# Ode to Chaos

## Neotropical Entanglements and Other Narrative Fictions from the Pluriverse

Sohn, Heidi

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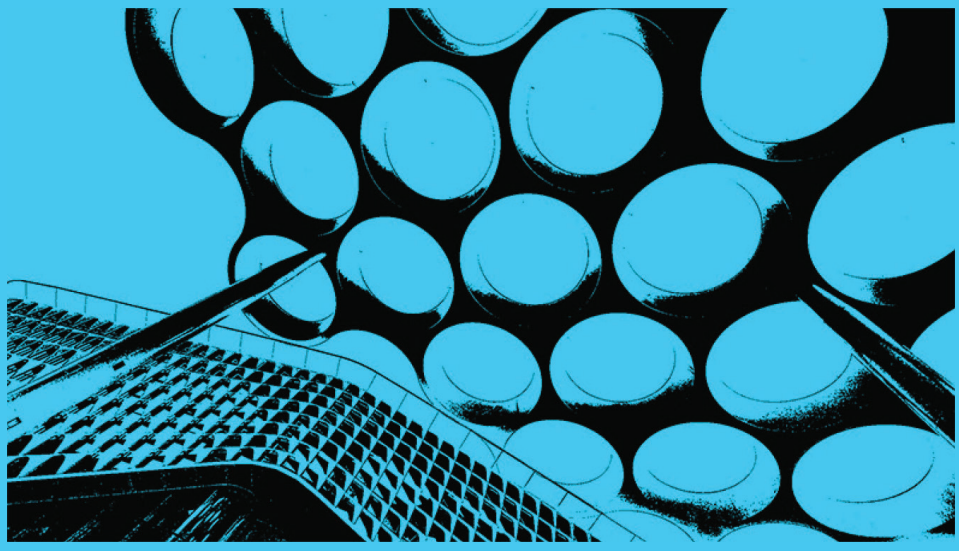
# THE SPACE OF TECHNICITY

## Theorising Social, Technical and Environmental Entanglements

Robert A. Gorny, Stavros Kousoulas, Dulmini Perera and Andrej Radman, editors



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Series Editors
Stavros Kousoulas, Andrej Radman, Heidi Sohn
Department of Architecture, Faculty of Architecture and the Built Environment, TU Delft

Volume Editors
Robert A. Gorny
Stavros Kousoulas
Dulmini Perera
Andrej Radman

Copy Editor
Heleen Schröder
Layout Editor
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Cover photo
Marc Boumeester

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ecologiesofarchitecture@gmail.com



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Book Abstract
Desperate times demand optimistic transdisciplinary measures. This volume unites a select group of thinkers who courageously traverse disciplinary boundaries. What brings them together iWs the least stratified 'component': a shared problem. It is a widely recognised that a problem gets the solution it merits. However, only a few acknowledge that a problem seldom neatly fits within a single discipline, nor does it conform to the principle of general equivalence. Handling its irreducibility and non-entailment is a skill possessed by very few. Even fewer take the quasi-causal capacity of what we term the 'space of technicity' seriously.

The space of technicity, the shared problem of this volume, is a consequence of immanence. Each configuration of surfaces comprising the built environment produces an intangible effect, acting as a quasi-cause. It can be referred to as downward causation or the timely rediscovery of (neo)finalism.

In this volume it is approached it from the perspective of axiology. The space of technicity allows us to evade techno-determinism without adopting an anything-goes attitude. That which has become manifest could have individuated differently. However, the potential of a body cannot be discerned before intervening in the causal fabric of agential reality to extract the singular points that make certain outcomes more likely than others, surpassing mere probability.

Series Abstract
The *Ecologies of Architecture* Book Series promotes a transdisciplinary approach to architectural thinking and doing by extending its interest to topics that bring together the three ecological registers, namely the environment, the social and the individual. Such an approach accounts for what the built environment will come to be, and speculates about who will become alongside it. The series focuses not only on the why, what and how of architecture, but also on the who, who with and for whom.



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# Ode to Chaos: Neotropical Entanglements and Other Narrative Fictions from the Pluriverse

Heidi Sohn

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Dawn is close. A thick layer of mist lingers a few inches above the ground in a patch of dense tropical forest near *Hopelchén*, the place of the five sinkholes. The air is humid and fat with dew; it smells of cold ashes and smoke, rotting leaves, mushrooms, moss, mud. A thin ray of light starts to make its way through the lush foliage of a gigantic *ya'axche*, the sacred ceiba (or kapok) tree. Its solid bark has the texture of grey elephant skin. It marks the center of the cosmos, the axis of life and death. Next to it lean the remains of a lifeless tree. A shiny black centipede crawls down and disappears in the ground into the bowels of *Xibalbá*, the underworld. Rustling sounds of biped footsteps approach, then stop. Two fingers, a thumb and an index, are inserted into a small hole in the trunk; they wiggle around like blind pigeons and then pinch. A blob of syrupy substance starts oozing out, leaving a trail of golden stickiness along its downward path. A buzzing sound fills the air and intensifies rapidly around the hole: the angry protest of a six-legged, stingless sentinel. The *jícara* is full of honey. Footsteps recede into the background. Silence returns to the forest. The sun is out, bathing the treetops and the creatures that dawdle and play on them. Bright red bromelias, white orchids and cobalt blue morning glories growing in all sorts of height-defying postures soak in the sunrays while a few *xunan-kaab*, stingless honeybees also known as *Melipona beecheii Bennett*, dance on their pistils brimming with pollen and nectar. The buzz of their flightpaths pierces the atmosphere of the forest, crisscrossing it like invisible spiderwebs. Inside the hollow tree trunk, in the *xjobón che*, an intra-world of exquisite spatial patterns, fractal recesses, cavities and chambers filled

with pungent fragrances and substances is being generated with the incessant batting of delicate wings and biochemical reactions. The hive, a sort of entelechy or superorganism, is the interior of an insect matriarchy, a "queendom," that has perfected the reproductive technologies necessary for the continuation of its own gene pool and its expansion in future colonies. It produces legions and swarms of specialized courtesan subjects: consorts, soldiers, drones, builders, workers, foragers, harvesters, caretakers, nannies. They provide the energetic conditions that make possible the perpetual production of a territory, and the surplus nutrients upon which their existence rests. *Kaab* is the word that encapsulates this palynivore world; in its patterned arrangements and rich, waxy modulations the flows of energy and matter are articulated across time and space.

Four bees, one after another, emerge from the hole. One after another, they take flight: east, west, north and south. They land on the branches of four ceiba trees, and merge into them. The transmutation of kingdoms, vegetable and insect, elevates these lifeforms through mutualism to thirteen bee-tree deities, *xmulzen kaab* or *bacab'ob*. Together they support the four cardinal points of the universe and its center. They guard and give consistency to the three existential planes of the universe: *Xibalbá*, the underworld of cenotes or sinkholes and underground rivers and caves; *Iztam Kaab Ayin*, the scaly surface of the Earth; *Oxlahuntikú*, the upperworld of skies and godly heavens. They carry *Xux Ek*, the morning star Venus, along its orbit across the heavens. Descending from the skies like shooting stars, bees dive and land in petrified form on lintels and celestial bands of temples and ceramic expressions of the trajectory of another world they help to feed and organize: the much younger dimension of humans. *Kaab*: the world is the hive is the bee is the honey.

