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The Word for World is Still Forest

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The Word for World is Still Forest

intercalations 4

The *intercalations: paginated exhibition* series is an experimental foray exploring the structure of the book as a potential curatorial space. As the reader-as-exhibition-viewer moves through the book-as-exhibition, she discovers that the erratic intercalations of the Anthropocene invite new forms of literacy, visuality, inquiry, and speculation that are, in the words of Clarice Lispector, less promiscuous than they are kaleidoscopic.

intercalations is a project of SYNAPSE—The International Curators' Network, published by K. Verlag and Haus der Kulturen der Welt in conjunction with "The Anthropocene Project."

intercalations:
paginated exhibition series

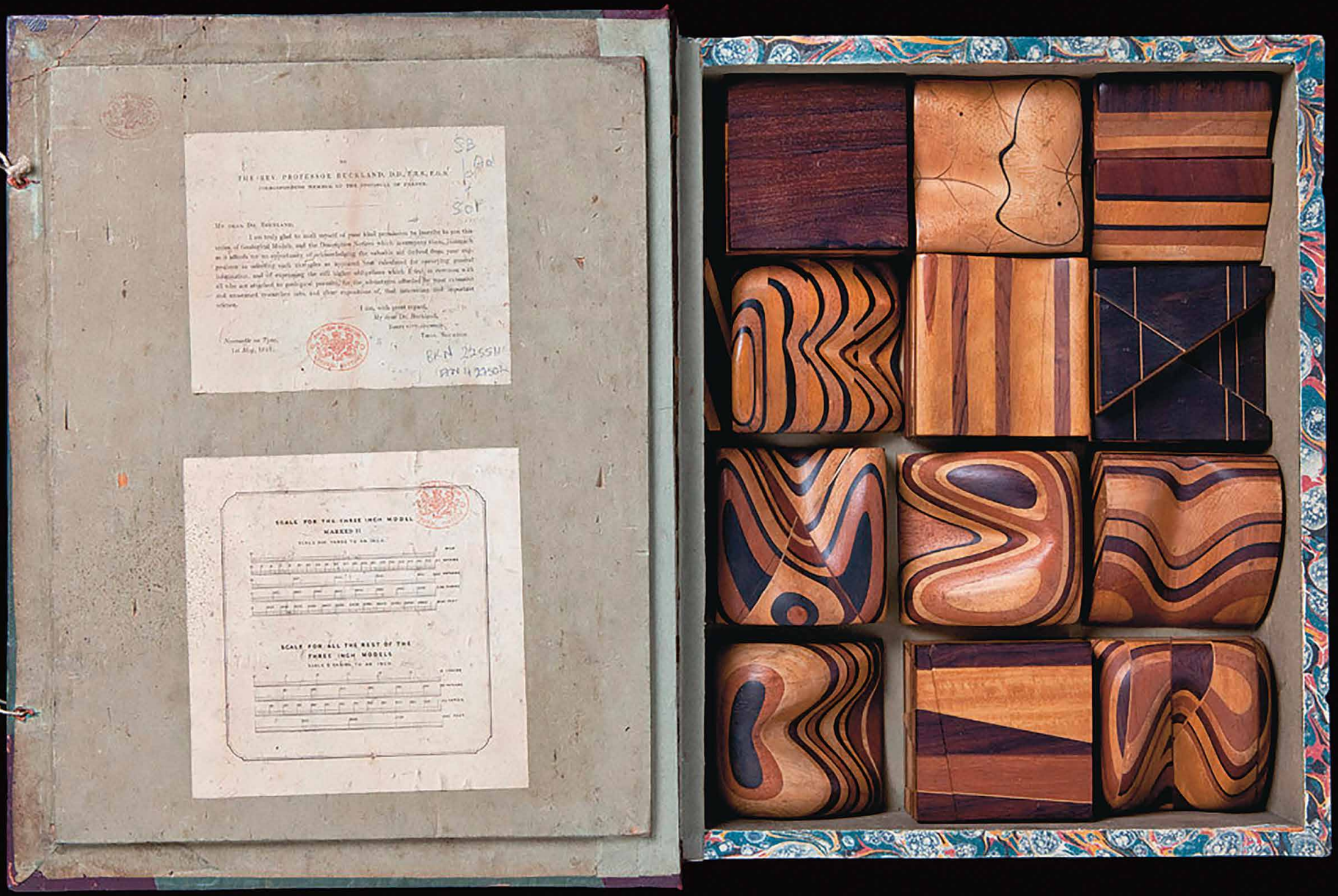
The Word for World is Still Forest creates a space for the reader-as-exhibition-viewer to consider how forests may be seen not only for their trees, but also how they can enable experiences of elegance, affirmation, and creation for a multitude of creatures; in response to their violent destruction, which characterizes the Anthropocene, these pages traverse various woodlands by way of their semiotic, socio-political, historical, and epistemic incitements in order to reveal how practices of care, concern, and attention also enable humans to inhabit and flourish in this world as forest.

The Word for World is Still Forest

co-edited by
Anna-Sophie Springer
& Etienne Turpin

in association with
Kirsten Einfeldt & Daniela Wolf

intercalations 4



THE REV. PROFESSOR BUCKLAND, D.D., F.R.S., F.G.S.

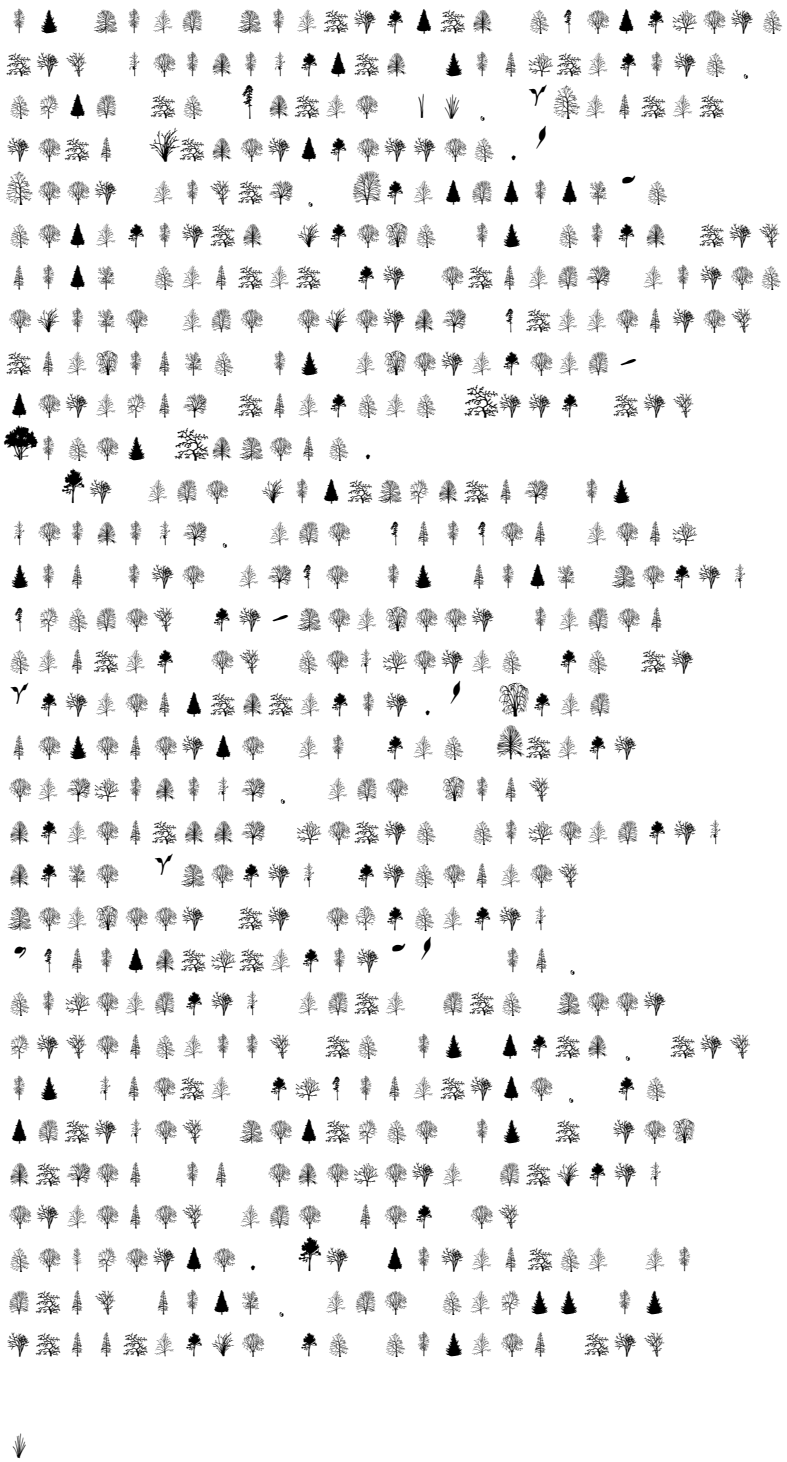
SCALE FOR THE THREE INCH MODELS MARKED H

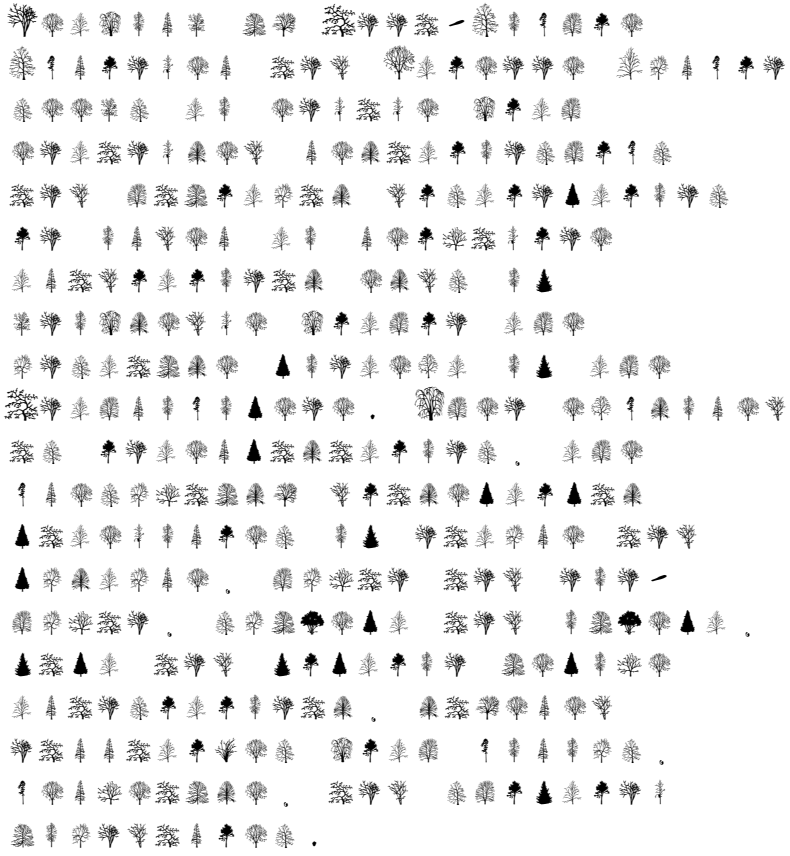
SCALE FOR ALL THE REST OF THE THREE INCH MODELS

← A set of twelve wooden geological models used for teaching the nature of faults, folds, inclines, intercalations, and strata, made in 1841 by the British engineer and surveyor Thomas Sopwith (1803–1879). Image courtesy of the Science Photo Library.

Preface

by Kirsten Einfeldt & Daniela Wolf





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Dear Reader-as-Exhibition-Viewer,

Borrowing its title from Ursula K. Le Guin's 1972 science fiction novella, *The Word for World is Still Forest* is composed in these pages as an homage to the forest as a turbulent and generative multinature. Throughout this book, we invite you to join us in traversing the mighty forests of Amazonia, Southeast Asia, and the Pacific Northwest, arriving in the old urban woods of Berlin, where this book was published. Moving from concepts of the forest as a thinking superorganism to the linear monocultural plantations and "concrete jungles" that threaten the life of global forests, you will encounter trees as companions, communities, entities, and providers; in other moments, they will appear as expert witnesses, data stories, or resourceful ancestors. Whether they occur as images, subjects, or architectures, the forests of this world will beckon you to remember that their destiny is entangled with yours. As in Le Guin's original story, this book contends that Forest and World are "two meanings and one."

Le Guin originally wrote *The Word for World is Forest* in 1968 as a direct response to the geopolitical climate and environmental violence of the American war in Vietnam. "1968 was a bitter year for those who opposed the war," she writes in the Introduction to the 1980 re-edition of the book, adding, "The lies and hypocrisies redoubled; so did the killing. Moreover, it was becoming clear that the ethic which approved the defoliation of forests and grainlands and the murder of non-combatants in the name of 'peace' was only a corollary of the ethic which permits the despoliation of natural resources for private profit or the GNP, and the murder of the creatures of the Earth in the name of 'man.' The victory of the ethic of exploitation, in all societies, seemed as inevitable as it was disastrous."

The story itself is a tale of planetary colonization, resource depletion, and enslavement, wherein a chauvinist, racist population of one planet—a deforested, naked Earth—conquers another planet rich in sylvan biodiversity and inhabited by a non-violent forest people capable of lucid dreaming. Their decolonization struggle is successful, but the cost of repossession is nothing less than the cognitive seed of power, bloodshed, and murder. *The Word for World is Forest* thus poses vexing yet necessary ethical questions about resistance, justice, and the fight for freedom.

Since we began to work on this volume in 2014, the relevance of Le Guin's description of militarized, ecocidal violence has only continued to intensify. As we write, the world appears fundamentally if disproportionately split between those who believe solely in hording the profits that they have amassed through destruction, and those who insist that the decency and dignity of living things cannot be so callously reduced to abstract transactions and shameless accumulation. In this perilous situation, Le Guin's "writerly resistance" reminds readers that science fiction is a formidable intellectual resource for political imaginaries. As editors, we see this *paginated exhibition* series as our own contribution to an insurgent social and environmental science fiction that responds to the physical, climatic, and conceptual foreclosures of the Anthropocene. To relay the potency of Le Guin's words and amplify their relevance for contemporary struggles, we invited the landscape architect and designer Elise Hunchuck and *intercalations* designer Katharina Tauer to reimagine some of the most compelling passages from *The Word for World is Forest* in the pages that follow.

This homage to words and forests is followed by an essay from Pedro Neves Marques about the particularities of Amerindian multinaturalism that sharpens our sense of the forest as an ontological multiplicity teeming with relations, perspectives, and temporalities. That such forests and worlds are largely incommensurable with Eurocentric image-making technologies poses a serious challenge to understanding and solidarity by demanding that we learn "how to inhabit the space of the in-between, the *interval* between 'worlds' in order to contribute to a decolonization of the many worlds from the imposition of the 'one world.'" This book is an attempt to open up a space for these transformations.

