knowledge led to attributing malignancy to a plant associated with indigenous worldviews. While spreading fear of amaranth as a malignant plant can itself be viewed as a superstition, it is particularly interesting that this rhetoric espoused by a scientific worldview contains a repressed awareness of the strength of this plant's agency.

The Rodale Institute for Organic Agriculture, founded by Robert Rodale in 1947, also attributed special powers to amaranth, imagining it, in turn, as equipped with the capacity to end world hunger. Raúl travelled in 1985 to the Rodale Institute and took this idea seriously. Proyecto Alternativas, which he launched together with Gisela, produced special amaranth nutritional supplements and distributed them in La Mixteca region among children with signs of malnutrition. Tests run by allied nutritionists showed that within six months, these amaranth supplements managed to bring children back to full health (Herrerías). The Rodale Institute; the Amaranth Institute in Iowa; Proyecto Alternativas in Tehuacán; Cooperativa Tatahuaso in Salta, Argentina; and various other similarly oriented projects today promote amaranth as a plant that can alleviate poverty and malnutrition among those human groups that became marginalized by colonial and postcolonial profit-driven agriculture and allied scientific discourses.

Amaranth led Raúl and Gisela to study the history of the region. They discovered pictures of pre-Hispanic irrigation installations that inspired them during the next thirty years in their work in ecohydrology. Drawings of small dams, channels, and rainwater collection, developed by pre-Hispanic farmers, whose remains are still to be found, were taken up by a group of engineers who joined Proyecto Alternativas. They constructed medium and small rainwater retention systems on various levels of the ravines and temporary streams, connecting horizontal channels as well as smaller vertical channels leading to the fields. They also taught the people how to build dozens of water containers to catch and preserve rain water. This system brought water to 250,000 people in the dry region of La Mixteca and it allowed for a prosperous growth of amaranth plantations. Soon amaranth took them even further.

In 1988, Raúl and Gisela managed to secure funding for their eco-agro-hydrological projects from national and international foundations, but in 1994, things changed dramatically. As NAFTA agreements were signed and celebrated in Mexico City, the Zapatistas rose up in Chiapas, the peso collapsed, and various banks went bankrupt. Gisela and Raúl realized that they could only count on amaranth. They teamed up with young engineers to invent amaranth agro-industrial machines and amaranth became a cash crop, something it has never been before in Tehuacán Valley. The idea, though, was not so much to generate wealth—it has not made anyone rich—but rather to use amaranth as self-sustainability and support for hydrological projects. Today,

two medium-sized factories produce organic amaranth sweets, snacks, cookies, and drinks, in some ways based on pre-Hispanic recipes, under the well-known brand Quali. They employ around 130 people, sell their products in Mexico and the organic market in Europe, and provide funds for continuing support for amaranth growers as well as for water works. Ingenious marketing of Quali products in the nongluten and organic markets allowed them to grow by 21.6 percent per year (while the average growth of the Mexican economy has been only 2.5 percent). All the employees of Quali and Proyecto Alternativas have medical insurance, paid holidays, and retirement benefits as well as collective food and childcare. The cafeteria cooks additional meals that women workers take home for their husbands and children, so that after the workday they do not need to start the evening by cooking for their families. The salary structure in Quali and Proyecto Alternativas, including the water sector called *Agua para Siempre*, has been modelled on the famous Mondragón Group of the Basque Country, in that the highest salary cannot be more than eleven times higher than the lowest. The profits from Quali are used to subsidize initiatives of *Agua para Siempre*.