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Saturday, October 18, 2022, 12.30. Zumaia, Euskadi. 28,6 degrees Celsius, the warmest October day in recorded history. It is high-tide, there is good visibility, the wind is calm. A small boat with a group of tourists sets off a few miles into the Cantabrian Sea towards the flysch formations of the UNESCO-sponsored Geopark. From the open sea the Gipuzkoa coastline becomes visible. An abrupt, yet surprisingly beautiful landscape of cliffs and geological formations that defy the laws of physics and aesthetics with their aggressive verticality meet the sea. The result is an ongoing geogenic spectacle: partially hidden horizontal planes of differential erosion and abrasion patterns where hard limestone layers rise to the surface in low tide, reveal an eerie, watery scape of elongated rocky filaments. Like the rumps of lithic whales stranded on the shore they are also the habitat of a delicate biotope of endemic species of fauna and flora that have evolved under

extreme conditions for millions of years. Together these tectonic formations are the pages of a gigantic open book. Each stratum is a chapter in the deep history of the Earth. The guide then points to the existence of a thin layer of not more than five millimeters of dark sediment trapped between more layers of limestone and marl – a soft, sandy composite material. From the boat it is invisible; yet the impact it has had on the planet is not. It is a layer of nearly pure iridium peppered with iron and nickel-rich micro-spherules that help tell the story of extraterrestrial impact, of extinction and of planetary change. Iridium, a siderophile, is rarely found on the crust of our planet because it prefers to merge with iron, thus becoming heavier and sedimented in much deeper strata close to the hot core of the Earth. But it also occurs in other space-borne objects, including smaller wandering bodies such as asteroids or meteoroids that have the tendency and bad habit of jaywalking into the orbits of other bodies, often provoking serious crashes. In the words of the tour guide, when geologists find iridium on the surface layers, they know that it is proof of some sort of extraterrestrial encounter of violent impact. The guide then hands a large plastic model of an ammonite – its stiff tentacles reaching out into space – to a little boy in the front row, to show the abundant fossils that have been found in the calcium strata of the flysch. The boy thinks it is an octopus hiding inside the house of another animal. The tourists laugh and forget about the ominous tone of an inhuman elementary story written by iridium, nickel, calcium, iron, chrome and gold millions of years ago. A story that connects the flysch coastline of Euskadi to another narrative dimension: the cracking and collapse of civilizational models.

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Solar zenith during spring (proposed date: April 1). Northern shores of the Western Interior Seaway (today: Hell Creek Formation, Tanis, North Dakota). Cretaceous-Tertiary Boundary (66.043 million years before the present). Large dinosaur herbivores go about their daily existence; they socialize and engage with other animals at the edges of a muddy waterbody. Nearby, next to the log of a gigantic fern, an old, wounded triceratops lies in silent agony as death nears. Suddenly, the bowels of the Earth rattle and rumble with an unknown force. Swarms of screeching pterodactyls take flight. Instants later a flash flood of fittingly antediluvian proportions takes over the canyon and mixes with an intense rain of spherules, ignited ash and balls of fire. Chaos ensues. All territories and strata are brought into violent contact; many vaporize instantly. Rock becomes liquid becomes gas; solid becomes atomized becomes atmosphere. There is no left or right, no up or down, no in or out. Time and space are jumbled into a hot cosmic mess. The ripped-out arm of a small dinosaur, an impaled turtle, an egg filled with debris, a fish's brain saturated with tiny metallic pellets next to another, smaller fish with its gills full

of tektites, black and green glass micro-spheres encased in amber, the blood of trees, will lie entangled in the mud for thousands of years, slowly being swallowed by the Earth and pressurized for eons until their organic matter and their carbon and calcium substrates have disappeared, leaving only an index of their presence; the semblance of their existence in the slowing-down speeds of a fossil entanglement. They will remain in this fossilized form until their next great shape-shifting transformation, in the revival of the nineteenth-century detective story, the forensic procedural (on a planetary scale) and in documentaries on primetime television. Resuscitated and fleshed out by digital technologies, VR media, and the great story-telling abilities of all-too familiar, trusted voices of wise old men, fossils become instrumental in the (re-)construction of our own "paleo-origins" and that of many warm-blooded animal species. They function as artificial evidence in a geo-forensic style, of one of the greatest mysteries of the twentieth century: they explain the sudden acts of appearance, disappearance and reappearance of (specifically non-avian) dinosaurs and reconstruct the theories of catastrophism and extinction that were until then absent (or had disappeared) from the public mind. The reappearance and familiarization of species which no one alive has ever seen, and thus cannot remember, on H&M toddler pj's, in infantilizing literature and grotesque Jurassic Park™ sequels, attest to the construction of a taste for spectacular, tangible extinction and resuscitation narratives; for endings eternally entangled in beginnings; of genesis and memory out of synch. Catastrophe as a malevolent villain, but also as the agent of history and change in which geology becomes biology becomes alloplastic: it becomes language. The resuscitation of Cuvier-inspired stories of cycles of bubbly emergence, surge and creation followed by long-term boredom and stasis followed by rewarding, bombastic and quasi-total obliteration. Mass extinction. Hyperbole works. One morning in November of 2019, we learn from *The Atlantic* that "Bad Luck (and Fossil Fuels) May Have Doomed the Dinosaurs: according to a new study, the infamous asteroid had only a 13 percent chance of exterminating the giant reptiles."[1] This means that it was the combination of several factors that made the collision lethal, from the inclination of the Earth at that precise time and date to the fact that the asteroid crashed into a zone of the planet where the subsoil is drenched in fossil fuels: hydrocarbon, gas, sulfur and many other highly volatile and explosive substances multiplied the blast manyfold. What would have been a "medium-range" cataclysmic strike if it had made contact on a landmass virtually anywhere else on the planet, became the epicenter of the fifth mass extinction event in the Earth's history. A blast of more than a hundred megatons pulverized all strata including deep lying layers of granite, producing trillions of tons of vaporized incandescent rocks and sediment, acid rain, tsunamis with pounding waves of more than 150 meters, widespread fires, followed by an atomic winter when photosynthesis was virtually impossible.

Seventy percent of all living organisms on the planet were victims of the explosion. Un/worlding. Only a small percentage of life survived this boundary event, the smallest organisms and those who had somehow adapted to underground life: smaller reptiles, mammals, insects (among them bees and wasps), amphibians and birds, some of which would eventually evolve in such a way that they could think about their own existence, about what makes it thrive and what endangers it. Today humans can imagine and factually remember the last boundary event of the planet as if they had witnessed it first-hand. It is now easier to remember extinction by cataclysm than by capitalism. Cultural collapse disorder triggered by overdependence on fossil fuels, or shifting baseline syndrome? We cannot forget what we do not know, yet somehow remember. We search for the origin, the exact location of impact: hard evidence of the crime scene.

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On an undisclosed date in 1947 a group of geophysicists set camp in the small settlement of *Chicxulub*, tick on a devil's horn, in the heartland of the Yucatán Peninsula in southeastern Mexico. They were experts in gravity studies searching for clues in the structures of rock formation that could reveal deep-laying inland oil deposits. At the time the Mexican government through its state-owned oil company Petróleos Mexicanos (PEMEX) was heading the extractivist race in the Gulf of Mexico. It was believed that due to the proximity to the underwater oil deposits in the gulf, and the very specific geomorphic conditions of mostly brittle porous limestone, the Yucatán Peninsula would become the Walhalla of Mexican oil production, which was already booming by then. The gravity maps, however, were disappointing in terms of finding hydrocarbon dregs in the mainland. Yucatán was no Texas. In the 1950s some drilling took place, but since this yielded no oil, the project was aborted. The geophysicists packed up their belongings and broke camp. Three decades later, on a bright day in the spring of 1978, a new generation of geophysicists led by Glen Penfield and Antonio Camargo returned to *Chicxulub*. The village had not changed at all. The oval houses of mud walls and high ceilings covered with palm leaves lined the main dirt road. The colorful *hamacas* hanging between citrus and mango trees gave shade to the chickens running around below them. A ranchera song was playing on a distant radio competing with the intense chirping of a cicada drunk with sunlight. Empty soup cans filled with flowers and other plants adorned the entrances of homes, and the air smelled of wood fire and freshly handmade tortillas. Glen and Antonio leased a little house for the expedition. They, like their predecessor scientists, had been hired by PEMEX. Following the first oil shock in October of 1973, the Western Fossil Fuel Intelligentsia had rung alarm. A new race to find oil deposits in allied