Curator Dan Handel presents a paginated version of his research on wood as a vital aspect of forest mythologies and a driver of industrial resource management. By translating elements from his previous exhibitions into this volume, Handel contributes to a renegotiation of the metaphors and mechanisms that render the forest present in human habits of consumption, creativity, and ideation. Canadian forest ecologist Suzanne Simard examines how underground networks of fungi uptake nutrients of salmon brought from sea to river to land by grizzlies and wolves. Simard's text summarizes her ongoing collaboration with

researchers from various First Nations communities in British Columbia to offer a defense of nature as a tangled web rather than a taxonomical order. Accompanied by visualizations from forestry researcher Kevin Beiler, this contribution makes a plea for a more holistic approach to forestry science and urges us to "fundamentally transform the modern scientific image of nature as a resource."

A reflexive essay on living collections by designer and ethnographer Yanni A. Loukissas unfolds alongside a remarkable series of data visualizations. As an inquiry into the botanical data of Harvard University's Arnold Arboretum, his project *Life and Death of Data* shows that in addition to the actual plant specimens of this collection, their metadata are valuable indices of historical events and local knowledge. As natural history institutions attempt to redefine their role to more thoroughly address contemporary ecological crises, Loukissas's work is a poignant reminder for curators to pay careful attention to the institutional and structural parameters of their collections; as his project demonstrates, there is a compelling narrative arc that connects historical practices of collecting and contemporary issues of storage and preservation among digital systems and data sets.

Shannon Castleman's photographs offer a closer look at trees caught somewhere between life and death. By recording the traces of incremental logging practices literally hacked into the bark of teak forests in Indonesia, her series asks the viewer to consider the consequences of subsistence livelihoods being outlawed in favor of more profitable, large-scale agroforestry. Remaining with the motif of the axe implicit in Castleman's work, we follow Nonuya knowledge-elder Abel Rodríguez (also known as Mogaje Guihu) to the Middle Caquetá River region in the Colombian Amazon. He shares an oral narrative conveying the discovery and eventual felling of the Tree of Abundance, which relays the origin of social, territorial, and ecological interdependency in the Amazon; at the same time, this mythological narrative alludes to the beginning of labor, violence, and disease. Rodríguez's storytelling was transcribed and edited in collaboration with Carlos Rodríguez from the Tropenbos International Colombia forest conservation group and the philosopher and editor Catalina Vargas Tovar. It is intercalated with a selection of Rodríguez's drawings, including some which depict the annual

cycles of rainforest and river ecologies. By sharing this remarkable world as forest—normally conveyed by speech and constrained by context—Rodríguez invites us to revel in the deep history of the forest and its mythic architecture.

An understanding of the Amazon as an anthropogenically cultivated multinature is further elaborated in the contribution by Brazilian architect, urbanist, and activist Paulo Tavares. His essay and richly annotated selection of archival photographs and contemporary cartographies expose the "politics of erasure" deployed by the Brazilian state against Indigenous peoples and their lands in the twentieth century. Highlighting the hybrid literacies required by resistance movements fighting illegal logging, plantations, evictions, and development, Tavares shows that genocide and ecocide are often two sides of the same coin in struggles for land sovereignty. He also underscores the politically significant thesis that many forests of the Amazon region are the result of Pre-Columbian domestication and cultivation practices. By rendering Amazonia palpable as the living ruin of an "'expanded polis,' within which humans and nonhumans co-inhabit a common political space," he infinitely complicates any comfortable dichotomies of city, civilization, and culture versus forest, wilderness, and nature. An interview with anthropologist Eduardo Kohn, based on his book *How Forests Think* and observations from his fieldwork in Ecuador, explores the philosophical implications of nonhuman thought. After a discussion about "thinking-with" multispecies semiotics, we conclude our conversation with questions about how to cultivate a forest-like mindfulness even in non-forest ecologies—a provocation that we hope resonates through many other contributions in this book as well.

Calling attention to the precarious nature of urban trees, we learn just how difficult these co-inhabitations are to maintain through architect Silvan Linden's report on the controversial felling of "city trees" by the Parks Department of Berlin-Mitte district. Here we discover that the *Wildwuchs*, or wild trees, were accused by officials of threatening the safety of pedestrians because they were not "proper" street trees. Landscape architect Sandra Bartoli's photo series "The Old Trees of Berlin's Forest" offers a lesser-known history of the ancient trees of the urban forest known as Berlin Tiergarten; these photographs remind us

of the quotidian ancestors in our midst and their histories, which can no longer be taken for granted. To conclude, a stunning, original typography of tree forms from artist Katie Holten's *About Trees* connects the paper of these book pages to their origins by way of a semiotics of forests as words. Bringing together poetry and prose, photography, storytelling, drawing, and exhibition making, as well as data visualization and remote sensing, *The Word for World is Still Forest* attempts to relay something of the confounding efflorescence of the worlds of forests through words and images. If you get lost in the forest, authorities advise that you stop moving and stay in one place to avoid confusion and increase the chances of being rescued. We see things differently: we suggest you stray far from paths cut by familiar habits and explore some of the innumerable perspectives on and of the forests that sustain this world.

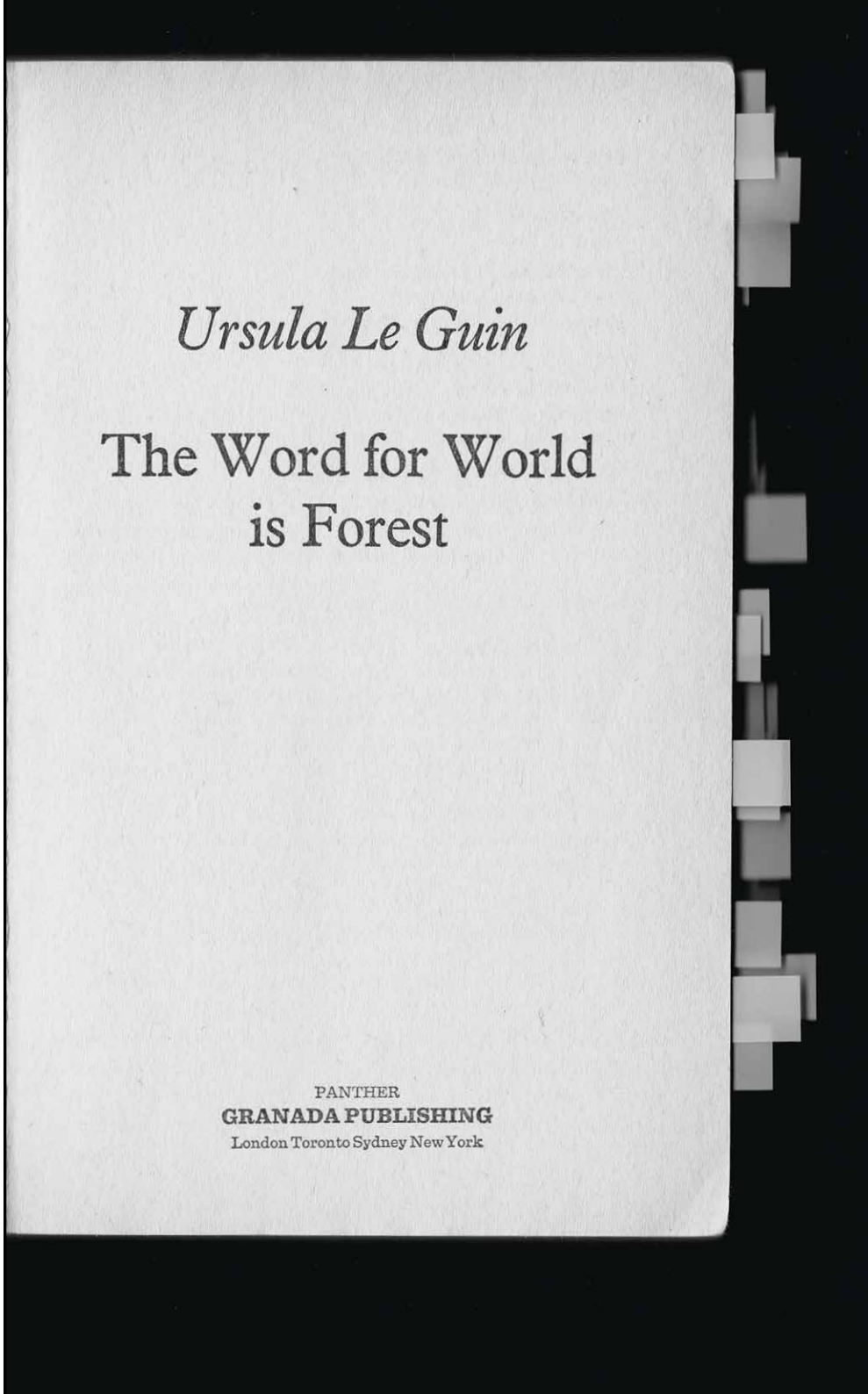
Finally, we would like to thank everyone who made this book possible. We are grateful to all the contributors for sharing their research, projects, and perspectives in this volume. A special thanks to Kirsten Einfeldt and Daniela Wolf for founding and coordinating the SYNAPSE International Curators' Network and its activities from 2011 to 2016 at Haus der Kulturen der Welt in Berlin and, together with Bernd Scherer, for inviting us to develop the *intercalations* book series. The project would not exist without the generous support of the Schering Stiftung, and here we are especially indebted to Heike Catherina Mertens for her ongoing mentorship. Thanks to Lucas Freeman for transcribing and copy-editing our interviews; Martin Hager and Jeffrey Malecki for their meticulous attention as copy-editors; and, Louis Steven for administrative and proofreading support. A very special thank you to Katharina Tauer, the designer of this series, for her incredible commitment, enthusiasm, patience, and openness to experiment with us while creating this work together over the last three years. This publication also took shape thanks to our ongoing exchange with an incredible network of friends, colleagues, comrades, and supporters, and here we want to thank especially Maria Thereza Alves, Bergit Arends, Annette Bhagwati, Lindsay Bremner, Charles Clement, Roger Conover, Fariba Derakhshani, Anita Eylmann, Andreas Frädrich, Elaine Gan, Christina Leigh Geros, Leah Gibbs, Jason Groves, Gabriele Herzog-Schröder, John Holten, Wolfgang Hückel, Armin Linke, Eije Erich Pabst, Richard Pell, John Paul Ricco, Susan Schuppli, Isabelle Stengers, Paulo Tavares, Catalina Vargas Tovar, Anna Tsing, Cecilia Vicuña, Caleb Waldorf, Eyal Weizman, Goethe-Institut, Lab Verde, WALHI, and all the members of SYNAPSE.

We hope you will enjoy these words and forests and find among them a renewed conviction that the loss of these worlds is nothing less than the loss of the world.

Anna-Sophie Springer & Etienne Turpin
Berlin & Jakarta, February 2017

Facsimiles courtesy of Ursula K. Le Guin, *The Word for World is Forest.* London: Granada Publishing, 1980.

Excerpts by Anna-Sophie Springer
Typesetting by Elise Hunchuck



endless leaves on endless trees

ruplast geodesics, forty timber huts built by creechie-labour, the sawmill, the burner trailing a blue plume over acres of logs and cut lumber; uphill, the airfield and the big prefab hangar for helicopters and heavy machinery. That was all. But when they came here there had been nothing. Trees. A dark huddle and jumble and tangle of trees, endless, meaningless. A sluggish river overhung and choked by trees, a few creechie-warrens hidden among the trees, some red deer, hairy monkeys, birds. And trees. Roots, boles, branches, twigs, leaves, leaves overhead and underfoot and in your face and in your eyes, endless leaves on endless trees.

New Tahiti was mostly water, warm shallow sea broken here and there by reefs, islets, archipelagoes, and the five big Lands that lay in a 2500-kilo arc across the Northwest Quarter-sphere. And all those flecks and blobs of land were covered with trees. Ocean: forest. That was your choice on New Tahiti. Water and sunlight, or darkness and leaves.

But men were here now to end the darkness, and turn the tree-jumble into clean sawn planks, more prized on Earth than gold. Literally, because gold could be got from seawater and from under the Antarctic ice, but wood could not; wood only came from trees. And it was a really necessary luxury on Earth. So the alien forests became wood. Two hundred men with robo-saws and haulers had already cut eight mile-wide Strips on Smith Land, in three months. The stumps of the Strip nearest camp were already white and punky; chemically treated, they would have fallen into fertile ash by the time the permanent colonists, the farmers, came to settle Smith Land. All the farmers would have to do was plant seeds and let 'em sprout.

It had been done once before. That was a queer thing, and the proof, actually, that New Tahiti was intended for humans to take over. All the stuff here had come from Earth, about a million years ago, and the evolution had followed so close a path that you recognized things at once: pine, oak, walnut, chestnut, fir, holly, apple, ash; deer, bird, mouse, cat, squirrel,

monkey. The humanoids on Hain-Davenant of course claimed they'd done it at the same time as they colonized Earth but if you listened to those ETs you'd find they claimed to have settled every planet in the Galaxy and invented everything from sex to thumbtacks. The theories about Atlantis were a lot more realistic, and this might well be a lost Atlantean colony. But the humans had died out. And the nearest thing that had developed from the monkey line to replace them was the creechie – a metre tall and covered with green fur. As ETs they were about standard, but as men they were a bust, they just hadn't made it. Give 'em another million years, maybe. But the Conquistadors had arrived first. Evolution moved now not at the pace of a random mutation once a millennium, but with the speed of the starships of the Terran Fleet.

'Hey Captain!'

Davidson turned, only a microsecond late in his reaction, but that was enough to annoy him. There was something about this damn planet, its gold sunlight and hazy sky, its mild winds smelling of leafmould and pollen, something that made you daydream. You mooched along thinking about conquistadors and destiny and stuff, till you were acting as thick and slow as a creechie. 'Morning, Ok!' he said crisply to the logging foreman.

Black and tough as wire rope, Oknanawi Nabo was Kees's physical opposite, but he had the same worried look. 'You got half a minute?'

'Sure. What's eating you, Ok?'

'The little bastards.'

They leaned their backsides on a split rail fence. Davidson lit his first reefer of the day. Sunlight, smoke-blued, slanted warm across the air. The forest behind camp, a quarter-mile-wide uncut strip, was full of the faint, ceaseless, cracking, chuckling, stirring, whirring, silvery noises that woods in the morning are full of. It might have been Idaho in 1950, this clearing. Or Kentucky in 1830. Or Gaul in 50 B.C. 'Te-whet,' said a distant bird.

'I'd like to get rid of 'em, Captain.'

ceaseless
cracking
chuckling
stirring
whirring
silvery
noises

the forest stood there green next to the ruins

was really funny the way Lyubov hated him. Probably the guy was effeminate like a lot of intellectuals, and resented Davidson's virility. Anyhow Davidson wasn't going to waste any time hating Lyubov, he wasn't worth the trouble.