In 2010, Raúl and Gisela were awarded the most important Mexican prize for the best social project “Iniciativa México”; in 2012, they received the National Agroalimentary Award; and in 2015, they received the Award for the Best Sustainable Rural Development Experience. It is hard to believe that these two humanists could achieve so much material change. One thing, however, that was not taken into consideration was the participation of amaranth that lead Raúl and Gisela to reactivate the regional interspecies memory of life in the Valley of Tehuacán. Raúl told me: “the meeting with amaranth was beautiful.” This celebratory conclusion needs to be problematized. In spite of all the attempts to mitigate market influence, turning amaranth to a cash crop opens up the question of if and how its sacred subsistence nature can transform to coexist with the neoliberal system without being transformed by it. While during its first era of glory under the Aztecs, amaranth allied itself with the indigenous aristocracy and priestly class, in its recent resurgence, it first became an ally of the marginalized indigenous poor and philosopher-activists, and then it compromised with the neoliberal capitalism that surrounds it by appealing to its change-seeking middle class and its victims who developed gluten intolerance. In parallel, the mutated weed varieties of amaranth began a guerrilla-like war against transgenic monocrops.

The World According to Amaranth

An active nature of amaranth emerged again as its weed varieties attacked genetically modified plantations of Roundup Ready Soy and Roundup Ready

Corn throughout the Americas. *Amarantus palmieri*, *Amaranthus rudis*, and *Amaranthus hybridus*, together with other weeds, mutated to withstand glyphosate, which is the main ingredient of Roundup used with various genetically engineered (GE) crop plantations. This is the way that weeds remember the pesticide glyphosate. This weed war against the GE-crop economy has also enrolled allies from among humans who had their reasons to hate it (see Eduardo Molinari's essay in this volume). In Argentina, where transgenic agriculture, featuring prominently Roundup Ready (RR)-soy that today occupies more than 50 percent of all arable land, was first introduced in 1996, family agriculture has almost completely disappeared. The profits offered by soy forced small growers to sell or rent their fields to soy lords and move to the city. The countryside turned into a "green desert" that has also become toxic. Farming without farmers is handled by huge agricultural machines, including planes and even satellite technology. The input of pesticides has grown several times during the two decades.¹³ Soil, water, and human bodies in the vicinity of the fields are heavily polluted. Rates of cancer and other autoimmune illnesses have increased significantly (Ávila Vázquez, "Agricultura tóxica"; Ávila Vázquez, *Evaluación de la salud*; Chaco Government Report). In these circumstances, anti-RR-soy activists chose amaranth as their symbolic leader. An award-winning environmental journalist, Ricardo Serruya, wrote a book titled *La venganza del amaranto* (The Revenge of Amaranth, 2013), and activists' pamphlets compare amaranth's red flower to a bomb-like explosion over the fields of RR-soy.

The Museo del Hambre opened an exhibition about environmental activism, titled "Malezas," which means "weeds," as it compares human and weed resistance.¹⁴ Some activists began to produce amaranth bombs, balls of mud filled with mutated amaranth seeds, and threw them to RR-soy fields. These acts of attributing to amaranth an agenda of revenge for the colonial and neocolonial domination of the indigenous fields by profit-oriented ventures is yet another manifestation of interspecies memory. Amaranth's precolonial alliance with indigenous people and their visions of life returns in anti-GE crops activism. According to Bayer, the mutated *Palmer Amaranth* is able to take over RR-soy fields and reduce its yield by up to 79 percent.¹⁵ When the crop stops being profitable, the field is abandoned. The abandoned RR-soy fields are slowly taken back by forests.

No genetically engineered crops are to be found yet in Tehuacán Valley, but the region's economy has been transformed in other ways to fit the global neoliberal economy. It is the second city of the Mexican state of Puebla, with a population fluctuating between 250,000 and 350,000, depending on sweatshop trends. The city has been known for its mineral

springs; Peñafiel, a multinational brand under Cadbury Schweppes, bottles water and sells it all over the country.

Tehuacán is a hard-working city. People look tired, they walk fast, slightly bent over, with their eyes fixed on the pavement. And the pavement has so many holes that there are no stones left at times. Many people wear masks over their mouths as if it were flu season, but I am told this has to do with the chicken and egg industry that competes with the blue jean sweatshops for the most important production in town. The face masks protect the lungs of chicken coop workers from harmful dust, feathers, ammonia, poultry fecal bacteria, and disease condensed in the air. There are no windows in the massive sheds that hold tens of thousands of suffering birds reduced to their biological capacity to produce eggs and surrender their eatable flesh. Many chicken factories lack facilities to treat residual water and filter the air. The contaminating stink extends far through the city. That is why people walk through polluted streets with surgical masks on.