territories had become not only important but rather urgent. It was worthwhile to run more tests on the Yucatán Peninsula. PEMEX complied. On the evening of their arrival, the scientists were invited for supper by the villagers. After they had eaten their spicy *pibil* meal, they decided to go for a walk. One of the villagers came along to show them the edge of the mysterious mound that had attracted some attention from the previous expedition in the 1940s. In the flat landscape of the Yucatán neotropics, this formation was indeed remarkable, especially because it was clearly a nonhuman structure. The villagers referred to it as the scaly back of *Iztam Kab Ayin*, or Crocodile Earth. Glen and Antonio returned home as the sun was setting, and lying in their hammocks they talked about their encounter with the mound. They insisted that the formation they had seen looked like ground zero of a gigantic crater. They could only speculate what had caused it, and for a moment they were only peripherally interested in finding oil. They lay there speaking under the stars until late at night, when the crickets had become silent. Meanwhile, thousands of kilometers away, the oil embargo was contributing to the waning of Western postwar progress, sending the global economy into deep contraction, and changing the expectations of what life in the West was supposed to be: closer, faster, brighter, warmer was becoming farther, slower, darker, colder. The next morning, they drove the gas-guzzling expedition Jeep to a nearby field where a small plane was waiting for them. They took off and flew in a northwesterly direction over the Alacranes Reef and out into the green Gulf of Mexico, towards the border town of Matamoros. Halfway through the flight, the equipment began receiving intensified airborne magnetic signals. Two adjacent lines showed simultaneously weak magnetic and high frequency anomalies (between 2 and 250 nanoteslas). Eventually, the images formed from the received data revealed an enormous underwater arc of 70 kilometers in diameter and more than a kilometer deep. From the skies, Glen and Antonio had found an underwater crater 180 kilometers in diameter that centered meters away from their little Mayan house they had rented in *Chicxulub*. Three years later, in 1981, after a lot of pushback from PEMEX, NASA, and the scientific communities on both sides of the border, Glen and Antonio contributed part of their research to the call to identify a giant meteorite crater initiated by Nobel prize winner Luis Alvarez, his son Walter and their collaborators, to prove the iridium-based hypothesis of the K-T boundary event. Some parts of Glen and Tony's work were kept classified until the 1990s as it was instrumental to the Mexican government's oil race and in the building of Laguna Verde, the only nuclear electric power plant in Mexico.

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Before the beginning of time... in the silent interstice of cosmic rest the universe was created by *Kukulcán* (Plumed Serpent) and *U K'ux Kaj* (One-Legged God, *Hurakán*, or Hurricane). Sometime in the years of the Lord between 1554–1558, in *Utatlán* or *Chichicastenango*, today Guatemala, the *Popol Vuh* was written by an anonymous Maya K'iche' penman.

July 12, 1562. *Maní*, Yucatán. Fray Diego de Landa, a Franciscan priest, and provincial guardian of the city of *Izamal*, the place where dew descends from the sky, was pressured to establish a tribunal for the Spanish Inquisition on the grounds of the small open chapel in the village of *Maní*, the place where everything happened. It had come to the attention of the Spanish conquerors that a small boy had been crucified in a Mayan locality of the area and deemed this act unacceptable. The misunderstanding set off a disproportionate retaliation. In a so-called act of faith de Landa destroyed and burnt countless idols and other religious objects in stone, clay and wood, skins with paintings and codices, weapons, utensils and other objects used in hidden heathen worship. It is esteemed that a large part of the records of Yucatan Maya knowledge were destroyed that night. A tropical Kristallnacht.

The Maya have been telling stories for centuries. Many stories were written with hieroglyphs on stelae, zoomorphs, ceramics and in *k'uhulhunob*, the sacred books. Some of these stories, the ones that managed to escape the destructive forces of colonization, were later recorded in Latin scripts to preserve the knowledge for future generations. The *Popol Vuh*, or Mat's people's book, is such an example. It narrates the story of the founding of the universe as a parallel event to the establishment of the Mayab, the terrestrial and cosmic universe of Mayan civilization.[2] It is a rather mad account of the design collaboration of under- and over-worldly forces that does not always go as planned; an ode to trial and error, to cosmic experimentation, quite literally. It depicts the accidented processes of materialization from the formless, rippling, murmuring, sighing of antimatter, of *xa'ak'*, chaos, to the slow formation of horizontal atmospheric layering. Before Life can be thought of, before humans can inhabit the Earth, the matters of the Sky need to be slowed down, worked out and established. This is a task that demands an understanding of the processionary movement of the planet in relation to the calendrical structure of the universe. It raises important and very advanced astronomical questions and incorporates them in understanding how these pertain to our planet prior to imagining the world of humans. In the *Popol Vuh* as in the few other Maya *k'uhulhunob*, or sacred books, that survived the Spanish invasion, conquering and colonization, there is a direct acknowledgement that life on Earth, in particular anthropomorphic life, hinges on the successions of events, accidents and phenomena that are quite literally nonhuman, otherworldly. That in

the myths these events are the result or the effect of the moods, desires or intentions of specific naturalist deities, points towards something that could be thought of as proto-environmental geo-design, an animist design "eco-*logic*." That these designs are envisioned by deities (anti-demiurges, masters of chaos) does not mean, however, that they are necessarily successful or productive. In fact, often they are not. Instead of slowing down matter, they speed it up. Or, instead of channeling flows into a prototype, the flows are set loose. Nonetheless, before the sky and the sea can serve as platforms for the animation of Life, *Kulkulkán*, the Plumed Serpent and Maker of Life, and *U K'ux Kaj* the Heart of the Sky, the one-legged lord of storms, engage in many experiments, some of them with entirely cataclysmic "solutions" that lead to mass extinction as one of their outcomes. Two examples are telling: one is to bombard the seas (and the moon) with rocks from the skies in the effort to create land, or to dry up surface areas for horizontal inhabitation, as if intuiting the collision of one or more of the asteroids of the Baptistina formation in our solar system as key to the rise of the Yucatán Peninsula and its remarkable geomorphology and sinkhole-punctured orography. This weird tale runs parallel to another story in which a cosmic crocodilian or "earth monster" must be decapitated in order to bring about the creation of the Earth, which its body then becomes (*Iztam Kab Ayin*, Crocodile Earth). Like most other earth monsters, the crocodilian is a paired monster: it makes mountains and causes earthquakes, and it is because of the instabilities that its ambiguity causes that it must be destroyed.[3] Another example is the great flood that the gods send to inundate the Earth after one of their humanoid experiments goes awry. *Kukulkán* and *U K'ux Kaj*, worried by the lack of luster of their creations, decide to revert bad experiments by simply drowning everything alive, to start over. The impulse to interpret these amazing myths from one's own perspective and worldview is often hard to resist. However, one must avoid reducing them only in function of the similarities one observes with Biblical passages, for instance, and more generally to syncretism or cultural contamination and religious pollution. Much of the colonializing views and some of the post-colonial approaches rely on such interpretations. But as *Kukulkán* and *U K'ux Kaj* teach us, to err is not only normal, but it is also godly. In the spirit of the normalization of mistakes, more experiments are necessary and thus always welcome. What if one thinks of these origin myths as a pedagogical tool, an instrument, to transmit and disseminate scientific knowledge that might be too abstract for laymen and women to comprehend undigested? Would it be possible to see in these accounts the seeds of a literature of worlding, of terraforming in the making? Arguably, these accounts contain delicate naturalist and animist intuition paired with keen observation skills and methods to find in the night sky the clues we seek to understand the universe (astronomy). Or when observing not only the formations on the surface of the Earth (geography/orography) but also the exploration

of caves and sinkholes (speleology) filled with fossils of extinguished beings: smaller avian dinosaurs, saber-tooth tigers, mammoths and even early humanoids (paleontology, pre-histories / paleoanthropology). Would it be far-fetched to think that in the *Popol Vuh* and other survivors of ancient Mayan knowledge there was already an understanding of the geogenic origins of the Yucatán Peninsula, something that has taken thousands of years to imagine and prove in the West? That this knowledge contains the understanding not only of the ontic and the motives for its conditions, but also a sophisticated grasp of the Earth's (and that of other) planetary systems, and the forces that shape them?

The myths of the Mayab take us from the violent, acute, cataclysmic origins of the universe, and the sudden rearrangements of matter (Cuvier smiles), to the slow yet powerful sliding movements of tectonic plates forming the Neartic and the Neotropical bioregions of the Americas, to the miniature processes of water-borne migration undertaken by the *xunan-kaab* stingless honeybees from the Yucatán Peninsula to the balmy shores of Cuba and other islands of the Caribbean. Driven by tropical storms at the moods of Hurakán, floating inside their *jobón*, colonies of *xunan-kaab* stingless honeybees and their pristine, intensely aromatic honey have found habitats on other shores, attesting to how, where relationships end, new worlds appear.