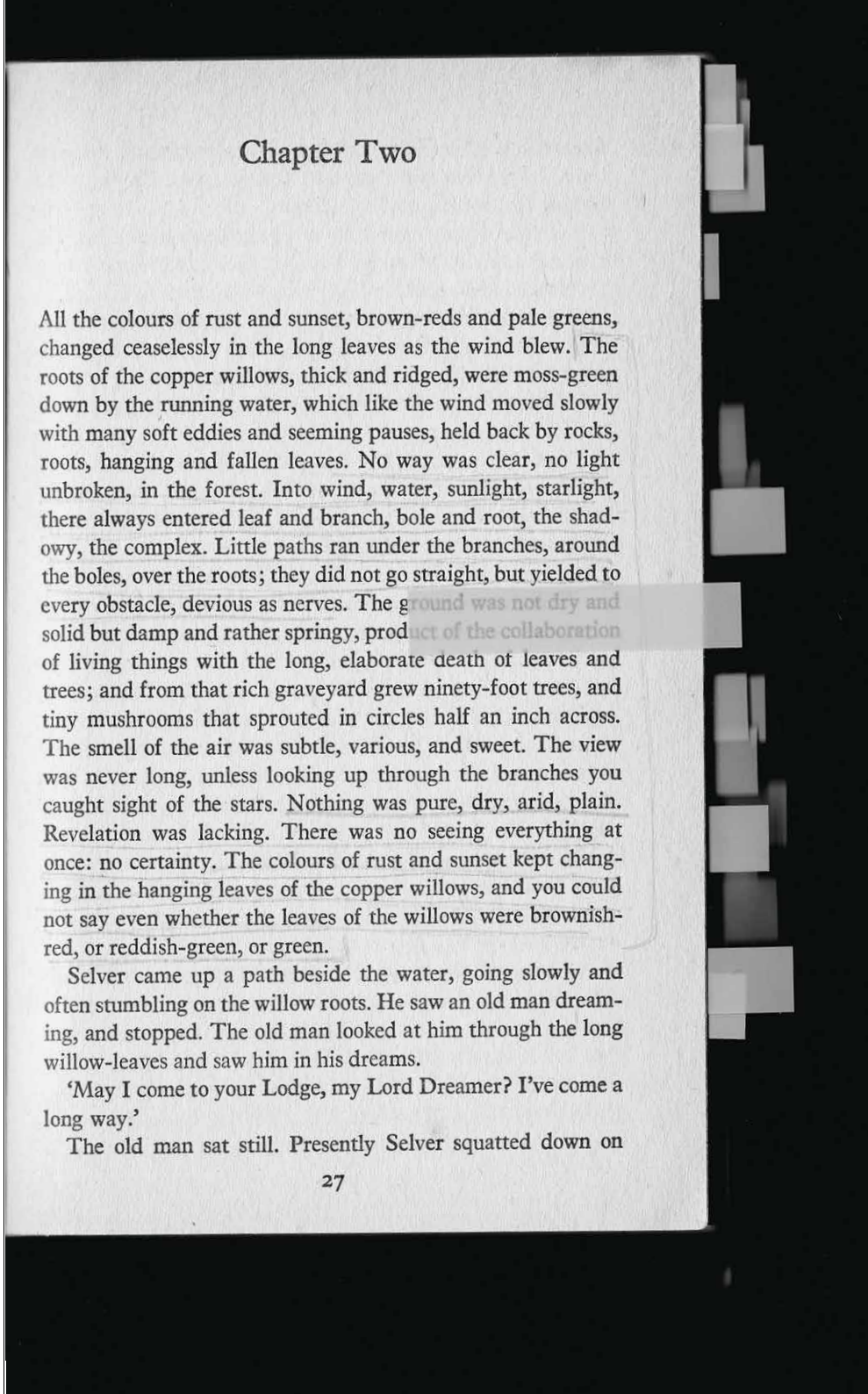
The Luau served a first-rate venison steak. What would they say on old Earth if they saw one man eating a kilogram of meat at one meal? Poor damn soybeansuckers! Then Juju arrived with – as Davidson had confidently expected – the pick of the new Collie Girls: two fruity beauties, not Brides, but Recreation staff. Oh the old Colonial Administration sometimes came through! It was a long, hot afternoon.

Flying back to camp he crossed Smith Straits level with the sun that lay on top of a great gold bed of haze over the sea. He sang as he lolled in the pilot's seat. Smith Land came in sight hazy, and there was smoke over the camp, a dark smudge as if oil had got into the waste-burner. He couldn't even make out the buildings through it. It was only as he dropped down to the landing-field that he saw the charred jet, the wrecked hoppers, the burned-out hangar.

He pulled the hopper up again and flew back over the camp, so low that he might have hit the high cone of the burner, the only thing left sticking up. The rest was gone, mill, furnace, lumberyards, HQ, huts, barracks, creechie compound, everything. Black hulks and wrecks, still smoking. But it hadn't been a forest fire. The forest stood there, green, next to the ruins. Davidson swung back round to the field, set down and lit out looking for the motorbike, but it too was a black wreck along with the stinking, smouldering ruins of the hangar and the machinery. He loped down the path to camp. As he passed what had been the radio hut, his mind snapped back into gear. Without hesitating for even a stride he changed course, off the path, behind the gutted shack. There he stopped. He listened.

There was nobody. It was all silent. The fires had been out a long time; only the great lumber-piles still smouldered, showing a hot red under the ash and char. Worth more than gold, those oblong ash-heaps had been. But no smoke rose from the

nolight unbrok eninthe forest



Chapter Two

All the colours of rust and sunset, brown-reds and pale greens, changed ceaselessly in the long leaves as the wind blew. The roots of the copper willows, thick and ridged, were moss-green down by the running water, which like the wind moved slowly with many soft eddies and seeming pauses, held back by rocks, roots, hanging and fallen leaves. No way was clear, no light unbroken, in the forest. Into wind, water, sunlight, starlight, there always entered leaf and branch, bole and root, the shadowy, the complex. Little paths ran under the branches, around the boles, over the roots; they did not go straight, but yielded to every obstacle, devious as nerves. The ground was not dry and solid but damp and rather springy, product of the collaboration of living things with the long, elaborate death of leaves and trees; and from that rich graveyard grew ninety-foot trees, and tiny mushrooms that sprouted in circles half an inch across. The smell of the air was subtle, various, and sweet. The view was never long, unless looking up through the branches you caught sight of the stars. Nothing was pure, dry, arid, plain. Revelation was lacking. There was no seeing everything at once: no certainty. The colours of rust and sunset kept changing in the hanging leaves of the copper willows, and you could not say even whether the leaves of the willows were brownish-red, or reddish-green, or green.

Selver came up a path beside the water, going slowly and often stumbling on the willow roots. He saw an old man dreaming, and stopped. The old man looked at him through the long willow-leaves and saw him in his dreams.

'May I come to your Lodge, my Lord Dreamer? I've come a long way.'

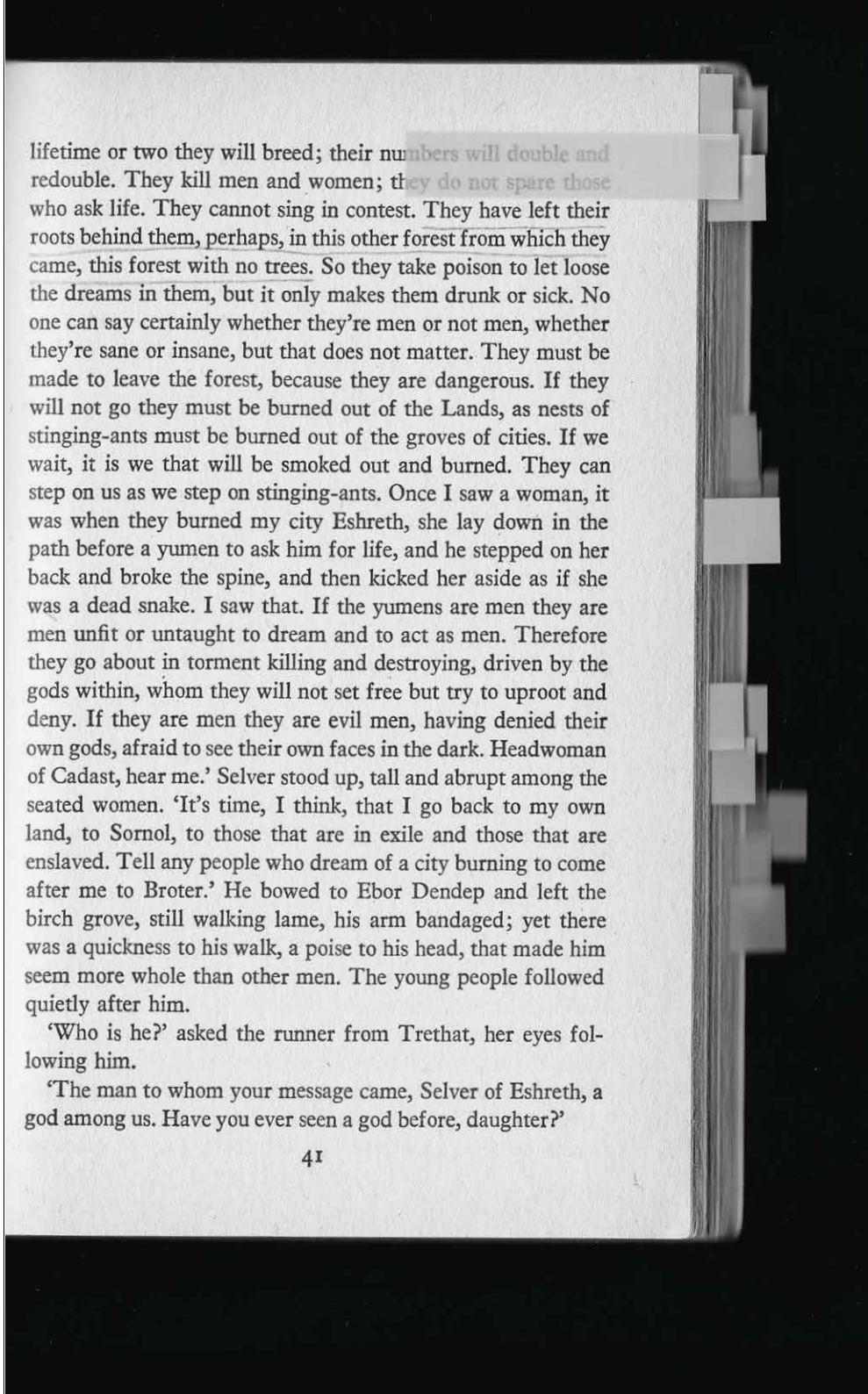
The old man sat still. Presently Selver squatted down on

blood ran out of the broken end

They were not all one people on the Forty Lands of the world. There were more languages than lands, and each with a different dialect for every town that spoke it; there were infinite ramifications of manners, morals, customs, crafts; physical types differed on each of the five Great Lands. The people of Sornol were tall, and pale, and great traders; the people of Rieshwel were short, and many had black fur, and they ate monkeys; and so on and on. But the climate varied little, and the forest little, and the sea not at all. Curiosity, regular trade-routes, and the necessity of finding a husband or wife of the proper Tree, kept up an easy movement of people among the towns and between the lands, and so there were certain likenesses among all but the remotest extremes, the half-rumoured barbarian isles of the Far East and South. In all the Forty Lands, women ran the cities and towns, and almost every town had a Men's Lodge. Within the Lodges the Dreamers spoke an old tongue, and this varied little from land to land. It was rarely learned by women or by men who remained hunters, fishers, weavers, builders, those who dreamed only small dreams outside the Lodge. As most writing was in this Lodge-tongue, when headwomen sent fleet girls carrying messages, the letters went from Lodge to Lodge, and so were interpreted by the Dreamers to the Old Women, as were other documents, rumours, problems, myths, and dreams. But it was always the Old Women's choice whether to believe or not.

Selver was in a small room at Eshsen. The door was not locked, but he knew if he opened it something bad would come in. So long as he kept it shut everything would be all right. The trouble was that there were young trees, a sapling orchard, planted out in front of the house; not fruit or nut trees but some other kind, he could not remember what kind. He went out to see what kind of trees they were. They all lay broken and uprooted. He picked up the silvery branch of one and a little blood ran out of the broken end. No, not here, not again, Thele, he said: O Thele, come to me before your death! But she did not