Figure 6. Chicken Factory Farm. IStock: roibu.

According to Gerardo Otero et al., an exponential increase in poultry production and consumption has been characteristic of the neoliberal economy and what they call the neoliberal diet that is based on chicken. Since 1994, Mexican poultry production grown by almost 250 percent. The neoliberal diet has also resulted in a greater intake of sugary foods, obesity, diabetes, and other diseases (Otero et al.).¹⁶ These ailments have been particularly intense among the Mexican and Central American poor as well as indigenous populations in the United States (Otero; O'Brien; Moran-Thomas). The most extreme form of the capitalist economy finds it most profitable to sell highly processed foods, filled with chemicals and addictive sugars to the poorest populations that, as a result, live on Bimbo® bread, candy, and sodas. Once again with NAFTA, Mexican people have suffered in their flesh the clashes of cultures. This time, it is the clash of the culture of processed foods coming from across the border with the Mexican culture of maize that kept Mexican indigenous peoples in

touch with their past, structuring their family life around this traditional crop, and constituting a cultural bridge between them and the mestizo majority.

Since the 1970s, nutritionists have publicized protein deficiency among poor, mainly indigenous Mexican children, which, according to them, precluded their proper brain development. It was proposed that this deficiency be remedied by distributing among peasants improved maize seeds that would produce cobs with higher protein content, along with introducing soy into their diet. Starting in 1996, these arguments have been used by various authorities, businesses, and sectors of the scientific community to justify support for planting genetically modified maize and soy in Mexico.¹⁷ However, indigenous Mexicans have never begun to eat soy, not liking its taste and not knowing how to prepare it. They also preferred their indigenous seeds to the hybrid varieties, and they have felt threatened by the prospect of the advent of GE-maize varieties, knowing what effects GE-agriculture has had in Paraguay, Argentina, and Brazil. Through the networks of alterglobalization, peasant activists from different countries share stories of loss of livelihood, chemical pollution, and violence resulting from the concentration of land in the hands of agribusiness. In contrast to the cultural transformations brought by the bioeconomy, the cooperative structure for the planting of amaranth introduced by Proyecto Alternativas fits with the indigenous peoples' cultures of communal cooperation. Amaranth has become an alternative to the sweatshop and factory farm model of development in Tehuacán Valley. No one wears surgical masks in amaranth fields. Here people also work hard, but they move slowly and from time to time stretch and look at the mountains and the sky.

Amaranth weed and edible varieties have reemerged as agents of resistance to corporate monocrop agriculture and, at the same time, as partners in the processes of re-existence aimed at decolonizing the Hispanic world by bringing back precolonial world visions and strategies (Mignolo).¹⁸ When indigenous technologies, values, and philosophies are incorporated into the contemporary context and connected with twenty-first-century knowledges, their synergies offer the possibility of an epistemological renewal that can lead to a restructuring of the economy and social organization for the sake of sustainability. But part of this renewal is conditioned by reconsidering plant and ecosystem natures as (re)active and human identity on Earth as intra-actively established by nonhumans. In other words, it is not sufficient to just learn indigenous people's agricultural strategies. The learning has to go deeper in order to understand and incorporate the most valuable aspects of indigenous people's relationship with the nonhuman world; for example, the capacity to learn not about it but from it and find partners within it.