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In the excavations of Structure 99 in the archaeological site of *Nakum* in north-eastern Guatemala, archaeologists found an interesting composite offering displaying several objects that tell the story of architectural and ritual practices such as caching and breaking of the Maya people who once used this ceremonial location. On the top of the structure a series of shattered pottery, stone tools and human bones lie scattered, connecting the moment of their discovery to the times when these were made and used for the last time. They are believed to be the remains of the final moments of this site, approximately 1,200 years ago. A few meters below this point, however, on the lower layers of the structure, another cluster of objects, including figurine heads of clay and jade pendants, are waiting to be found. Once unveiled, they tell a different, much older story, dating to the Protoclassic phase between 2,200 and 2,500 years ago. The archaeologists consider these objects evidence of ceremonial and ritual practices as well as signs of the animist culture that gave them shape. In other words, of a culture that symbolically and ritually assigned vitality and agency to everything in the world.[4] The most important finding in *Nakum*'s Structure 99 is an elongated, hollow, polished clay cylinder approximately thirty centimeters long, with individual removable clay lids on each end. The cylinder has a small orifice along

its front side. The odd shape of the object raised many questions as to what it might be, until it was established that this cylinder was not a musical instrument as was first thought, but was in fact an ornamental *xjobón che*, a representation of a beehive, intended as an offering, probably to *Ah Muzen Kaab*, the descending lord of bees and beekeepers (depicted in many cultural objects throughout the Mayab). This would make it the oldest pre-Columbian *xjobón che* found to date in all of Mesoamerica, and proof that *xunan-kaab* stingless honeybees (*Meliponae, Trigonae*, and others) and their keeping (meliponiculture) have been at the center of the ritual, religious and economic practice of ancient and contemporary Maya culture for at least three thousand years. The *Nakum xjobón che* object is an identical reproduction of the traditional *jobón*, the human-made (or adapted) "receptacle" into which a stingless honeybee colony found in the wild is ushered, transported and adopted in closer proximity to the home of the beekeeper, usually in nearby villages in rural areas. Meliponiculture is known as husbandry: xunan-kaab means lady bee, hence, to tend her, humans regardless of their own gender, assume the role of the bees' husbands, protectors and providers. The nests (hives) of xunan-kaab found in the tropical forests of the Yucatán Peninsula and other regions of the Mayab are not comparable with those of other species of honeybees, such as the European species of *Apis mellifera. Meliponas* seek out dead trunks, and a sentinel will either find or drill an orifice into the wood that will serve as the single, main entrance of the hive. The queen enters first with her courtesans, followed in sequences by the rest of the bees. Her colony is slowly formed inside. *Meliponas* do not produce a honeycomb in the traditional sense and stay clustered in small colonies that produce hubs of individual pellets the size of a small pea, little pots of dark brown and black cerumen or wax, filled to the brim with the exquisite honey and propolis they produce. When "adopted" by a human keeper, a colony will continue to produce its nest in the same way as in the wild, but inside their own *jobón*. The human keeper will extract the honey via one of the side lids only on specific occasions during the year (before the rainy season), as this is when the surplus of honey, propolis and royal jelly becomes available for harvesting. In the tropical forest, when a colony has reached its growth threshold, it sends an expedition of drones to locate a suitable nest, followed by symbolic division dances, swarming and ultimately, the establishment of a new queendom. This process of colonial expansion is re-enacted in the human-managed *jobón* system, where the human husband or keeper will help the ripe colony out of the *jobón* and into a new nest. The honey produced by the stingless honeybee is famous for its high medicinal and nutritional value. But it is much harder to extract economic profit from meliponiculture, as it produces honey in much smaller quantities than regular (industrialized) apiculture. Like marriage, meliponiculture is a labor-intensive practice, one which demands mutual respect and dedication from

both, the human and the bee. This relationship has developed and evolved for millennia, as the findings in the offering of Structure 99 in *Nakum* demonstrate. An archaeologically found object becomes *xjobón che* (symbolic beehive), becomes *naijl kaab* (beehouse), becomes *kuxtal* (life): a mode of existence. Meliponiculture is more than a technology. It is the non-scalar nexus of an ancient cosmovision and an ecology of practices that shape the foundations of the Mayan civilizational model and those of the *xunan-kaab's* miniature lifeworld. It foregrounds specific modes of co-emergence, co-production and co-existence of insects and humans. Arthropods and Anthropos, an unlikely interspecies encounter that defies the logics of production, overturns the rules of supply and demand, and questions the laws of exchange. In this short incursion, what is found under layers of soil, artifacts that surge from the past to make us curious, to make us wonder, also make us remember that beyond symbiosis there is always already sympoiesis. That life, and the worlds we inhabit are "complex, dynamic, responsive, situated, historical systems."[5] That *kuxtal* and *kaab* (life and worlds, hives, bees) are creations, and as such they are always already "collective, emergent and relational."[6] Worlding is a transitive act, a making-with.

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There is a short fable that is told to young children in the Mayab when they squirm at the sight of or encounter with a bee. A boy is walking through the jungle on his way home when he is confronted with a buzzing swarm of bees. He has never seen a colony-dividing swarm choreography, so he is very scared and begins throwing sticks and stones at the loudly humming cloud of insects. The bees are angered by his actions but seek no retaliation. Instead, the swarm finds its way to its new *xjobón che* and disappears in its depths. The boy is confused about the phenomenon he just witnessed and, driven by curiosity, he comes closer to the hive, only to find himself face to face with the sentinel guarding the entrance. He attempts to stick his index finger inside the small orifice but retreats with a holler: he has been stung! Furious, the boy tries to catch the sentinel with his sore index finger and thumb in a tweezer position. But instead of grabbing the insect, the boy feels a warm, soft, bulb-like object inside, and without knowing why, he pinches it. A blob of rich honey erupts and covers his fingers. As he licks the honey off, he tastes the sweetness of this substance, and feels instant goodness and relief. He sits down next to the dead tree where the new colony has formed its home, trying to savor the last little bits of honey on his fingers. The sentinel appears suddenly on his nose and stares at him with its bright blue eyes and its cute body covered in orange hairs and black and white fur. In a voice that is not human but also not godly, the bee tells the boy that she is *xunan-kaab*, the lady bee, named like all her

sisters in the hive and in the world. She tells him that like him, and all humans, she too has teeth, and not a stinger like the wasps or the scorpions; she explains that stingless honeybees and humans are kin. She tells him the secret to harvest her honey and wax before the rains come, before she disappears back into the hive. The boy returns to the village and reveals the gift of meliponiculture. Since then, children are taught to respect and care for bees as their docile cousins. In the Mayab, *xunan-kaab* is often referred to as another Maya sister, as an expression of insect-human kinship.

The long story of the relationship between *xunan-kaab* and her human keepers predates agriculture by a couple of thousand years. In fact, beekeeping, and in the case of the Maya world, meliponiculture, was a constitutive factor in the development of the *milpa* technology upon which the entire agricultural basis of the Mayab is founded. Beyond being the main vector in the production of honey, royal jelly or propolis, and wax, *xunan-kaab* (and other endemic species of stingless bees) are also very efficient pollinators. Beekeeping of *Meliponas* made possible the domestication and spreading of several forms of wild maize. Corn in its domesticated versions is the one single most important product of Maya (and the Mesoamerican) civilization. Maize is not only the base of all food and rich culinary cultures in Mesoamerica, but it is also the cosmic stuff out of which the contemporary generation of humans is made of, *la raza del maíz*. This explains the direct relationships between honeybees and the divine or scared, either in upwards motion towards the heavens, or downwards, into the dark underworld. *Xunan-kaab* in their worldly form as bees or in their transmuted form as *xmulzen kaab* or *bacab'ob* were informants of the state of the human being and the different environmental planes. Bees recorded and transmitted invisible environmental data to the gods, in particular to *Ah Muzen Kaab*, the lord of the bees. Signs of environmental stress such as impending drought or excess rain, the threat of hurricanes and tropical storms on crops, even the behavior of humans – all information of huge significance also in political terms – were transmitted to the gods. Humans who developed the right observation techniques could access these registers as well. This happened through a meticulous interpretation of the qualities of the honey produced by the *xunan-kaab*. Depending on the quantity, viscosity, acidity or color of the honey produced, humans could know if there were environmental developments underway that were cause for concern. In such cases, elaborate ceremonial offerings were made to appease the relevant deities. It would take the West centuries to develop entomology, on the one hand, and on the other for the military complex to adopt one of its applications: the potential of honey to capture and store data and to transmit nonscalar intensive information on the state of the environment, from indices of radioactivity to the presence of land mines. In the Mayab, the honey assemblage connected the plane of human existence and