this forest with no trees

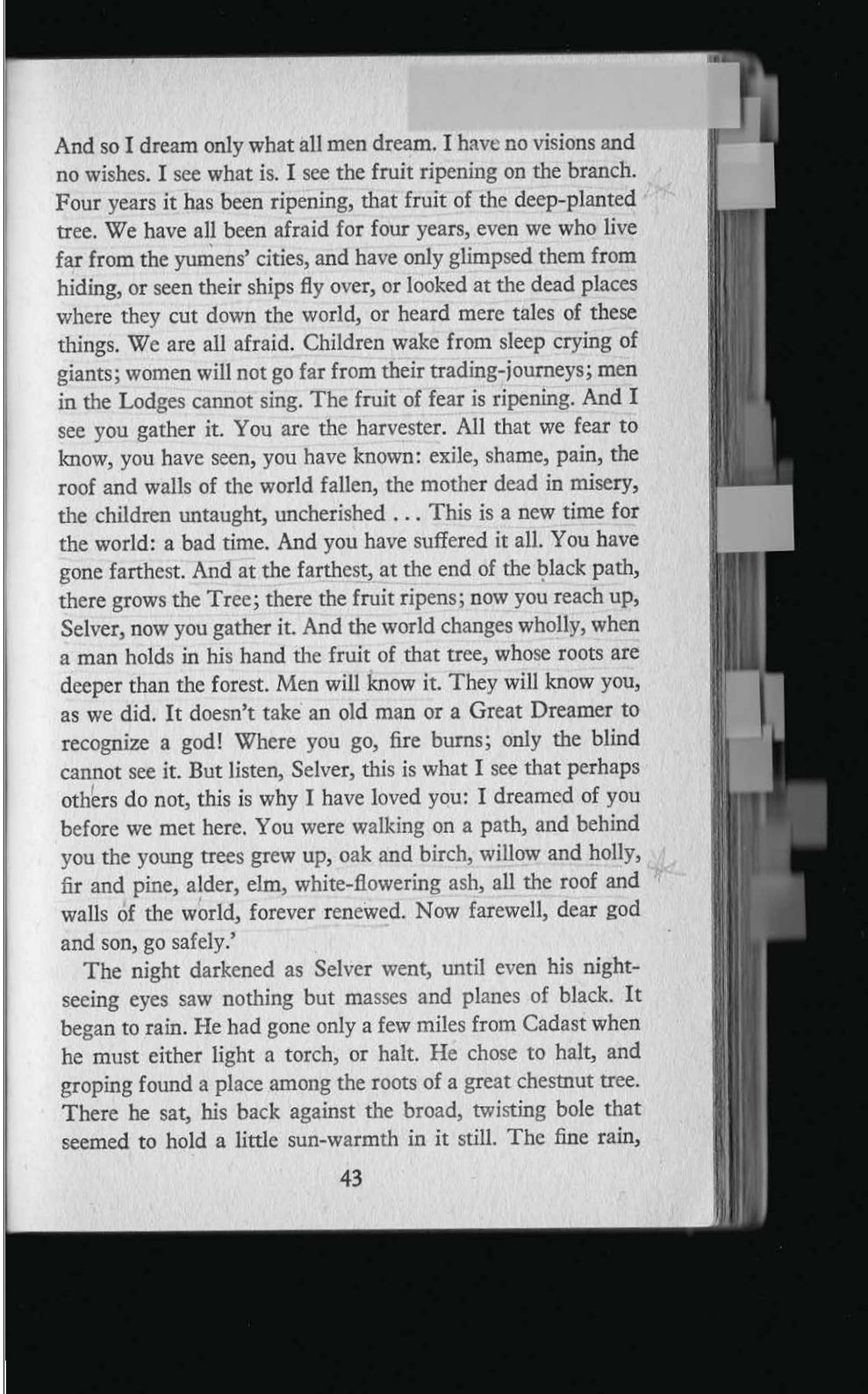


lifetime or two they will breed; their numbers will double and redouble. They kill men and women; they do not spare those who ask life. They cannot sing in contest. They have left their roots behind them, perhaps, in this other forest from which they came, this forest with no trees. So they take poison to let loose the dreams in them, but it only makes them drunk or sick. No one can say certainly whether they're men or not men, whether they're sane or insane, but that does not matter. They must be made to leave the forest, because they are dangerous. If they will not go they must be burned out of the Lands, as nests of stinging-ants must be burned out of the groves of cities. If we wait, it is we that will be smoked out and burned. They can step on us as we step on stinging-ants. Once I saw a woman, it was when they burned my city Eshreth, she lay down in the path before a yumen to ask him for life, and he stepped on her back and broke the spine, and then kicked her aside as if she was a dead snake. I saw that. If the yumens are men they are men unfit or untaught to dream and to act as men. Therefore they go about in torment killing and destroying, driven by the gods within, whom they will not set free but try to uproot and deny. If they are men they are evil men, having denied their own gods, afraid to see their own faces in the dark. Headwoman of Cadast, hear me.' Selver stood up, tall and abrupt among the seated women. 'It's time, I think, that I go back to my own land, to Sornol, to those that are in exile and those that are enslaved. Tell any people who dream of a city burning to come after me to Broter.' He bowed to Ebor Dendep and left the birch grove, still walking lame, his arm bandaged; yet there was a quickness to his walk, a poise to his head, that made him seem more whole than other men. The young people followed quietly after him.

'Who is he?' asked the runner from Trethat, her eyes following him.

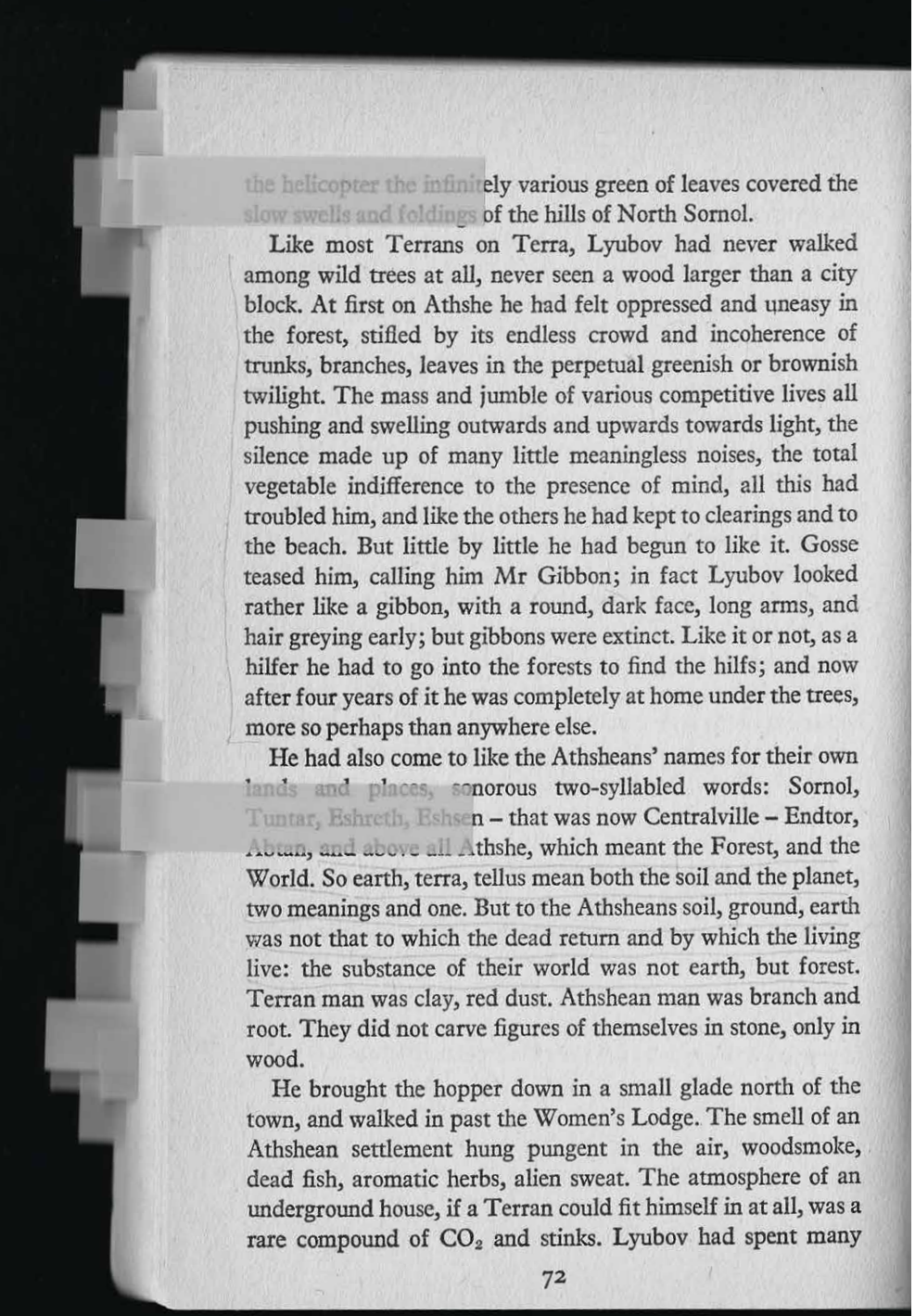
'The man to whom your message came, Selver of Eshreth, a god among us. Have you ever seen a god before, daughter?'

we are all afraid



And so I dream only what all men dream. I have no visions and no wishes. I see what is. I see the fruit ripening on the branch. Four years it has been ripening, that fruit of the deep-planted tree. We have all been afraid for four years, even we who live far from the yumens' cities, and have only glimpsed them from hiding, or seen their ships fly over, or looked at the dead places where they cut down the world, or heard mere tales of these things. We are all afraid. Children wake from sleep crying of giants; women will not go far from their trading-journeys; men in the Lodges cannot sing. The fruit of fear is ripening. And I see you gather it. You are the harvester. All that we fear to know, you have seen, you have known: exile, shame, pain, the roof and walls of the world fallen, the mother dead in misery, the children untaught, uncherished . . . This is a new time for the world: a bad time. And you have suffered it all. You have gone farthest. And at the farthest, at the end of the black path, there grows the Tree; there the fruit ripens; now you reach up, Selver, now you gather it. And the world changes wholly, when a man holds in his hand the fruit of that tree, whose roots are deeper than the forest. Men will know it. They will know you, as we did. It doesn't take an old man or a Great Dreamer to recognize a god! Where you go, fire burns; only the blind cannot see it. But listen, Selver, this is what I see that perhaps others do not, this is why I have loved you: I dreamed of you before we met here. You were walking on a path, and behind you the young trees grew up, oak and birch, willow and holly, fir and pine, alder, elm, white-flowering ash, all the roof and walls of the world, forever renewed. Now farewell, dear god and son, go safely.'

The night darkened as Selver went, until even his night-seeing eyes saw nothing but masses and planes of black. It began to rain. He had gone only a few miles from Cadast when he must either light a torch, or halt. He chose to halt, and groping found a place among the roots of a great chestnut tree. There he sat, his back against the broad, twisting bole that seemed to hold a little sun-warmth in it still. The fine rain,



the helicopter the infinitely various green of leaves covered the slow swells and foldings of the hills of North Sornol.

Like most Terrans on Terra, Lyubov had never walked among wild trees at all, never seen a wood larger than a city block. At first on Athshe he had felt oppressed and uneasy in the forest, stifled by its endless crowd and incoherence of trunks, branches, leaves in the perpetual greenish or brownish twilight. The mass and jumble of various competitive lives all pushing and swelling outwards and upwards towards light, the silence made up of many little meaningless noises, the total vegetable indifference to the presence of mind, all this had troubled him, and like the others he had kept to clearings and to the beach. But little by little he had begun to like it. Gosse teased him, calling him Mr Gibbon; in fact Lyubov looked rather like a gibbon, with a round, dark face, long arms, and hair greying early; but gibbons were extinct. Like it or not, as a hilfer he had to go into the forests to find the hilfs; and now after four years of it he was completely at home under the trees, more so perhaps than anywhere else.

He had also come to like the Athsheans' names for their own lands and places, sonorous two-syllabled words: Sornol, Tuntar, Eshreth, Eshsen – that was now Centralville – Endtor, Abtan, and above all Athshe, which meant the Forest, and the World. So earth, terra, tellus mean both the soil and the planet, two meanings and one. But to the Athsheans soil, ground, earth was not that to which the dead return and by which the living live: the substance of their world was not earth, but forest. Terran man was clay, red dust. Athshean man was branch and root. They did not carve figures of themselves in stone, only in wood.

He brought the hopper down in a small glade north of the town, and walked in past the Women's Lodge. The smell of an Athshean settlement hung pungent in the air, woodsmoke, dead fish, aromatic herbs, alien sweat. The atmosphere of an underground house, if a Terran could fit himself in at all, was a rare compound of CO_2 and stinks. Lyubov had spent many

their world was not earth but forest

~~your world will no longer be used as a colony~~

Eshsen were there along with the five from the ship. The new ones looked clean and polished as new iron. The old ones had let the hair grow on their faces, so that they looked a little like huge, black-furred Athsheans. They still wore clothes, but the clothes were old and not kept clean. They were not thin, except for the Old Man, who had been ill ever since the Night of Eshsen; but they all looked a little like men who are lost or mad.

This meeting was at the edge of the forest, in that zone where by tacit agreement neither the forest people nor the yumens had built dwellings or camped for these past years. Selver and his companions settled down in the shade of a big ash-tree that stood out away from the forest eaves. Its berries were only small green knots against the twigs as yet, its leaves were long and soft, labile, summer-green. The light beneath the great tree was soft, complex with shadows.

The yumens consulted and came and went, and at last one came over to the ash-tree. It was the hard one from the ship, the Commander. He squatted down on his heels near Selver, not asking permission but not with any evident intention of rudeness. He said, 'Can we talk a little?'

'Certainly.'

'You know that we'll be taking all the Terrans away with us. We brought a second ship with us to carry them. Your world will no longer be used as a colony.'

'This was the message I heard at Broter, when you came three days ago.'

'I wanted to be sure that you understand that this is a permanent arrangement. We're not coming back. You world has been placed under the League Ban. What that means in your terms is this: I can promise you that no one will come here to cut the trees or take your lands, so long as the League lasts.'

'None of you will ever come back,' Selver said, statement or question.

'Not for five generations. None. Then perhaps a few men,

Mimetic Traps: Forests, Images, Worlds

by Pedro Neves Marques

> There is no unmediated photograph or passive camera obscura in scientific accounts of bodies and machines; there are only highly specific visual possibilities, each with a wonderfully detailed, active, partial way of organizing worlds. All these pictures of the world should not be allegories of infinite mobility and interchangeability, but of elaborate specificity and difference and the loving care people might take to learn how to see faithfully from another's point of view, even when the other is our own machine.
>
> — Donna Haraway, "Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective," 1991

The Nature of Images

As suggested by Indigenous and anthropological accounts, Amerindian people living in the Amazon do not perceive the forest as "one" forest. Likewise, this forest can also not be unified into a single image—not only because their image of the forest disagrees with ours, but especially because their forest might be better understood as a multiplicity of images or a kind of crystal, with many sides, angles, and perspectives looking back at each other. The Amerindian way of perceiving images in and of the forest is thus fundamentally different from the ways techno-scientific media record and access it—which does not deny mutual collaborations and entanglements. This is because, across the onto-cosmological spectrum,

technologies do not exist in a vacuum. Technologies carry with them worlds; they are ontological embodiments.

By examining the ambiguity of images between different *naturecultures,* a term borrowed from Donna Haraway, I want to think about the encounters and discrepancies between different techno-visual ontologies by way of the natureculture of images in the Amerindian Amazon forest.[1] I will do so by reading the words of Yanomami shaman Davi Kopenawa through the lens of Amerindian multinaturalism, along with their detailed analysis by anthropologist Eduardo Viveiros de Castro in his essay "The Crystal Forest: Notes on the Ontology of Amazonian Spirits,"[2] as well as by following anthropologist Michael Taussig's notion of mimesis.

The difficulties and complexities that arise in the context of cosmopolitical encounters have occupied, for the last few decades and increasingly so, the politics of contemporary anthropology. This means that besides seeking ways to understand other worlds in the first place, anthropological methods must also acknowledge the irreducibility of the worlds in question—which immediately puts attempts of mediation and translation before an intrinsic conundrum. This arises, for instance, when an Amerindian person claims that the nature of the forest *is* itself different (a multinaturalist approach), instead of saying that *they see* the forest differently (which would be a multiculturalist approach). Notwithstanding such

1 My use of "naturecultures," rather than simply referring to "the nature" of images, follows from Donna Haraway's *Companion Species Manifesto* (Chicago: Prickly Paradigm Press, 2007). Haraway coined the term in order to break the modern opposition between nature and culture, not to say one and the other do not exist, but instead so as to emphasize the symbiosis between images of nature and culture in the ordering of given socio-cosmological boundaries.