Amaranth shows activists ways to fight against the corporate takeover of food production and it also points them toward a possible alternative organi-

zation for poverty alleviation. As Miguel Altieri notices, “many scientists in developed countries are beginning to show interest in traditional agriculture, especially in small-scale mixed crop systems because they search for ways to remedy deficiencies in modern agriculture. As more research is conducted, many farming practices once regarded as primitive or misguided, are being recognized as sophisticated and appropriate” (107–08). For example, Silva Grobelnik Mlakar et al. present amaranth as an alternative crop able to mediate the negative consequences of globalized industrial agriculture. Amaranth allies with the poor and with alternative economy activists who want to rebuild the lost agrarian knowledges that could restore damaged ecosystems and reintegrate marginalized indigenous peasants. Of course, amaranth has no way of finding them in the way we are looking for things, but it sends millions of its seeds throughout the world and these are waiting like Uexküll’s tick for a person like Raúl to carry them back to the fields.

Amaranth Living Thought: A Coda on Anthropomorphism

In this essay, I think of the history of amaranth in the Tehuacán Valley not only as the human history of growing amaranth, but also as amaranth’s search for alliances with humans that would allow for it to spread. While telling this story, I focused on moments and areas where relations between the plant and humans build a biocultural reality that is materially and semiotically significant and politically active. When looked upon historically, the interspecies relationships between inhabitants of Tehuacán Valley and amaranth, albeit always transforming, are remembered and continued through millennia, in ways that are not random. It appears that the ways in which amaranth spreads and mutates, in the context of human economies and politics, show some kind of learning and a *long durée* “intelligence” of the species. This vision partially anthropomorphizes amaranth, but I argue that careful anthropomorphism may be a necessary strategy and is justified. Nonhuman life has the capacity to transform based on some sort of interpretation of previous experiences that reminds us of human thinking.

Anthropomorphism can be both an epistemological as well as ethical tool. In this way, by looking at the similarities and partnerships between human and nonhuman forms of life, and not only the differences, we move away from objectifying them as resources, and we move away from anthropocentrism. Anthropomorphism may push us to interact with nonhuman world in a more respectful way and motivates us to make an effort to imagine more how to *live with* it as opposed to how to *use* it. This is how many indigenous and other people think and live in their worlds, and it opens the way for me to learn to

transform the conceptual framework I grew up with, aligning my work with others who work toward an epistemic change.

Portuguese social theorist Boaventura de Sousa Santos claims that social justice is conditioned by epistemic justice; he argues that the concepts, ways of knowing, and philosophies of indigenous people should be given attention equal to that of Western philosophies. Kohn takes this movement a step further by arguing that human relationships with the nonhuman world will never be sustainable for our mutual benefit as long as nonhuman living thoughts of the world are not taken seriously. Modern, science-based discourses safeguard distinctions between human and nonhuman life, describing their behavior in terms that reserve superior attributes for humans. In her “Conversations on Plants Sensing,” Natasha Myers reflects on scientific phobia toward anthropomorphizing nonhuman life. She quotes a scientist who tells her that anthropomorphizing is “just a bit fifth-grade sometimes.” Myers comments: “This is a familiar move. The charge of childishness or immaturity is common among those who police against anthropomorphism in scientific discourse” (53). They do so convinced that anthropomorphism can lead to an inaccurate understanding of the nonhuman world, but they do not see that avoiding it at all costs can have similar results. For Myers, Marder, Morton, and Simons, like for me, careful anthropomorphism is a necessary and valid tool for understanding nonhuman life. It constitutes, as Morton explains, an epistemological bridge between human language and otherness of the world. Simons distinguishes between simple anthropomorphism from animal stories and eighteenth-century allegories and the “strong anthropomorphism” that questions normalized ideas of humans and nonhumans and extends our understanding capacities. It is this kind of an extension of conceptual frames that I aimed to develop in this essay. I wanted my readers to consider that when we say that people who want to do something about poverty in a dry land often find amaranth, perhaps we miss the fact that it is also amaranth finding them. It is my conviction that the belief that anthropomorphism is a mistake results from an excessive certainty that nonhumans cannot possess anything like agency or practice anything like thought. As we approach an animal, a plant, or a rock, we may be decentred, dehumanized, and transformed by them more than we realize. As a result, where we think that we anthropomorphize by imposing our human frameworks on the nonhuman world, these frameworks may have never been just human, but rather they have been elaborated in long-lasting interspecies partnerships.