everyday life in ways that are today unprecedented in other cultures. Honey had a broad application that went far beyond that of a simple sweetener, which, it must be added, was of little value to Maya culture. The ceremonial and ritual import of *Melipona* honey *(kaab)* placed it beyond everyday consumption; it was used in the fermentation process of *balché*, a highly intoxicating drink consumed only on special occasions. Further, it played a central pharmacological role in the production of medicine as a potent antibiotic and anti-inflammatory ointment used for the healing of sores and dressing of wounds. The use of beeswax was also fundamental for the development of Maya culture in the production of molds, tools, and other crafts, and as a substance with tributary value. The relationship between the stingless honeybee and the Maya remained undisturbed for thousands of years, withstanding the arrival of the Spanish invaders in the sixteenth century and the subsequent pressures of the colonization period. Honey was locally and nationally exported to satisfy the sweet tooth of the West, as was the wax, which was used to produce trillions of candles that brought light to countless dark Catholic churches. During colonial times, meliponiculture, in addition to its cultural and anthropological importance, became established as a vital economic activity of the Maya people, something that remained in place until relatively recently, when the world shared by *xunan-kaab* and the Maya was disturbed by the introduction of what experts refer to as biotechnology and bio-economics. Since the mid 1990s, the state of the *xunan-kaab* in the Yucatán Peninsula has been worrisome, as is the case of most bees around the world, with steep population declines and a loss of biodiversity. Next to the waning of cultural practices such as meliponiculture, of interest are four non-human suspects: two cosmopolitan species – the European honeybee (*Apis mellifera*) and sugar cane (*Saccharum officinarum*), and the rogue actions of a third and fourth agent: the so-called Africanized "killer bee" (*Apis mellifera scutellata*) and the non-nutritious, low-calorie artificial sweetener saccharin (E954). But that is another story.

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It is early morning, but the heat of the summer sun is starting to lick the bright white exterior of the eastern walls. I feel sweat pearls on my lip as I unwrap myself out of the low-hanging hammock. Coffee is already brewing in the small kitchen. I can smell it and hear how the lid on the small blue enamel pot rattles as the black liquid starts squishing in. The house cat, a slender black tabby called *Ek* jumps on the kitchen counter to catch a small bee. It's the first day of fieldwork. I have been asked by a group of agronomists from the Autonomous University of Yucatán to make a site model to accompany a poster presentation and panel discussion they are preparing for a conference at the Department of Horticulture and Crop Science

of the University of Ohio. I am excited to join them, and eager to learn more about the intricacies of the Maya Yucatec *milpa* system they are studying. *Milpa* is a Náhuatl-Spanish word usually substituting the Yucatec Maya *kool*, which refers to the pre-Columbian plot of land, a practice, and a symbiotic system or technology of working-with the land (an equivalent of small scale migrating agriculture); a polyculture that combines several species of endemic horticultural plants (corn, sweet potatoes, calabash, chili-peppers, tomato, beans and other legumes) and the animal species they attract (arthropods, mammals), with other forestry activities (beekeeping, small-scale logging, resin collecting, foraging, and so on). It alternates intensive periods of "patch-based" sowing and harvesting with long periods of land rest and recovery, which in the Yucatán Peninsula is of key importance. Due to the geological composition of mostly brittle limestone, the subsoil comprises only shallow layers of arable soil. As a system of land management, it is not compatible with modern agroindustry, biotechnologies, or neurotic monocultures. It is not devised as a system of exploiting the land or the soil, thus, while it does provide for the livelihoods of the community it yields additional benefit in the form of non-monetary value.

We get into a white Nissan pickup truck and leave the city of Mérida. It is a long and uncomfortable ride on bumpy roads through the rainforest. We walk for another hour along narrow trails in the dense tick-infested grass and undergrowth of the jungle before we reach the *milpa.* A clearing of about three thousand square meters opens in the emerald-green patch of dense forest. The *milpa* is covered with tall maize plants crowned with golden manes flowing over the light green leaves of their cobs. Closer to the ground a mesh of pumpkin plants spreads and sprawls, its stems and tendrils, huge leaves and yellow flowers climbing onto the corn stalks. Squash plants, dark green cucumbers, *chilacayotes*, and watermelons grow in runaway positions close to the edge of the field. Multicolored beanstalks, shiny *chile de árbol*, and a few aromatic tomato plants frame the middle parts of the *milpa*. It is difficult to walk through this entanglement of flowers and leaves and bulb-like, shiny vegetables growing without any apparent grid or matrix. The buzz of insects is overpowering and increases as the sun climbs higher in the sky. These are all key pollinators, even if they do not know it. Their purpose, like that of most species of *Hymenoptera*, is to guzzle up as much pollen as their bellies allow and to drink as much nectar as they can hold. Some will produce invertase, the enzyme needed to catalyze nectar into honey. The airspace of the *milpa* is an intense zone of vectors of pollen-eating pollinators zigzagging in all directions. A few light-blue butterflies the size of a large platter flutter by. I can only imagine the size of their caterpillars chewing away on the underside of a leaf. The *milpa* is regularly visited by other endemic animals: *coati, tlacuaches, cacomixtles*, all sorts of large and small field rodents and hundreds of birds who steal a few bites

or pick into the fleshy side of a pumpkin and then poop the seeds out somewhere more private in the forest. They too play a role in the dissemination and reproduction of plants as indirect fertilizers and seed-spreaders. Occasionally a deer will show up and at the first unexpected sight or sound nervously run back into the forest. Deer are believed to be magical animals, guardians of the fresh water sinkholes that are so abundant in the Yucatán Peninsula and the golden treasures submerged in turquoise depths that their waters guard. Time passes slowly here in the milpa. Next to the shadows of the great ceiba and mango trees I think of the primordial cosmic links between plants-soil-toil. Thoughts from the outside, the time of modern life, are strange and utterly useless here. Sitting on a flat stone, I make a few sketches. I start with the date. It is the summer of 1996. It is impossible for me to know that the so-called biotechnology revolution has started and that its first battles are raging not far from here. Or to think that imperceptible pollutants, chemical substances and composites produced thousands of kilometers away in Chinese factories, with the names of German and North American pharmaceuticals, are penetrating the layers of political discourse and public opinion, permeating the thin skins and tissues of seed epidermis, spreading into their cell composition and changing their DNA chains forever. Still invisible to the human eye, these changes are endangering the delicate ecosystems and interspecies relations that the *milpa* affords and makes possible.

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Outer layers of the skin register a slight decrease in temperature. Sleep cycles have been completed. Eyelids open slowly. Front arms rub nose, eyes and snout. Whiskers are activated and start receiving signals: frequencies, odors, smells, vibrations, dust particles, cells, hormones. Slight degree of adrenalin-increase due to hints of feline presence in immediate radius. Strong impulse of the sweet smell of complex carbohydrates, protein, riboflavin. Hunger pang. Hindlegs tense and rump relaxed. Exit orifice. Adjust pupils to sudden differential of light. Skittle erratically across the horizontal surface. Dodge random falling object. Activate thermal vision: blue green. Inanimate object. Smell intensifies. Food source located. Layer of textile hinders satisfaction. Sniffle. Nibble. Scratch with extracted nails. Slit achieved. First seed captured. Initial satisfaction as carbohydrate is digested. Enzyme confusion. Overlapping smells, one not identified. Danger in the food source. Assess reaction. Loud noise in secondary radius. Adrenaline rushing to legs. Heat map registers orange and red cluster. Large animal approaching. Abort scavenging. Hide behind dense object. Cease all movement. Whiskers activated on high alert. Ears on radar mode. Large animal approaches food source. Source of food is lifted. Large animal and food source leave the area. Lower heart rate. Return on latest smell trail. Hide in burrow.