2 "The Crystal Forest: Notes on the Ontology of Amazonian Spirits," *Inner Asia* 9, no. 2 (2007): 153–172.

challenges, we might do well to embrace this sense of irreducible worlds, however, since non-equivalence itself goes against the grain of the homogenizing effect of modern techno-visual ontologies. In many such ethnographies, the question has thus become how to inhabit the space of the in-between, the *interval* between "worlds"—collaboratively and politically—in order to contribute to a decolonization of the many worlds from the imposition of the "one world."[3]

There is hardly any cosmology, Western or otherwise, which does not structure the social by separating or connecting, socializing or naturalizing, distinct classes of beings and persons.[4] And images, whether ideational or material, play a critical role in stabilizing such divisions. As contemporary anthropologists face up to their cosmopolitical role in this mess of a shared planet, it might help to look into how the naturecultures of image-making techniques are employed in different worlds. What happens when such other techno-visual ontologies look back at modern images (their decolonizing effect)? How might such different image ontologies henceforth "talk" to each other? And what are the possible forms of the anthropological image, as that which may be capable not only of crossing cosmological frontiers but, moreover, of *inhabiting* those frontiers?

3 On the clash between the "one world" and other, suppressed worlds, and the necessity of taking a multi-world approach seriously (i.e. with implications for society and law) see, among others, Marisol de la Cadena, "Uncommoning Nature," *e-flux Journal*, "Supercommunity," 22 August 2015, http://supercommunity.e-flux.com/texts/uncommoning-nature; and John Law, "What's Wrong with a One-World World," Heterogeneities.net, 25 September 2011, http://www.heterogeneities.net/publications/Law2011WhatsWrongWithAOneWorldWorld.pdf.

4 See Jacques Rancière's notion of the "distribution of the sensible," in *The Politics of Aesthetics* (London: Continuum, 2006).

Image-Doubles

The Yanomami shaman Davi Kopenawa says in his accounts (transcribed by anthropologist Bruce Albert) that "[t]he *spirits* are so numerous because they are *images of the animals of the forest*. All those in the forest have an *utupë* image: those who walk on the ground, those who walk in the trees, those who have wings, those who live in the water." Moreover, Kopenawa places these image-spirits at the center of the life of animals: "these images are the true center, the true core of the forest beings."[5] There is thus a spirit for every type of animal in their environment, but more importantly these spirits are images of the animals themselves: a mimetic relation between images and spirits, but also between such image-spirits and the nature of animal bodies. In his words, "[the animals] are merely imitating their images."[6]

Anthropologists of the Amazon region have described *image* and *spirit* in mutually ambiguous terms, as Michael Taussig does in *Mimesis and Alterity*, a book that draws on the mimetic quality of Cuna cultures indigenous to Colombia and Panama. This ambiguity becomes especially evident in a section where Taussig compares two different translations of the same Cuna healing story in order to show how a change of

5 I quote this passage from a short text, transcribed by Bruce Albert and translated from the Portuguese into English by Eduardo Viveiros de Castro: Davi Kopenawa "Xapiripë," in Bruce Albert and Davi Kopenawa, *Yanomami, o Espírito da Floresta* (Rio de Janeiro: Centro Cultural Banco do Brasil/Fondation Cartier, 2004). Quoted by Viveiros de Castro in "The Crystal Forest," 13. Emphasis by the author. This version can be found in Davi Kopenawa, "Sonhos das origens," transcribed by Bruce Albert in September 1998. Henceforth, I will be quoting from Kopenawa's biographical manifesto, *The Falling Sky: Words of a Yanomami Shaman* (Cambridge: The Belknap Press of Harvard University, 2013).

6 Kopenawa and Albert, *The Falling Sky*, 61.

words can produce readings that are significantly, yet only apparently, different from one another. The first translation was created in the late 1920s by a Cuna who, under his new name Charles Slater, became a sailor on British ships. It reads: "Anywhere we want to go for *image* we can go. If I want to go far up in the blue sea I can go there for *image*, and I can go under there too." The second translation, written in the 1930s by Baron Erland Nordenskiöld in collaboration with the Cuna Indian, Rubén Pérez Kantule, follows: "Wherever we want to go with the *spirits'* help we can go. If I want to go far out on the blue ocean I can do it with the help of *spirits*, and I can also go down in the sea."[7] For Taussig, Nordenskiöld's is no mere clarification. On the one hand, the two phrases suggest that image-spirits are a means of crossing normally unbridgeable frontiers (going out and down into the sea); on the other, they suggest that from "the (mere) image of a thing comes its soul and spirit," with agency being therefore distributed across different forms.[8]

Here we have, firstly, the mimetic faculty or role of images. Summarizing it as "the nature that culture uses to create second nature," *mimesis*, for Taussig, means a type of bodily knowledge arising from confrontational alterity, that is, as a means of "contact" between seemingly distant beings, spaces, and attributes: capturing the predatory affect of given animals in hunting and shamanism, or invoking the medicinal attributes of given substances and spaces, as when Taussig finds pictures from medical journals glued on the mud wall of a

7 Erland Nordenskiöld and Rubén Pérez, "An Historical and Ethnological Survey of the Cuna Indians," ed. Henry Wassen, *Comparative Ethnographical Studies* 10 (1938): 355. Quoted in Michael Taussig, *Mimesis and Alterity: A Particular History of the Senses* (London and New York: Routledge, 1993), 102. Emphasis by the author.

8 Ibid., 103.

small "alternative" hospital in Western Colombia.[9] Central to Taussig's observations is his estimation that mimesis is actualized most strongly in liminal moments, that is, when borders are inhabited (and the skin, fur, clothes, feathers, and tattoos for that matter, are borders) and otherness and the adaptation to what lies beyond oneself dissolves, constituting, through that process, selfhood. Secondly, however, we find statements that Amerindian notions of human interiority can be, to use the words of anthropologist Alfred Gell, "conceived as an interior person, a homunculus, within the body," and not as the kind of immaterial substance which Christianity defines as the soul.[10] In other words, there is a body, or the image-spirit of a body, within a body.

From this perspective, talking about animism in terms that suggest everything—animals, plants, mountains, rivers, the moon, and the stones—has a soul seems insufficient, when across Amerindian socio-cosmologies one finds the idea that interiority or souls are "*spiritual doubles* of their material forms," that is, of their outer bodies—perhaps even, following Kopenawa, their environmental relations: the animal in its place.[11] In *Mimesis and Alterity*, Taussig refers specifically to the Cuna word *purpa* (and the plural *purpakuna*), which has been translated in a range of ways as souls, "mimetic doubles," "invisible replicas," and "invisible counterparts" of one's body.

9 Ibid., 247.

10 Alfred Gell, *Art and Agency: An Anthropological Theory* (Oxford: Clarendon, 1998), 136. For matters of brevity and dexterity, I am purposely leaving aside any further notes on the thorny problem of anthropomorphism vs. anthropocentrism in Amerindian socio-cosmologies: that "human" actually refers to the anthropomorphic or humanoid.

11 Norman Macpherson Chapin, "Curing Among the San Bias Kuna," unpublished Ph.D. dissertation (Tucson: University of Arizona, 1983), 75. Quoted in Taussig, *Mimesis and Alterity*, 101.

The inner image of an animal or plant is a mirror, or image-double, of its outer skin or material form: its appearance before others. Thus, "the *purpa* of a man with one leg, for example, also has only one leg."[12] Exteriority and interiority are mimetic-doubles of one another, representing themselves mutually: mimesis.

This implies that the difference between animist and naturalist ontologies, to use anthropologist Philippe Descola's terms, should not be simplified to different degrees of distribution of subjecthood—that moderns, too, for example, start acknowledging the autonomous agency of others. Nor should these mimetic relations simply propose an inversion of the modern dualism between body and mind (as in cognitive embodiment theories, a pretense also addressed by Descola).[13] Rather than restricting any definition of animism to a plurality of souls, this perplexity of bodies inhabiting bodies, added to the suspicion of clothes hiding an inner humanity, has led anthropologist Eduardo Viveiros de Castro to suggest the notion of "somatism" as a better alternative to "animism."[14]

Image-Spirits

With Taussig in mind, I want to return to Kopenawa's words. Talking about image-spirits, he continues:

12 Ibid.

13 Philippe Descola, *Beyond Nature and Culture* (Chicago: University of Chicago Press, 2013), 187–88.

14 Eduardo Viveiros de Castro, keynote lecture for the symposium *Em Torno do Pensamento de Eduardo Viveiros de Castro* at SESC Ipiranga, São Paulo, October 2015.

> These […] are the *images of the animal ancestors* we call *yarori.* A very long time ago, when the forest was still young [and] our ancestors—*who were humans with animal names*—metamorphosed into game. The human peccaries became peccaries. The human deer became deer. The human agoutis became agoutis. These *yarori* first people's skins became those of the peccaries, the deer, the agoutis that live in the forest. So it is ancestors turned other that we hunt and eat today.[15]

Here, Kopenawa is focusing on myths and cosmogonist stories common across Amerindian South America: the first times, long ago yet in ever-present actualization, when all living forms, whether animal or plant, were human. Accordingly, image-spirits refer not only to the image-double of a given animal but also to humanity in general: a common humanity, visible at the beginning of time and now invisible, because dispersed into the forms taken by the many species-beings of the forest—beings who, each from their own perspective, still see themselves as humans but who cannot see us or any other animals or plants as such.[16]

In "The Crystal Forest," referring to Yanomami cosmogonies Viveiros de Castro writes, "mythic discourse can be defined as, first and foremost, a record of the process of

15 Kopenawa and Albert, *The Falling Sky*, 61. Emphasis by the author.

16 See Joanna Overing, "Puzzles of Alterity in an Amazonian Ontology: How Is a God, Spirit or Animal a Human Being from a Piaroa Point of View," AAA Meetings (November 1999): 9. References to such origin stories abound in the literature about the region. For example, talking about this topic in his book *The Jealous Potter* (Chicago: University of Chicago Press, 1988), Claude Lévi-Strauss refers in particular to Waiwai and Cashinawa myths. For a general introduction to the theme, see Viveiros de Castro and Déborah Danowski, *Há mundo por vir? Ensaio sobre os medos e os fins* (São Paulo: Cultura e Barbárie, 2014).

actualization of the present state of things out of a virtual pre-cosmological condition endowed with perfect transparency —a 'chaosmos'."[17] As such, image-doubles (the mimetic body within the body) can be better understood as the fixed projection of such chaosmosis. They are an outer, actual form, indexed and specified (as if a picture frozen in time), of a metamorphic inner image, which is in turn a manifestation of that mythic virtual humanity that included every variation of species and from which all species came. Curiously, Kopenawa says that *utupë*, the image-spirits, "are like photographs." This is also true for the Cuna word *purpa*, which may also refer to origin myths, semen, menstrual blood, and speech—that is, to reproduction, replication, or mimicry in general.[18]

Following Kopenawa, Viveiros de Castro offers an impressive definition of spirits in Amazonia:

> A spirit in Amazonia is *less a thing than an image, less a term than a relation, less an object than an event*, less a transcendent representative figure than a sign of the immanent universal background—the background that comes to the surface […] when the human and the nonhuman, the visible and the invisible *trade places*. An Amazonian spirit, in sum, is *less a spirit in opposition to an immaterial body than a dynamic and intensive corporality*.[19]

17 Viveiros de Castro, "The Crystal Forest," 17.

18 Regarding Kopenawa and photography, see Kopenawa and Albert, *The Falling Sky*, 60. For the many uses of the word *purpa*, see Taussig, *Mimesis and Alterity*, 102. Furthermore, the Brazilian anthropologist Pedro Niemeyer Cesarino notes that *ütupe* is comparable to "*yochin* of Panoan, the *karon* of Jê and the *'ang* of Tupi speaking peoples," indicating a certain generalization of such uses.

19 Viveiros de Castro, "The Crystal Forest," 20. Emphasis by the author.

Viveiros de Castro implies that spirits result from instantiations. Seeing a spirit is not so much seeing a thing, but catching a glimpse, as if peeking under the animal's skin, of the continuous, metamorphic "virtual multiplicity" addressed by myths, whereby spirits, animals, plants, and so on, "are only so many different intensive vibrations or modulations" of which "the human mode can be imagined as the fundamental frequency of this animic field."[20] If, as the above myths tell, the commonality of culture—humanity—beyond the modern concept of human species is a quality of Amerindian animism, the nature of cosmopolitical relations and representations within this "animic field" is thus said to be negotiated by the embodiment of the *many natures* of such humanity.

Viveiros de Castro is the author who has most consistently consolidated the idea of multinaturalism—the anthropological concept, created in the encounter between animist and naturalist ideas about nature, which states: one culture (humanity), many natures (images, bodies, affects), instead of the modern creed of many cultures and one nature. Within this multinaturalism, the nature of images depends on the body, and yet the body too is but an image. The body is "the origin of perspectives"—and the problem is that perspectives are not stable; they are constantly being exchanged, the ontological borders of such natures being crossed.[21]

For when does one see such image-spirits? Under normal circumstances one does not see the animals as they are to themselves, playing flutes that—to us—are only coconuts lost

20 Viveiros de Castro adds, "a spirit is something that only has too little body insofar as it posses too many bodies, capable as it is of assuming different corporal forms. The interval between any two bodies rather than a non-body or no body." Ibid., 21.

21 Ibid.

in the forest, waging war with enemies, which—to us—is simply them hunting prey.[22] Spirits make themselves visible only through unnatural encounters (when perspectives "trade places"), and are thus relational and virtual through and through—much like the status of the animal and the human within perspectival animist societies.[23] These "unnatural encounters" can be induced intentionally through relational practices such as shamanism, dreaming, hunting, and gardening, or occur by accident in the forest. The instability of the mimetism between images and bodies is laid bare in such spirited instances, moments when images are exchanged and otherness is temporarily interpreted and inhabited. What seems to be at stake, then, is the appearance of bodies before others and the possibility of an exchange of perspectives, that is, of seeing and catching—or being caught in—image-spirits; seeing the human in what should be nothing but an animal or a plant; seeing the equivalence of humanity across the ontological divide separating species and worlds, habitats, environments.

Following Kopenawa's words, it seems that if images are central to mimesis, it is as shapes that shape ways of seeing. It is not simply, as in Plato's classical mimesis, as a projection of an idea, or in modern terms as a representation of the body of which the image is a copy or an expression. Rather, the image

22 Tânia Stolze Lima, "The Two and its Multiple: Reflections on Perspectivism on a Tupi Cosmology," in *The Forest and The School/Where to Sit at the Dinner Table?* ed. Pedro Neves Marques (Berlin and Cologne: Archive Books and Akademie der Künste der Welt, 2014), 373–408.