Notes

1. The Aztecs used the name “Popoloca” to refer to all the people whom they considered to be barbarians or unable to speak correctly, stuttering.
2. *Amaranthus hypochondriacus* is part of so called *Amaranthus hybridus* complex that varies between edible and weed varieties. According to the National Research Council, *Amaranthus hybridus* group’s taxonomic problems are far from clarified because of a very common hybridization and misapplication of names (79). Some forms of weed known as *Amaranthus hybridus* could therefore be a feral (I owe this term to Libby Robin), hybridized incarnation of the ancient crop of *Amaranthus hypochondriacus* that may have survived in the forest and may have been eaten by Popoloca people. This hypothesis needs to be further researched.
3. On the sensorial life of plants and their communication and thinking, see also Hall, Holdrege, Chamovitz, Sacks, Pollan, and last but not least, see Anna Tsing on plants’ and fungi’s political subversion.
4. This innovative concept of Karen Barad suggests that identity is formed through *intra-action* and does not precede it as in *inter-action*.
5. Biosemiotics reads biological capacities of organisms as possibilities of experience and interprets organisms’ behavior as signs that have meaning. Uexküll, who is famous in particular for his description of how it is to be a tick, is considered to be the founder of biosemiotics.
6. According to Niederberg, amaranth (*Amaranthus*), goosefoot (*Chenopodium*), ground cherry (*Physalis*), and teosinte (*Zea*) in the valley of Mexico may have been objects of horticultural experimentation between 6000 B.C. and 4500 B.C.
7. Records of tributes paid to the Aztec emperor show that amaranth ranked third after maize and beans (Sauer; Wilson and Heiser).
8. *Chinampas* were floating gardens that supplied food for Tenochtitlan, the Aztec capital.
9. Early’s research comes from the Codex Mendoza.
10. *Tlaminime* means in Nahuatl “someone who knows something.”
11. Charles Gibson explains, for example, that Spaniards filled in the channels ingeniously used in *chinampa*-style agriculture by Indians and they never got to know indigenous techniques except as an object of historical anthropology at the end of the nineteenth century.
12. Early did not find any law that would forbid planting amaranth, and he is surprised that its plantations disappeared completely in relatively short time for a species’ demise. He establishes that in 1577, amaranth was still one of the four main crops in Mexico, while in the agricultural survey performed in 1890, there was not a single mention of it, as if it were completely abandoned and forgotten.
13. Glyphosate use increased in Argentina between 1970 and 2000 by 1300 percent (Negri et al.) and according to Red Universitaria de Ambiente y Salud, it grew 700 per-

cent between 1990 and 2011. According to other sources, since the start of GE soy expansion between 1996 and 2009, glyphosate application increased by 1,400 percent, from fourteen million to more than two hundred million liters (Giarracca and Teubal 2010, quoted from Cáceres 2014)

14. See Wherevent, “Malezas,” <http://www.wherevent.com/detail/CNB-Contemporanea-Malezas-Accion-colaborativa-Julia-Mensch-Museo-del-Hambre>.
15. See Gil, “Defeating Palmer Amaranth,” <https://www.agriculture.com/crops/pesticides/palmer-amaranth-bedeveling-farmers-like-no-other-weed>
16. Arenas Reyes, Humberto. “How Has the Mexican Poultry Sector Fared under NAFTA?” *WATTAgNet*, 24 Jul. 2014, <https://www.wattagnet.com/articles/19592-how-has-the-mexican-poultry-sector-fared-under-nafta>.
17. This argument should not be used since, in contrast to hybrid maize higher in protein, GE-maize is significantly inferior to native maize in terms of nutritional value.
18. Hispanic studies scholar Walter Mignolo defines re-existence as a network of discourses and practices aimed at decolonizing the Hispanic world that are often inspired by precolonial knowledges.

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