The *tlacuache*, a small endemic marsupial that looks like a pocket-size opossum, adopts its usual doughnut position and returns to sleep. It is the third time this week that it has attempted to steal the seeds, this time it will cease the ones that fell out of the sack. There is something odd about the way these seeds smell and taste. Meanwhile, the sack of soybean seeds marked clearly with the text Roundup™ and the 'green-white-blue washed' Bayer ™ logo, has been transported by tropical Menno to his 1958 Chevy pickup truck standing outside with the headlights on. It is 4.30 am in *Hopelchén*, the place of the five sinkholes. Menno and his farmer clan adjust their denim overalls as they get ready for another day of intensive farming. They are members of the Santa Rosa Camp, an Old Colony Mennonite community among many that have relocated to the Yucatán Peninsula after migrating from the northern state of Chihuahua where their ancestors settled exactly a century ago, in 1922. As self-appointed stewards of God's Creation tropical Menno and his clan enact their religious right to ignorance daily. In a carefully manicured selection (and shunning) of modern science and technologies, and a choreographed lack of contact with the Outside, Old Colony Mennonites residing mostly in the southern state of Campeche have become one of the most important agents in the ongoing ecocide of the neotropical forests that cover the Yucatán Peninsula. As the *tlacuache,* and many other lifeforms, will soon find out Mennonites are responsible for rampant deforestation, loss of habitat, and the wide-spread soil, air and water pollution in the region, spreading highly toxic, systemic pesticides and herbicides to protect the genetically modified 'pretreated' seeds upon which their large scale, highly industrialized mono-agricultural empire depends. Among the invisible culprits are systemic pesticides (neonicotinoids, such as imidacloprid and thiamethoxan produced by Syngenta™; and organophosphates, such as broad-spectrum glyphosates – Roundup and Gaucho™, produced by Monsanto-Bayer™). Systemic pesticides are substances that affect the plant genetically, that is, seeds that are pretreated with these pesticides will transmit the substances into the plant as it grows. The sap that circulates through the plant soaks every cell with the toxin contaminating its flowers, pollen and nectar, as well as its fruit and seeds (if the plant is designed to produce seed, that is.) Bees and all pollinators that come in contact with the plant or the substance (through consumption, i.e.) will ingest doses of these toxins and become intoxicated in various degrees and with different symptoms. Seed pretreatment, a form of lacing, spraying and any form of administration, as well as the seeds, the plants, the bees and other pollinators, and the animals that eat these plants or other animals that have been in contact with them, become part of a lethal chain on a micro-scale that extends exponentially. A deadly biotechnology, where the plant becomes the poison, designed to leave few and weak traces. Forensics in the wild.

Hairs on the side of cheek twinkle. Drop in light volume and pressure. Sleep cycle completed. Hunger pang. Activate whiskers. Input signals of strong smell of hexapods. Close range food source. Hunger pang. Skittle across horizontal surface. External plane. Darkness increases. Odors multiply. Large source of immobile insect-based protein. Ingest. Ingest. Ingest. Clean snout and whiskers. Ingest. Activate adrenaline for digestion. Enzyme confusion. Endocrine system on alert. Sharp pain pangs in flank. Return to nest. Failed attempt. Renewed attempt to return to nest. Failed attempt. Hindlegs not reacting. Assume side-position. Loud noise audible. Escape not possible. Large biped animal approaches. Loud voice audible.

"Nog en Waschbä, de sik doot stelt!" (Another racoon that plays dead!) Blackout. The *tlacuache* was not catatonic nor was he playing dead. Due to the lack of other sources of food, it had been feeding on a diet of dead bees piling up in the corner of the shed. They were victims of something known as colony collapse disorder: disorientation, intoxication. Perished due to the combined actions of neurotoxins and death of their gut bacteria by glyphosate. Should an autopsy by performed on the *tlacuache*, it would reveal several miniature tumors growing like grapes inside its tiny body. It died of lymphoma metastasis. In an apparently disconnected event, in 2011 the EU issued a ban on a shipment of honey produced in the Yucatán Peninsula under the claim that it contained traces of genetically modified pollen.[7] This led the Mexican authorities to ban GM seeds and fertilizers in the region.

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It was in 1998 when as a young architect I was invited to participate in the interior re-design of three thousand square meters of office space for the Mexico City headquarters of the sugarcane refinery Beta San Miguel. Although the architectural interventions were limited to the design of mostly open layouts for office workspaces, the project was nevertheless interesting: the owners had a substantial art collection which they wanted to exhibit in their offices. The budget was also practically unlimited. They had a taste for exotic hardwood. Black ebony, swamp mahogany and other expensive timber was to be laced with iron and concrete for the hallway flooring, covered with antique Persian rugs in the main offices, very much in the industrialized postmodern style of the 1990s. They enthused over the proposal of a design for two hundred linear meters of undulating walls executed in sucupira wood, as well as pear and cherry wood panels, on which their art pieces would be displayed. I was involved only peripherally, helping with electrical installation drawings and other less exciting work. The perk of the job was the regular visits to the company's main sugarcane refinery in the state of

Quintana Roo in the Yucatán Peninsula, which we reached taking a small propeller plane from the Cancún airport. There was no runway, so the plane would land on site. The refinery was established on the grounds of *San Miguel de K'ux*, an ancient latifundio that was now the production site of Beta San Miguel. The living quarters were housed close by in a beautiful eighteenth-century hacienda of red and yellow walls and high ceilings in the middle of the jungle. All the rooms were connected by exterior hallways that smelled of bat droppings and wax. The *chacuaco*, the refinery's tall brick chimney, served as the lookout point onto sugarcane plantations that extended as far as the eye could reach. This was the vast landscape of unlimited, sweet capital. The visits were mainly to discuss the headquarters project with the owners, who had temporarily moved to the hacienda while they purchased what they referred to as "some more land" in an *ejido* called *Laguna Om* in the neighboring state of Campeche. The sugar industry, like the extraction of hydrocarbons, is a highly profitable tropical business. It was introduced at a small scale to the Yucatán during the seventeenth century, growing rapidly into one of Yucatán's most important businesses, along with henequén, an agave fiber plant, and honey. During the eighteenth and nineteenth centuries vast landscapes of *latifundios*, large land holdings, or single-owned estates, spread out over the tropical forest, placing exuberant architectural palaces in the middle of the jungle, and introducing widespread deforestation and land-clearing technologies. While in the rest of the New World slavery was a common labor practice, it was not popular in Mexico. The Maya, as were most indigenous people in the country, were a sufficiently docile and cheap labor force, not prone to uprisings or revolt over landgrabs and other exploits (although there are notorious exceptions, including the Caste Wars between 1847–1901). In official discourse, the *latifundio* technology was ended as an outcome of the Mexican Revolution of 1910. Following the ideologies of Emiliano Zapata and his Southern Army, Maya insurgents and revolutionaries fought to put an end to the dominion of sugarcane and *henequén* plantations and the destruction of the *milpa* heritage. The revolutionary motto: *tierra y libertad*; *la tierra es de quien la trabaja* (land and freedom: land belongs to who works it) sounded loudly in Yucatán. It was a premonitory cry. As I saw in the late 1990s, the latifundio technology was back, alive and kicking, fostering a heavily industrialized mode of production based on exploitative monocultures. The sugarcane plant, *Saccharus officinarum*, a wind-pollinated species, was also thriving again. A century earlier it had placed pressure on meliponiculture, which was waning partially due to decreasing quantities of produce. The arrival of sugarcane and *ingenios azucareros* (sugar refineries) triggered the introduction of the cosmopolitan honeybee *Apis mellifera*, colloquially known as the European or American bee. This was an attempt to improve the amount of honey produced in an industrializing context in which the Maya were kept in a disadvantageous

position. It would take decades before the link was established between deforestation and habitat loss, the introduction of invasive species and monocultures not reliant on insect-pollination, and the loss of biodiversity, including the slow extinction of several of the sixteen species of endemic stingless bees in the Yucatán neotropics. I certainly was not aware of that either, but looking at the sun setting behind the palm trees into a horizon of bright green waves and orange skies, I thought about what it would be like to have been a laborer in those plantations before there was electricity. Right then, a *hacienda* employee wearing a black and white uniform offered me a coffee. It was aromatic like the coffee is in the neotropics. Almost automatically, I reached for the trusted little pink envelop with its white powder, the guarantee of "guilt-free" sweetness. I was not aware then that I was ingesting the very first product developed by Monsanto, saccharin, nor that it was connected to the slow waning of meliponiculture, and the rise of lifestyle disease disorders such as metabolic syndromes that would make honey interesting once again to the obese consumer of the twenty-first century.