23 "If Amazonian concepts of 'spirit' are not rigorously speaking taxonomic entities, but names of relations, movements and events, then it is probably just as improbable that notions such as 'animal' and 'human' are elements of a static typology of genuses of being or categorical macro-forms of an 'ethnobiological classification'," Viveiros de Castro, "Crystal Forest," 21.

exists as that which mediates between a here and a there—the image-skin: a liminal space, keeping ontological worlds at bay as much as connecting them.

Image-Traps

How does the above multinaturalist approach to images and spirits reflect back on the mediation performed by techno-visuals in cosmopolitical encounters between worlds? As stated, technologies embody particular worldviews, and in their embodiment they end up privileging some of them above others. But often technologies also serve as "traps," with the ability of connecting distinct (and otherwise distant) bodies, as Alfred Gell once suggested in his essay, "Vogel's Net: Traps as Artworks and Artworks as Traps."[24] For Gell, the animal hunting trap is a prime example of an object that blurs the distinction between artwork and artifact, because in order to act successfully on its prey, the trap must interpret different life-worlds at the same time—that of hunter and prey. In doing so, it both relies upon and expresses the "complex intuitions of being, otherness, relatedness" that place art at the core of that social engine we call culture.[25]

According to Gell, the animal trap "communicates a deadly absence" of both hunter and prey.[26] Even without the actual presence of either, this double absence also contains their virtual, semiotic embodiment. On the side of the hunter,

24 Alfred Gell, "Vogel's Net: Traps as Artworks and Artworks as Traps," in *The Art of Anthropology: Essays and Diagrams*, ed. Alfred Gell and Eric Hirsch (London: Athlone Press, 1999), 187–214.

25 Ibid., 203.

26 Ibid., 199.

a good trap embodies a hunter's skill, as well as his knowledge and attunement to the surrounding life-worlds. As for the prey, traps are always "lethal *parodies* of the animal's *Umwelt*,"[27] be these formed in the animal's literal shape—Gell gives the example of a giraffe trap in the shape of a giraffe—or acting "more subtly and abstractly," as a stimulus for their behavior—"you need a clever trap for a clever animal," such as monkeys.[28] Dynamic and ghostly images of hunter and prey, traps allow for the deduction of each other's dispositions without ever fully having access to each other's world. This relation is only intensified in the event of a trap's activation, for it then acts as a trigger setting in motion the mimetic encounter of two worlds. Even before capturing the animal the trap has already captured its nature and image.

But what if one's body itself is the trap? In his study of the forests of the Ecuadorian Amazon among the Runa people, anthropologist Eduardo Kohn refers to the co-evolution between the giant ant-eater's tongue and the tunnels inside the mounds of termites.[29] For example, Kohn narrates how Runa men "took delight in explaining […] how the giant ant-eater adopts the *perspective* of ants in order to fool them; when the ant-eater sticks its tongue into ant nests, the ants see it as a branch and, unsuspecting, climb on."[30] Such a doubling appears similar to Deleuze and Guattari's famous example of the orchid and the wasp.[31] Nonetheless, while the latter is

27 Ibid., 202.

28 Ibid., Introduction to *The Art of Anthropology: Essays and Diagrams*, 19.

29 See Eduardo Kohn, *How Forests Think: Anthropology Beyond the Human* (Berkeley: University of California Press, 2013). See also Eduardo Kohn in this volume, 158–68.

30 Ibid., 96. Emphasis by the author.

31 Gilles Deleuze and Félix Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia*, trans. Brian Massumi (Minneapolis: University of Minnesota Press, 1987), 10.

framed (against mimesis) in terms of the philosophical concept of becoming, Kohn's example is intrinsically semiotic, and may open up other entry points into the naturecultures of images in Amerindian animism and beyond.

In what is called mimicry in biology, distinct organisms share similar morphological qualities. Following the non-Western explications of Kohn and the Runa, such similarities are the outcome of a mutual interpretation of signs and the recognition of shared, though irreducible, worlds. But it is not that one becomes the image of another—the reciprocal shaping of form between the ant-eater's tongue and the termite mound's tunnels—nor is it any attempt at inhabiting another's affective world. There is no stepping outside oneself, it seems to me, in Kohn's example; no illusion of transcendence or transparency. One does not become the other; one becomes something else, something in-between—a form of learning from the *interval*.[32]

To summarize, it is not that traps are representations of two beings-in-the-world operating inside one image-machine, but that traps are like portals into worlds: they are frontier technologies. Thus Gell writes that "[t]he trap embodies a scenario, which is the dramatic nexus that binds […] protagonists together, and which *aligns them in time and space*."[33] Isn't this alignment what we are looking for? The ant-eater's embodied trap is about the possibilities one invents so as to be caught in another's image. It is about capture and interpretation, to thread the line of encounter. It is about sharing practices.

32 The "interval" is a concept amply used by film-maker and anthropologist Trinh T. Minh-Ha. See Trinh T. Minh-Ha, "She, of the Interval," in *When the Moon Waxes Red: Representation, Gender and Cultural Politics* (London and New York: Routledge, 1991).

33 Gell, "Vogel's Net," 202. Emphasis by the author.

The Anthropological Image?

Looking beyond life in the Amazon, it is not without reason that humans send robots out into space to capture images of places that humans cannot reach. Or that when in Fukushima—where cameras fail to capture radioactivity—the Geiger counter acts as a trap. Better yet, let us be symmetrical: in Fukushima, the Geiger counter *is* a camera.

It may very well be impossible to produce material transpositions of the Amerindian notion of image, from bodies and chants to film, paper, computer screens, and digital data. The linear perspective embedded in the camera's infrastructure, for example, implies that any such attempt will always and inevitably pass through a modernist, naturalist filter: an objectifying gaze that captures the environment at a distance, from which a division between self and other is established. This is not a bad thing; again, it is simply the confirmation of ontological embodiments in technological devices. The ontological difficulty in achieving total cultural transparency by scientific and technological means should not be a concern, nor does it undermine any anthropological attempt at cosmopolitics. For while the camera may hardly be the appropriate tool for translating non-naturalist cosmovisions, their use by Indigenous peoples has contributed, indubitably, to strategies of political empowerment as well as disruptive filmmaking practices. This is a beautiful, practical, embodied metaphor for multinaturalist encounters and discrepancies.

And yet, the above divide itself may be misleading, for it seems that images produced in "overdeveloped" modernity no longer obey the single objectifying gaze of a naturalist

ontology defined by the nature/culture divide. As Donna Haraway wrote, almost thirty years ago:

> The visualizing technologies are without apparent limit; the eye of any ordinary primate like us can be endlessly enhanced by sonography systems, magnetic resonance imaging, artificial intelligence-linked graphic manipulation systems, scanning electron microscopes, computer-aided tomography scanners, color enhancement techniques, satellite surveillance systems, home and office VDT's, cameras for every purpose from filming the mucous membrane lining the gut cavity of a marine worm living in the vent gases on a fault between continental plates to mapping a planetary hemisphere elsewhere in the solar system. Vision in this technological feast becomes unregulated gluttony; all perspective gives way to infinitely mobile vision […] this eye fucks the world to make *techno-monsters*.[34]

While the cyborg enhancement of one's body through a variety of visual systems has become normal, the total detachment or autonomy of nonhuman visuality—that is, visuality created and perceived independently of human knowledge systems—has also become a reality. In overdeveloped modernity, the positivist necessity "to distance the knowing subject from everybody and everything in the interests of unfettered power"[35]

34 Donna Haraway, "Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective," in *Simians, Cyborgs and Women: The Reinvention of Nature* (London and New York: Routledge, 1991), 188.

35 Ibid.

no longer even seems in need of a subject, eyes, or a living body. There exist today more computer-generated images to be read by algorithms than images read by humans; and while such autonomy may appear harmless in the management of finance algorithms or image-recognition codes, it also is key to matters of life and death by drone. Techno-monsters indeed, breaking from modernity into an emergent ontology: an entirely new inhuman image regime.[36]

My issue, then, is not only the consequences of an encounter between animist imagery and Western image ontologies. Rather, I am concerned about the possible shapes taken by the anthropological image when it is understood as a practice that, to paraphrase Haraway, can rupture the hegemonic gaze which sees objectivity everywhere. To think images as the embodiment of worlds means not only thinking the ontology of images but also thinking images ontologically, that is, not as representations but as *representatives*: "These are images which must see us in order for us to be able to see them, […] images through which we see other images."[37] A fine definition of the anthropological image if there is one.

Whether all of this may be of interest will be checked by the emancipation lived both on the side of non-naturalist cosmologies, such as found in Amerindian animisms, and on that of modern technosciences. That capitalism cannot be excluded from the spread and ideological application of such technosciences is a reminder of how cosmovisional

36 See Trevor Paglen, "Operational Images," *e-flux Journal* 59, 2014, http://www.e-flux.com/journal/59/61130/operational-images.

37 "Representatives," not "representations," is how Viveiros de Castro interprets the role of image-spirits in reference to Albert's translation notes on Kopenawa's speech; see Viveiros de Castro, "The Crystal Forest," 20. Kopenawa himself uses the Portuguese word *representante*; see Kopenawa and Albert, *The Falling Sky*, 60.

differences are more often than not incommensurable, and how incommensurability is incorporated into different image technologies, be it cameras or tattoos. Barriers and frontiers should not be a problem, though. Clearly, the horizon of total liquidity and transparency is a capitalist dream—and there is more than enough proof that genocide is the only result capitalism is capable of producing in the encounter with every barrier, with every frontier.

Fig. 01. Installation view, *First, the Forests,* curated by Dan Handel, 2012.
© Canadian Centre for Architecture, Montréal.

It Goes on Like a Forest

by Dan Handel

"There are no cities anymore […] it goes on like a forest […] that is the reason why we cannot have the old […] planned city and so on. We should think about the means that we have to live in a jungle and maybe do well by that."[1]

In this curious paragraph, Ludwig Mies van der Rohe, one of the most influential protagonists of modernist architecture in the twentieth century, implicitly admits his defeat. After more than a decade in the United States, it became clear to him that the Eurocentric idea of cities as manifestations of human progress, so central to the rhetoric of the modernist movement, simply did not hold in post-war America. Commentaries on this statement tend to focus on its meaning for urbanism, finding the expressions of Mies's disillusionment in his plan for the IIT campus in Chicago, or in the regional visions of his collaborator and fellow émigré Ludwig Hilberseimer.

However, by focusing on the role of the forest in the metaphor, a range of historical, environmental, and temporal functions assumed by the cultural imaginary of Western societies can be unraveled. In this sense, Mies's words betray a deeper recognition about the defeat of the modernist project, rooted as it was in a belief in linear time and a progressive

1 Ludwig Mies van der Rohe, quoted in Detlef Mertins, "Living in a Jungle: Mies, Organic Architecture, and the Art of City Building," in *Mies in America*, ed. Phyllis Lambert (Ostfildern: Hatje Cantz, 2001), 633.

Fig. 02. Tapestry of woodcutters at work, Tournai workshop, fifteenth century.
Courtesy of the Musée des Arts Décoratifs, Paris.

conception of society constantly advancing towards a better future. In contrast to these modern beliefs, a forest that simply "goes on" is ubiquitous, lacking both an originating moment and stated objectives. Yet, the histories of forests are a complex of cyclical, spatio-temporal, and material-energetic flows that defy any linear trajectory. From this perspective, additional latent cultural constructs can be detected in Mies's text: forests are presented as inherently ambivalent material settings, but also as abstract sites for extraction and production; as disappearing entities that keep reappearing; and as rationalized environments that become the locii for irrational longings. These three related binaries sketch out an ahistorical image of forests and their interactions with humans that can be leveraged to reveal a range of economic, environmental, and cultural consequences.

Forest Economies

In 1907, art historian Aby Warburg focused his attention on three Burgundian tapestries produced in the fifteenth and early sixteenth centuries, all of which depicted the same subject: woodcutters at work. Struck both by the realist figures and the fantastic elements constituting the scenes in which these figures were placed, he noted that "the figures, who ought to appear one in front of the other, are piled up on top of each other, and the tapestry weaver's *horror vacui*, his compulsion to fill every inch of the surface, destroys the ambient atmospheric space by crowding it with foliage and animals of every kind. Monkeys, slags, deer, pheasants, rabbits, even beasts of prey—a lion, a wolf, a leopard—have gathered in

the woods for purely decorative purposes."[2] Indeed, the intensity of the scene is overwhelming, with humans, animals, and plants embedded in a highly processed forest environment. [Fig. 02.] But what is being cut down and destroyed? Warburg's discussion of ambience and atmospheric space refers not only to the pictorial plane, but to an underlying longing for a pristine archaic state of nature. Later in the text, he writes, "the realm of nature, for which every overcivilized society longs, was peopled here […] not by the satyrs of antiquity but by the involuntary comedians of the world of heavy manual labor."[3] Without underplaying the influence of artistic representation, nor Warburg's own art historical project, we can nevertheless argue that the work produced in the Tournai tapestry workshops captured a reality in which European forests were no longer considered part of nature. Such longing for nature, whether present in the sensitivity of medieval patrons or imagined by a nineteenth-century German scholar, could not find its subject in the real forest, which had already been transformed into a production environment by labor and aristocratic interests.

Once nature was left behind, forests were repositioned as sites of economic activity, that is, as environments that could be classified and enumerated based on the available raw material they contained. As aristocratic economies gave way to national and then transnational ones, the materials produced from these forests entered into increasingly complex cycles of production, distribution, and consumption, which complemented and

2 Aby Warburg, "Peasants at Work in Burgundian Tapestries," in *The Renewal of Pagan Antiquity: Contributions to the Cultural History of the European Renaissance*, ed. Aby Warburg and Kurt Forster (Los Angeles: Getty Research Institute for the History of Art and the Humanities, 1999), 316.

3 Ibid., 319.

Fig. 03. A Dutch marquetry cabinet, using various types of wood from the colonies in the same piece of furniture. Attributed to Jan van Mekeren, c. 1700. Courtesy of the Rijksmuseum, Amsterdam.

Fig. 04. IKEA Malm cabinet. Courtesy of IKEA.

augmented their natural growth cycles. Colonial infrastructures allowed for the appearance of products such as Dutch cabinets, made through marquetry of various wood types, which represented the reach of the Dutch commercial empire. [Fig. 03.] Centuries later, Ikea products such as the popular "Malm" cabinet—while notably quite different in appearance—follow a similar pattern of construction by blending more than twenty types of wood during their production process. [Fig. 04.]

The centuries that separate the Dutch Golden Age and the Ikea Era were full of innovative moments regarding the management of forests, including the emergence of scientific forestry and numerous technological advances that optimized extraction and regeneration processes across the spectrum, from the individual tree to the regional scale. Yet, from an economic standpoint, radical breaks occurred only in a few rare instances. One of these diachronic moments was the incorporation of the forest into a forest-products industry, which more or less kept pace with the rise of the modern industrial economy. Another was the complete abstraction of material environments and the shift from "woodlands" to "transactions." This major transformation, which began in the latter half of the twentieth century, was first recognized by the industry itself, with mammoth international forest corporations like Weyerhaeuser redefining their lands as assets and modifying their business diagrams accordingly. [Fig. 05.] Political economic theory followed, with the periodization of a "late" capitalism by Ernest Mandel wherein financial capital and its essential abstractions became the main driver of the economy. A decade or so later, economist Milton Friedman pushed the abstraction of forests even further in his "Lesson of the Pencil," which aired in 1980 as part of a PBS television broadcast titled

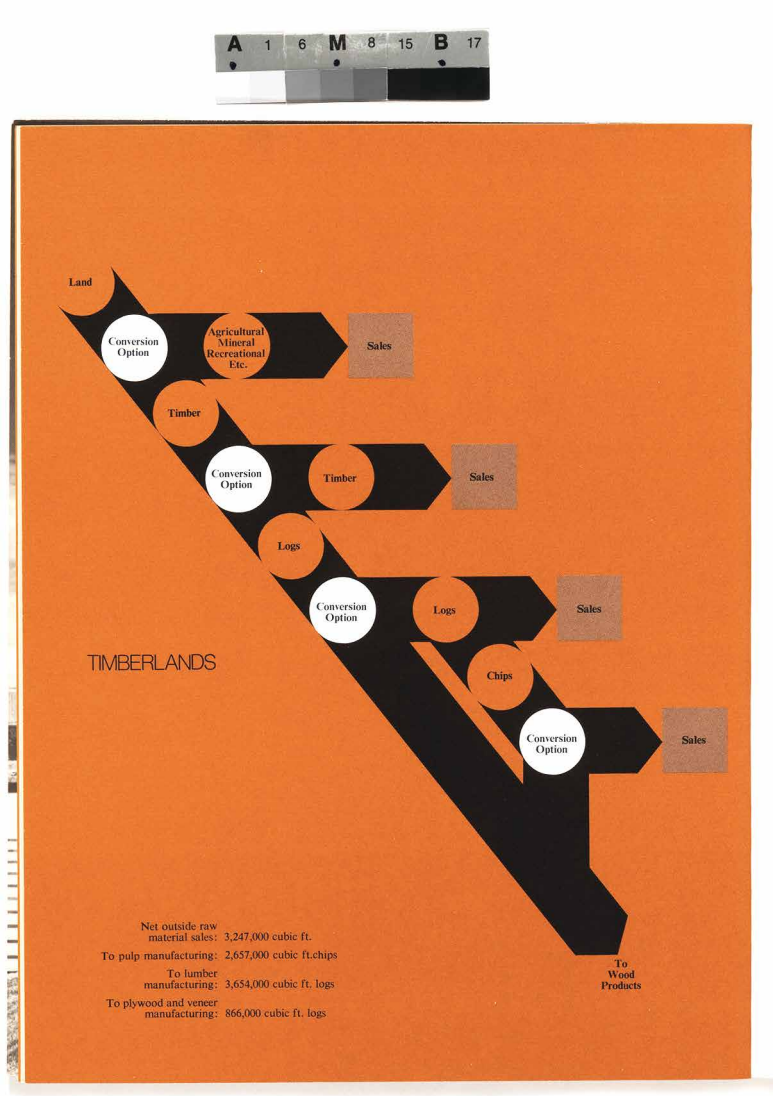


Fig. 05. Weyerhaeuser asset diagram, taken from their 1971 annual report. Courtesy the Weyerhaeuser Company.

Fig. 06. "Lesson of the Pencil," Milton Friedman, 1980. Still from the Public Broadcasting Service series *Free to Choose*, 1980.

Free to Choose. [Fig. 06.] Showing a simple lead pencil, Friedman described its component parts: "The wood from which it's made comes from a tree that was cut down in the state of Washington. […] This black center is compressed graphite. I'm not sure where it comes from, but I think it comes from some mines in South America. This red rubber top probably comes from Malaya, where it isn't even native; it was imported from South America by some businessman, with the help of the British government."[4] For Friedman, the fact that a simple product was made of materials from all over the world and

4 For more info on the PBS-series *Free to Choose* (1980) by Milton and Rose Friedman, see: https://en.wikipedia.org/wiki/Free_to_Choose.

fabricated by different people who do not speak the same language—and might even be hostile to one another if they met in person—was the ultimate illustration of the benefits of the free market, its capacity "not only to promote productive efficiency but even more, to foster harmony and peace among the peoples of the world."[5] This American-centric, hyper-optimistic line of reasoning entirely disregarded the reality of forest environments where workers were frequently exploited, some in conditions of slave labor, while many others were regularly put in harm's way by the requirements of their daily operations. This blindness was essential; spreading the gospel of the free market required not only the creation of idealized forests as sites of harmonious production, but also the abnegation of forests as real, material, and multispecies ecologies.

Forest Environments

The disappearance of forests prompted public sentiments which spurred the growing popularity of the environmental movement in Western societies. Starting in the 1970s, a wave of environmental legislation prohibited destructive logging, and forest companies were hard-pressed to introduce sustainable management practices that would ensure the long-term persistence of forests—which were becoming closely associated with the sequestration of carbon dioxide from the atmosphere and, in certain public discourse, with the survival of the human race as such. Many elements presented in these environmental assessments were backed by rather grim

5 Ibid.

FIG. 1. U. S. FOREST SERVICE

PRAIRIE STATES FORESTRY PROJECT

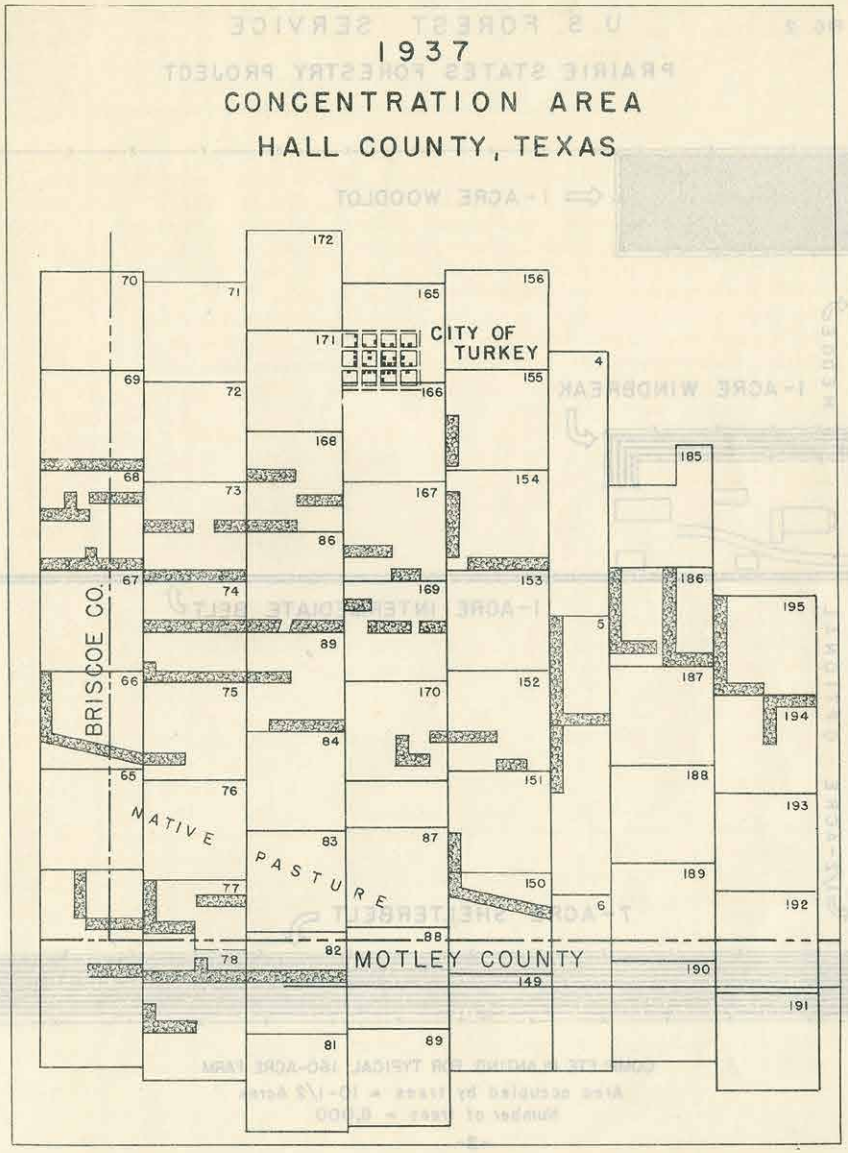


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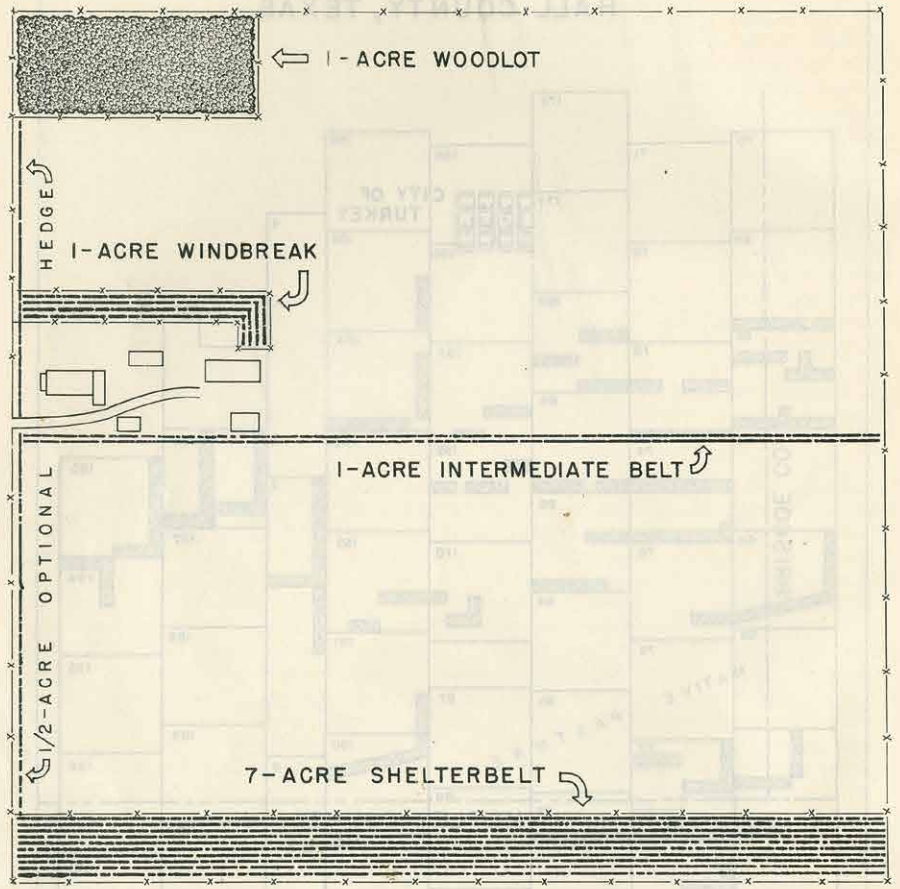
FIG. 2. U. S. FOREST SERVICE

PRAIRIE STATES FORESTRY PROJECT



COMPLETE PLANTING FOR TYPICAL 160-ACRE FARM
Area occupied by trees = 10-1/2 Acres
Number of trees = 8,000

-8-

Figs. 07–08. Forestry for the Great Plains Program, U.S. Department of Agriculture, 1937. Courtesy of Harvard Libraries, Cambridge, Mass.

evidence: prior to the start of the twentieth century, many of the world's original forests had already been lost, yet millions of square miles were still being destroyed every decade.

However, not all evidence supported the argument that forests were disappearing. While forests were being destroyed in some parts of the world, they were making a return in others. Moreover, the tendency to associate less forest cover with human action and more cover with natural processes was frequently challenged by the complex economic and social realities on the ground. Already in the Dust Bowl of the 1930s, when entire states entered into crisis mode, federal agencies extended their traditional conservationist policies to propose a new forestry program for the Great Plains. [Figs. 07–08.] The logic was simple: if every farmer on a typical 160-acre homestead planted ten acres of trees in the form of woodlots, windbreakers, and shelter belts, the agglomerated effect would be that of a giant forest to battle soil erosion and reduce degradation. For that purpose, each farm required 8,000 trees, which were to be supplied by the U.S. Forest Service. In the years the program was active, millions of trees were planted. This fragmented forest cover, acting as environmental infrastructure, is still visible in the prairie states where it was implemented. The same rationale drove projects such as the Green Wall, initiated by China at the end of the 1970s, whereby the central government sponsored the planting of millions of trees in order to battle desertification along its border with the Gobi Desert. [Fig. 09.] One result of the Green Wall was the appearance of a new forest covering a combined area of 500,000 square kilometers, which can be considered the largest planned forest in the world. At the same time, some of the most dramatic threats to forest environments emerged as outcomes of natural processes. In 1980, the dramatic

Fig. 09. The Green Wall of China. Photo courtesy of Lukas Oleniuk, 2008.

eruption of Mount St. Helens, located in the heart of the Pacific Northwest forest region, resulted in catastrophic environmental effects on the surrounding area, which is still barren today. The following decade saw the beginning of a series of outbreaks of the mountain pine beetle, leading to extensive forest blight. Possibly facilitated by climate change, these severe outbreaks destroyed, according to estimates, more than 160,000 square kilometers of pine forest in British Columbia alone, which positioned the mountain pine beetle, a natural agent, as the number-one threat to North American forests.[6] [Fig. 10.]

6 Hillary Rosner, "The Bug That's Eating the Woods," *National Geographic*, April 2015, http://ngm.nationalgeographic.com/2015/04/pine-beetles/rosner-text.

Fig. 10. Microscopic enlargement of a mountain pine beetle.
Image by Genome Alberta, Calgary.

When nature is destroying forests, and when human actions bring them back, we can begin to understand that familiar images of destructive logging in the Amazon, or the illegal timber trade in China, are just the more sensational moments of a deep, more pervasive cycle of disappearance and reappearance, destruction and regrowth, which has tracked alongside various human-forest interactions for centuries. From this perspective, apocalyptic sylvan narratives—including the one lending its title to this book—strike a deeper chord by presupposing an antagonism between humans and their environment. More than acting as authentic reflections of their specific historical moment, they echo previous moments of cultural crisis by portraying forests as an idealized world not yet corrupted by human civilization.