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Up until the late 1980s Mexico was ruled by a mighty political class that had remained in power since the 1920s as an outcome of the Mexican Revolution. Governed by masons and patriarchs, the PRI (*Partido Revolucionario Institucional*) ran the country as a sort of low-intensity dictatorship (*dictablanda*) for nearly seventy years. When the PRI rule began showing obvious signs of failure, the reaction of the younger, fresher generation (many of them graduates of American Ivy League universities) was to update the political agendas and dusty discourse. The older generation was colloquially referred to as *los dinosaurios del PRI* (the PRI dinosaurs), alluding not only to the fossilized political views of these reptilian rulers and their refusal to go extinct, but also to their adamant support for and obsession with an extractivist political economy based on hydrocarbons, in particular crude oil and petroleum derivates. Since the 1930s when President Cárdenas nationalized the oil industry (PEMEX), Mexico had been on a steady growth path – or development trajectory – that also sank the national economy in deep debt with the US and the IMF. By the 1980s it was clear that the younger membership of the PRI, important sectors of society and the general electorate wanted the dinosaurs gone. As a result of the global financial crash, in part fueled by the first and second oil crises stemming from conflict with Middle Eastern countries, Mexico declared bankruptcy in 1982. In exchange for a massive bailout package, the country adopted a free-market rhetoric that backed the PRI's full alliance with neoliberal regimes and logics. This enforced important constitutional reforms that benefitted the interests of foreign and private capital, honoring NAFTA and

other such arrangements. Silently, however, the younger PRI was planning the extinction of the dinosaurs with a long-term politico-economic project known as *la reforma energética* (energy reform). In the early 1990s it was unthinkable that Mexico would ever let go of what was both a crown jewel and cash cow, the state-controlled PEMEX, but in the back offices of the PRI, politicians were already preparing the transition that would take the country by surprise more than two decades later. In any case, back in 1988 at the time when President Salinas de Gortari "stole" the election, the countryside and the urban poor were once again on the losing side: *ejidos* and communal land-tenure became private property and were sold off massively, especially in the vicinity of urban areas. In other regions, like the Yucatán Peninsula, the constitutional reforms to land tenure fostered massive selloffs of tropical forest and jungle areas. The same happened to 2,400 parastate-owned industries, such as the national telecommunication company TELMEX. Labor laws further weakened the social contract, making painfully visible the asymmetrical abyss that had always already been there, but which had been ignored or glossed over, between the populations of "deep Mexico,"[8] that is, rural, indigenous populations, as well as the urban poor, and the mostly creole and mestizo urban middle class. The dinosaurs were tentatively placed outside the public eye, of course, but untouchable as they were, they remained active in the background, planning their next parasitic attack.

On January 1, 1994 a loud roar was heard in the deep forests and across the highlands of Chiapas in the southeastern regions of the Mayab. Led by sub comandante Marcos (now called Galeano) the EZLN (*Ejército de Liberación Nacional*, or National Liberation Army), better known as the Zapatistas, took up arms against the Mexican state and stormed the city of San Cristóbal de las Casas. Effectively, they began the second Mexican Revolution of the twentieth century, a revolution that had the potential to liberate the country from centuries of colonial exploitation, and agitate for much-needed reparation. Unfortunately, this revolution was discursively constructed and spun as a "revolt" by the government, the media and powerful elites; a revolt that ended quickly and "peacefully" with the San Andrés Pact in 1995. The Zapatistas achieved many things, among them planting the seed of indignation (*la digna rabia*) and demanding a better life (*el buen vivir*), as well as laying the foundation for the five organizationally autonomous territories known as *caracoles* (snails) and good governance boards (*juntas del buen gobierno*). But perhaps the strongest idea that the Zapatistas contributed was that of radical pluriversal politics, based on "a world in which many worlds fit." The affirmative, almost peaceful ring of that ecumenical mantra attracts the imagination, captures hope, and kindles the creative impulse to design and construct such worlds. Yet, for countless *indígenas* in the Mayab and beyond, this has translated as a world in which many worlds compete, kill, infringe, fight and die off. Worlds of discrimination,

displacement, injustice, exploitation, rape, loss and death. A continuous harvest of constant systemic and structural violence. Low and high intensity wars waged against the autonomy of indigenous cultures with unfair, asymmetrical means for five hundred years. The Mexican state has launched endless attacks and persecutions, covertly or by omission, against the *pueblos originarios*, native or indigenous people, since the San Andrés Pact. One such attack was the Acteal Massacre on December 22, 1997, when forty-five members of the peaceful *Tzoltzil* civil society organization *Las Abejas* (the Bees) were murdered by armed paramilitary forces who had been trained by the Mexican state. Or, in addition to countless other acts of violence, the disappearance and murder of forty-three students in Ayotzinapa on September 26, 2014. *Nos enterraron sin saber que éramos semillas* (they buried us without knowing that we are seeds.)

1712, *Tzeltal* rebellion in Chiapas
1761, *Canek* rebellion in the Yucatán
1821, *Totonicapan* rebellion in Guatemala
1847–1901, "Caste War" in the Yucatán
1915–1922, Socialist Leagues of Resistance in the Yucatán
1932, *Matanza* in El Salvador
1960–1996, Civil War in Guatemala
1994, Zapatista Uprising in Chiapas
1995, Maya Land Rights Movement in Belize
1997, Acteal Massacre
1997, Murder of *Ch'orti'* leaders in Honduras

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This is the story of a boy who was like no other. He heard this from his grandmother while she warmed blue tortillas on the fire before sending him off to school in the nearby town of *Tepetitán*, the place between hills, in Tabasco. He heard it from his mother when he returned from school and sat at the table slurping his bean stew. He heard it from his teachers standing next to the papaya trees in the dusty playground at recess. They were all a little afraid of him. The boy was unique in many ways but what made him truly remarkable was that, like an octopus, his skin too would change color when he dreamt. People would pay the grandmother a few coins to peak into the only window of the shack where the boy's family lived while he took his daily afternoon naps, when the heat had become too intense to sleep in the hammock outside. Some days his skin would become brighter than on other days, with truly fascinating kaleidoscopic combinations of swirling tonalities of purple, green, yellow, turquoise and orange running through his short legs and

arms. His skin took on the colors and textures of sunsets, rolling waves, waterfalls, fireworks, jungles, *cempazuchitl* flower fields. Like everything in life, this boy too had to grow and change, and as he did, so did his dreams. Instead of colors and beautiful patterns, his skin started to reflect black and silver tattoo-like shadows of tools, technological objects and machines. Airplanes were delineated one day on his exposed left arm, and what looked like hangars and a runway on his leg. This dream became recurrent until it shifted into what looked like long thin veins of dark green color running through his back. It was a pipeline that connected to a gigantic refinery on the left hand and to a nuclear power plant on the right. People who had become regular spectators over the years, started to worry about the lack of color, the lack of life in his skin, and commented on this in the village during market days. So did his grandmother, who decided to stop the viewing business until further notice to protect her grandson. One afternoon the boy, who was now a teenager, returned home from running errands. He was tired, so he lay down on a wooden bench on the shack's porch. He fell into deep, heavy sleep, his shoulders moving up and down as he took deep breaths. Suddenly the skin around his temples took on a bright, dark yellow color that shifted into large concrete and steel structures with stylized rooftops in the Maya building styles. This image started mutating rapidly into many other, clearly architectural shapes, all of which rendered with very specific materials, typologies and scale. Twenty-one such images were shifting and looping on his face, his cheeks, his forehead, his ears. He was breathing rapidly and somewhat erratically. Along the side of his right jawbone and down his jugular, elongated marks that looked like railway tracks made their appearance and ran down along his limbs. A train began to rumble over his entire body, as it began heaving in regular convulsions. The train ran over the jungle, destroying the lairs of jaguars, wild pigs and monkeys alike. Trillions of insects, bees, butterflies, caterpillars, tarantulas, snakes, snails, crabs, and spiders crawled all over his skin. Ancestral ceibas and other giants of the tropical forest fell over. The train rumbled on, cracking the fragile soil and collapsing into the *cenotes*, the sinkhole system below. Instead of reflecting turquoise water, the boy's skin turned dark red, obsidian green, black. Dead deer and crocodiles piled up around his knees. His arms were covered in what looked like shards of pottery, on his belly a mask of green jade appeared briefly only to be covered in dark ink. The grandmother stood there with a broom in her hand, stupefied by the horrible spectacle taking place on her only grandson's body. She decided it was enough. She filled a *jícara* with water from the well and sprinkled it on the boy's face. He woke up coughing and drenched in sweat and water. The grandmother placed her brown hand on his head and whispered in his ear: "*mi hijo*, it was just a nightmare."

A few decades later the same boy was living in the Palacio Nacional in Mexico City. He had become the leader of the so-called 4T, or Fourth Transformation, and

president elect of Mexico, which he called *La República del Amor* (the republic of love). He was cheered and loved and abhorred and feared. But what he truly wanted was to be remembered for what he was convinced was a vision of the future, that boy-dream that conformed with the dreams of white bearded patriarchs on the other side of the ocean. That one-world world that he missed intensely without ever having seen it or having been there. Unaware of his dream-sensitive skin, he made it his personal mission to materialize his megaprojects at all costs: the airport, the train, the refinery, and all the deadly infrastructures that connected them, even if they belonged to a different era, that of the dinosaurs.

The *Tren Maya* (Maya Train) has been firmly rejected by most Maya people, and criticized as the re-inscription of colonializing tendencies and further pillaging of their lands and heritage. It is a direct affront to the integrity of mountains, jungles, steppes, waters and skies (all of which are alive in the Maya cosmology) as much as to that of human and more-than-human inhabitants, past, present and future. Many Mexicans have united and joined the Maya people in unprecedented acts of solidarity and protest, extending the discontent to the courts of law. Nonetheless, the megaproject is currently being developed as a militarized project of "national security" in seven segments along more than 1,500 kilometers across the Yucatán Peninsula, placing incalculable pressure on otherwise highly fragile ecosystems and modes of life. The impact so far has matched the horrid visions on the boy's skin: countless hectares of tropical forests and wildlife habitats are being cleared and destroyed. The collapse of *cenotes* under the weight of negligent designs and hasty engineering are filling these underground sacred caves and river systems with the debris of the western nightmare. It is a nightmare that, for better or worse, seems to be coming to an end elsewhere, in another world. Uncountable archaeological sites are being carelessly uncovered and quickly archived in unknown locations, forever tampering with evidence of the presence and lives of the ancestors of more than eight million native Maya people who call the Yucatán Peninsula their home today. The train and its deadly infrastructural design expose many Maya communities to a way of life that threatens their own. As dusk falls upon the forest, our skins turn black.

*Ik'Yak'ab' Tah'n* (black is his dark heart).

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> "Chaos is defined not so much by its disorder as by the infinite speed with which every form taking shape in it vanishes. [...] Chaos is an infinite speed of birth and disappearance."[9]

To conclude, a few extra words of explanation. These fragments are compressed versions of a huge amount of material and information that I have collected and drawn from a few corners of my own memory and experience, and of the Mayab, the intoxicating universe of Maya culture and technicities, which I hold so dear. They are approximations of the generating idea that gave rise to this chapter: the co-existence of worlds of insects, non-human animals, people, plants and environmental beings such as tropical forests with the one-world worldview that Western civilization has imposed, and which now seems to be coming to an end. The idea that we all exist in a single world, or reality, and are thus irremediably, fatefully, tied to its collapse, needs to be refuted and chiseled away, starting perhaps with the exploration of other narratives and storytelling experiments that contribute to the construction of worlds that exist, although not equally, in a Pluriverse. These notes attempt to deal with these incommensurable yet interlocked worlds without drowning in an ocean of academic cross-references and citations.

During the past year I have tried over and again to capture and domesticate a wild entanglement of somehow connected elements, domains, scales and story lines, using the tools of academic research and writing that are available to me. These attempts to seize a swirling, moving, twisting constellation using theoretical methods have been stifling and ultimately, in vain. They have, however, brought me closer to the realms of *xa'ak'*, chaos, understood, also in the Maya universe, not as absurdity and disorder, but as a cosmic source prior to all life from where intense energetic flows are propelled into virtually every direction, bringing with them productive creations and/or dysfunctionalities. These can, and do, coexist. Everything that emerges from this source if not possible, is pure potential. The speed with which these flows engulf us determines our constant struggle to slow them down, to construct rafts to float over to calmer shores, even if provisionally they give support while we construct a territory, a Life. In the force flows of cosmic energy that spiral from *xa'ak'*, honey and petroleum function as temporary stabilizers, they create (narrative) territories that help me to speed up the stories and slow them down so that all agents get to inhabit a part of the storyline. The bees and humans that I write about here, follow their own entangled trajectories. But they are vectors, also for storytelling about how order and disorder are continuously at play; how many worlds constantly collide, intersect and interact, often

struggling to maintain a territory, a language, a culture, a religion, a worldview, a technology, a relationship with an insect or with a deadly chemical compound. A world where many worlds *may* fit, or a pluriversal understanding of reality that begins with narratives and stories that bring them together and hold them apart. I take inspiration and thus owe tribute to the marvelous novel *The Actual Star* by American novelist Monica Byrne.[10] Not only does she construct a complex plot, but she also weaves life into worlds distant in historical time, yet not in space or experience. I owe credit and tribute also to Katarzyna Beilin's interesting and carefully curated work on the relationship of plants, humans and non-human animals, and the land of the regions that we care about.[11] The snippets and short anecdotes I share take shape only when read and associated further in the thoughts of the reader. Then, they live on, or they disappear.

**Notes**

1 Robinson Meyer, "Bad Luck (and Fossil Fuels) Might Have Doomed the Dinosaurs," *The Atlantic*, November 9, 2019 https://www.theatlantic.com/science/archive/2017/11/the-extinction-of-the-dinosaurs-was-very-unlikely/545378/.

2 Anonymous, *Popol Vuh: Las Antiguas Historias del Quiché* (illustrated) (Guatemala: Editorial Piedra Santa, 2003).

3 Gabrielle Vail and Christine Hernández, *Recreating Primordial Time: Foundation Rituals and Mythology in the Post-Classic Maya Codices* (Boulder: University of Colorado Press, 2013).

4 Jaroslaw Zralka et. al., "Excavations in Nakum Structure 99: New Data on Protoclassic Rituals and Precolumbian Maya Beekeeping," *Estudios de Cultura Maya* 44 (2014), https://doi.org/10.1016/S0185-2574(14)71396-6; Jaroslaw Zralka et. al., "The Discovery of a Beehive and the Identification of Apiaries among the Ancient Maya," *Latin American Antiquity* 29, no. 3 (2018): 514–31, https://doi.org/10.1017/laq.2018.21.

5 Donna Haraway, *Staying with the Trouble: Making Kin in the Chthulucene* (Durham, NC: Duke University Press, 2016), 58.

6 Arturo Escobar, *Designs for the Pluriverse: Radical Interdependence, Autonomy and the Making of Worlds* (Durham, NC: Duke University Press, 2018), xvi.

7 Sainath Suryanarayanan and Katarzyna Beilin, "Milpa-Melipona-Maya: Mayan Interspecies Alliances, Facing Agrobiotechnology in Yucatan," *ACME: An International Journal for Critical Geographies 19*, no. 2 (2020): 469–500, https://acme-journal.org/index.php/acme/article/view/1746.

8 Guillermo Bonfil Batalla, *México Profundo* (Mexico City: Grijalbo, 1987).

9 Gilles Deleuze and Félix Guattari, *What is Philosophy?*, trans. Hugh Tomlinson and Graham Burchill (London and New York: Verso, 2003), 118.

10 Monica Byrne, *The Actual Star* (New York: Harper Voyage, 2021).

11 Katarzyna Beilin, website, https://www.beilin.space.

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Desperate times demand optimistic transdisciplinary measures. This volume unites a select group of thinkers who courageously traverse disciplinary boundaries. What brings them together is the least stratified 'component': a shared problem. It is a widely recognised that a problem gets the solution it merits. However, only a few acknowledge that a problem seldom neatly fits within a single discipline, nor does it conform to the principle of general equivalence. Handling its irreducibility and non-entailment is a skill possessed by very few. Even fewer take the quasi-causal capacity of what we term the 'space of technicity' seriously.

The space of technicity, the shared problem of this volume, is a consequence of immanence. Each configuration of surfaces comprising the built environment produces an intangible effect, acting as a quasi-cause. It can be referred to as downward causation or the timely rediscovery of (neo)finalism.

In this volume it is approached it from the perspective of axiology. The space of technicity allows us to evade techno-determinism without adopting an anything-goes attitude. That which has become manifest could have individuated differently. However, the potential of a body cannot be discerned before intervening in the causal fabric of agential reality to extract the singular points that make certain outcomes more likely than others, surpassing mere probability.

When operating within the ethico-aesthetic paradigm, where sense becomes intricately dependent on sensibility, and vice versa, the volume's attitude might be said to approximate the Spinozian third kind of knowledge that intuits design (and its space of technicity) beyond mere imagination or reason.

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