Forestry Cultures

Perhaps it should come as no surprise that crisis takes us back to the forest. According to literary scholar Robert Pogue Harrison, Western civilization "literally cleared its way in the midst of forests [which] defined the limit of its cultivation, the margins of its cities, the boundaries of its institutional domain."[7] Such a conception is anchored in an imagined primeval past, which accounts for some defining myths such as the sylvan lineage that led to Romulus and the founding of Rome. However, the friction with the forest through which "civilization" is formed is better understood as a cyclic rather than linear process. In his work, Harrison refers to the

7 See Robert Pogue Harrison, *Forests: The Shadow of Civilization* (Chicago: University of Chicago Press, 1992), ix.

eighteenth-century Neapolitan thinker Giambattista Vico, who postulated a striking narrative of the procession of culture from primordial origins. Harrison writes: "This was the order of human institutions: first the forests, after that the huts, then the villages, next the cities, and finally the academies."[8] This schematic trajectory of civilization only appears as linear; in fact, it encapsulates an essential ambivalence regarding the function of forests in the history of mankind: were they simple points of origin or artificial human institutions? Vico never provides a definite answer. Rather, his deep skepticism towards the Enlightenment notion of progress alludes to a pendulum-like movement of history in which forests become cities in order to later possibly become forests again.

This ambivalence can account for the other part of the foundational Roman myth in which the city that came out of the forest will one day return to it. The reverberations of this myth are threaded deep into the fabric of Western culture. The disturbing visions of Piranesi, portraying the edifices of great civilizations taken over by sylvan vegetation, or the decline of the Venetian Republic supposedly prompted by the dwindling supply of timber from its hinterland, are two such examples.[9] Under these terms, the longing for nature Warburg writes about can be cast in new light; more than mere nostalgia, it stands for a possible return of humans to the forest, and thus a reconciliation between nature and civilization. This desire was at the crux of a particularly German brand of

8 Giambattista Vico, quoted in Harrison, 20.

9 The republic of Venice was highly dependent on its natural resources, due to the structure of its economy and its reliance on maritime commerce. For a thorough environmental and economic history of Venice and its forests, see Karl Richard Appuhn, *A Forest on the Sea: Environmental Expertise in Renaissance Venice* (Baltimore: Johns Hopkins University Press, 2010).

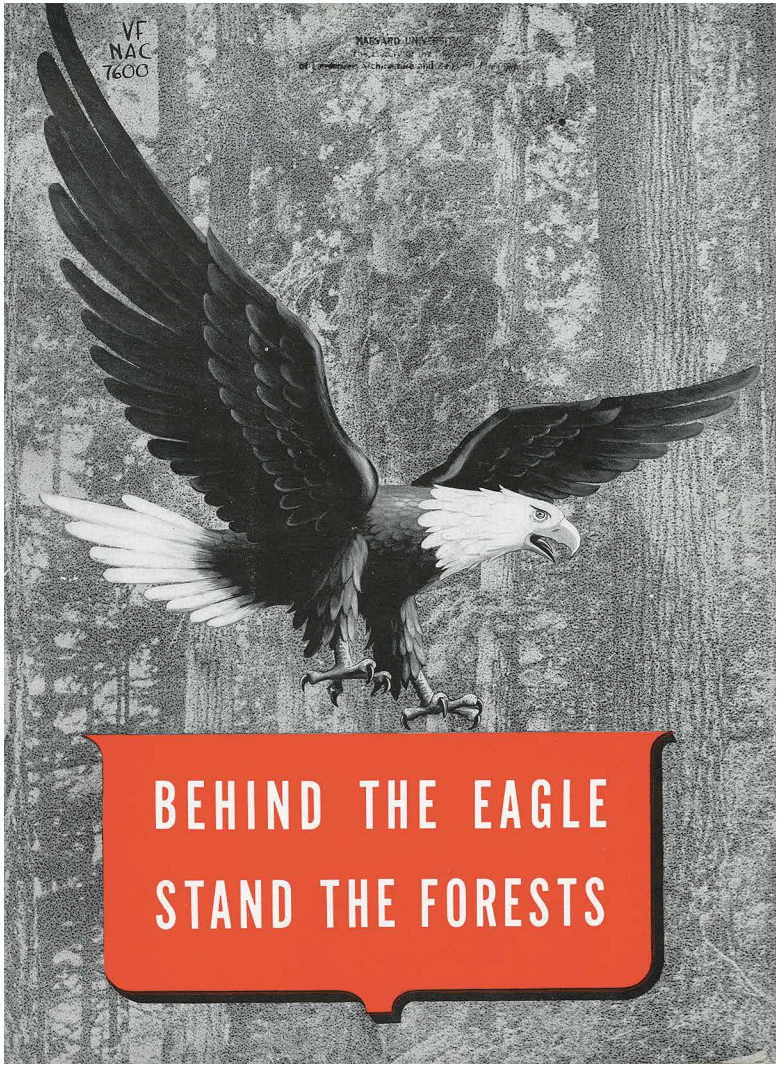


Fig. 11. "Behind the Eagle Stand the Forests," Timber Engineering Company Inc., 1942. Courtesy of Harvard Libraries, Cambridge, Mass.

Fig. 12. Alfred Caldwell (architect and draughtsman) and Ludwig Hilberseimer (architect), Landscape Perspective for the Settlement Unit, 1944. Pen and black ink on cardboard, 45 x 61 cm. Collection Centre Canadien d'Architecture/Canadian Centre for Architecture, Montréal. Gift of Alfred Caldwell.

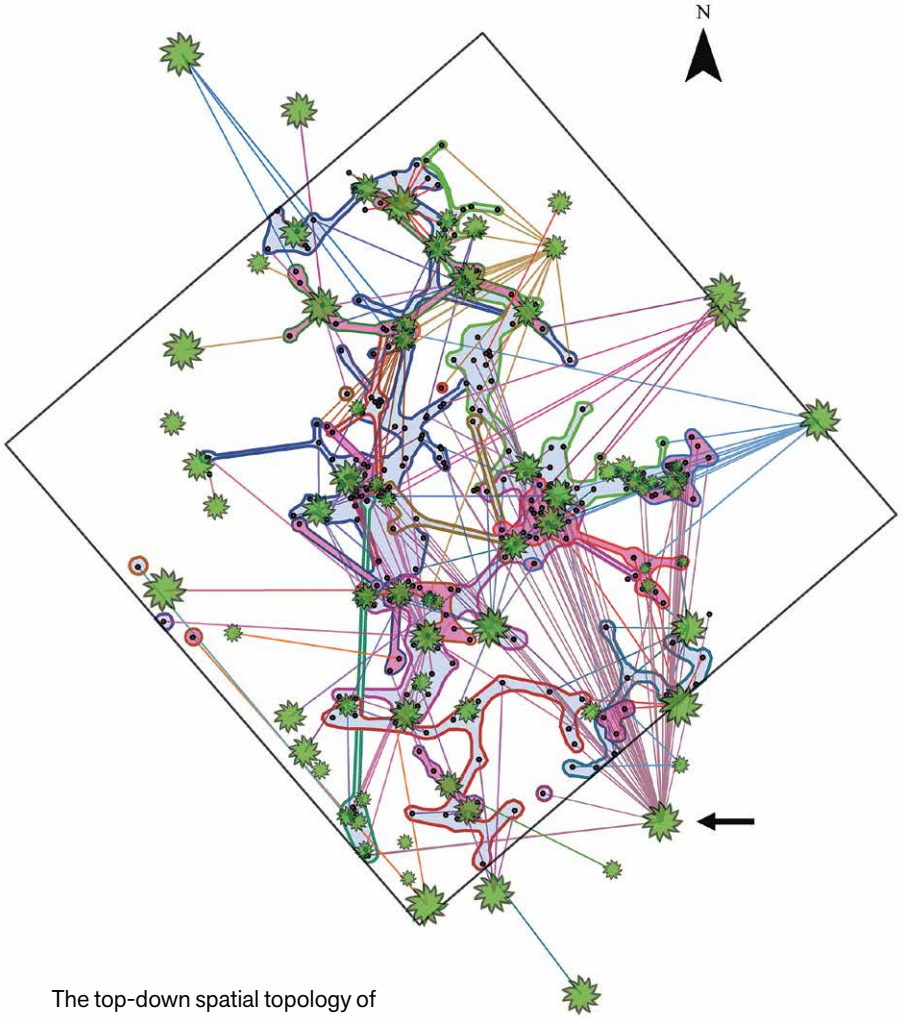
romanticism, which looked back to classical traditions as its source of inspiration. Curiously, at the same time German foresters such as Heinrich Cotta and Georg Ludwig Hartig labored to formulate a new, hyper-rational discipline of forestry science positioned at the conjunction of mathematics, geometry and sylviculture, cultural undercurrents carrying an atavistic notion of nature were growing stronger. In the romantic imagination that forcefully swept the nation in its quest for origins and legitimization, sylvan environments were re-mystified and historicized as the cradle of the Germanic civilization, as well as the locus of its authentic identity.

Fig. 13. Installation view, *WOOD: The Cyclical Nature of Materials, Sites and Ideas,* curated by Dan Handel, Het Nieuwe Instituut, Rotterdam, 2014. Courtesy of the author.

This dual thrust of rationalization and mystification found its way to other parts of the world, carried on the backs of Prussian forest experts, who gained an international reputation as the masters of scientific management throughout the nineteenth and into the twentieth centuries. And so, managed forests in European countries, the British colonies, and the United States all bear the unpronounced mark of myth. While often explained in scientific and economic terms, their capacity to forge individual or collective identities creeps in, as does their pervasive function as a menace to civilization. [Fig. 11.]

Following the cyclical scheme of our narrative, we can return to Mies and Hilberseimer to point out that the striking regional plans produced by the latter, in which vast territories dotted with generic human settlements immersed in tree cover, were just another expression of this thrust, taken to its logical extreme.[10] [Fig. 12.] Their inherent ambivalence as real projects for real sites and theoretical constructions was layered in what they showed: the possibility of rational, serial, and non-differentiated living in the ever-changing forest environment. Their haunting quality is that of disaster areas taken over by natural inertia. As such, they may reflect Mies's gloom after all. However, if the entangled histories of trees and humans are more carefully considered, we can say that the defeat of modern architecture was perhaps complete but not final. It was simply one point on the trajectory that follows the recurring rise and fall of forests, and its omnipresence in the Western cultural imaginary.

10 The drawings were drafted by Alfred Caldwell, faculty member of IIT and an architect focused on landscape work in and around Chicago.



The top-down spatial topology of *Rhizopogon* species pluralis genets [in botany, a "genet," or clonal colony, is a group of genetically identical individuals] and Douglas fir trees in a thirty-by-thirty-meter plot. The plot (square outline) lies on a southeastern slope and contains sixty-seven trees of various ages (green shapes, sized relative to each tree's diameter). Small black dots mark *Rhizopogon* ectomycorrhiza sample locations (n = 401), 338 of which were associated with a specific tree and fungal genet based on microsatellite DNA analysis. Samples representative of each fungal genet are outlined in differing colors. *Rhizopogon vesiculosus* genets (n = 14) are shaded with a blue background, and *R. vinicolor* genets (n = 13) with pink. Lines illustrate the linkages between tree roots encountered in *Rhizopogon* ectomycorrhizas and corresponding source trees aboveground ("root lengths") and are colored according to tree genotype. An arrow points to the most highly connected tree, which was linked to forty-seven other trees through eight *R. vesiculosus* genets and three *R. vinicolor* genets inside the plot. Some trees, mycorrhiza samples, and/or genets may be obscured by overlapping features.

The Mother Tree

Text by Suzanne Simard
with visualizations by Kevin Beiler

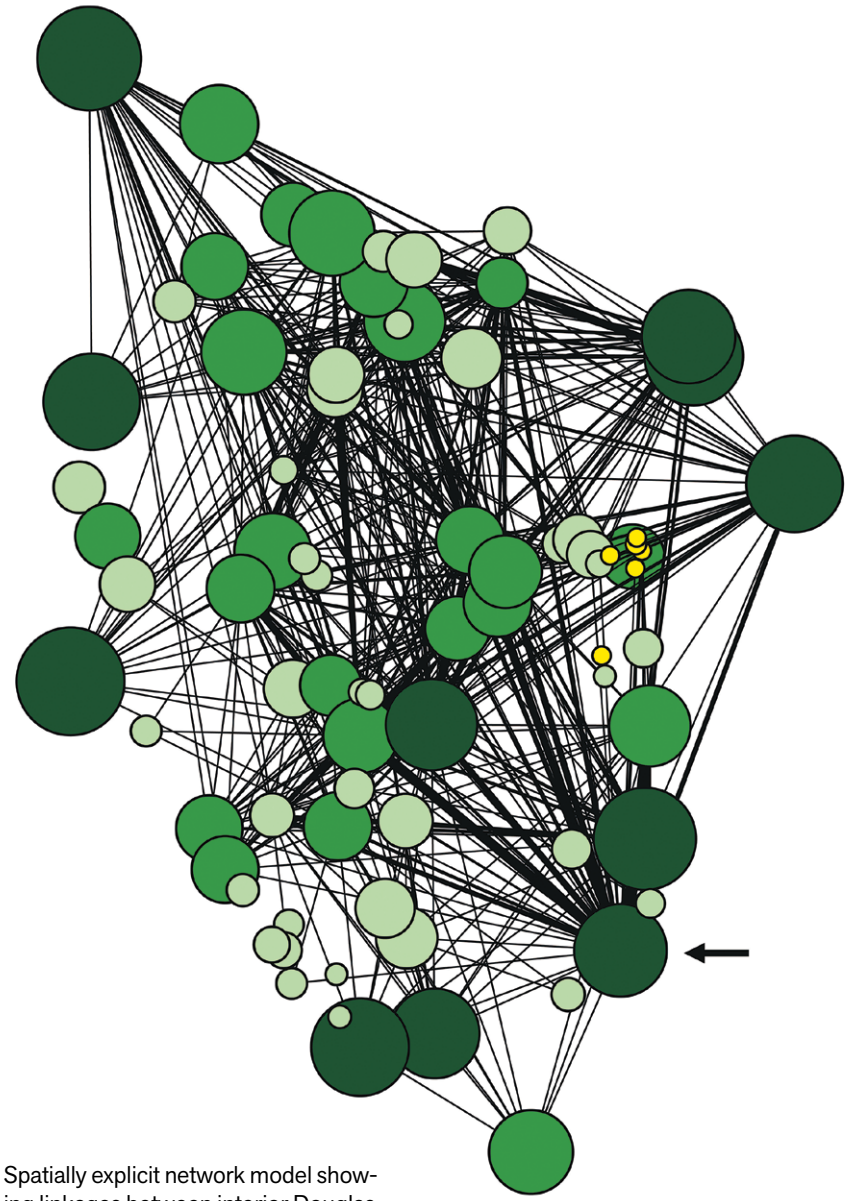
Elders fill a special role in any community, having earned the respect of the tribe for their life-long wisdom, knowledge, and teaching. They help link individuals to the broader community as a whole, and connect the past with the future. Not all old individuals are elders, nor are all elders old. In my family, grandmothers and grandfathers usually filled the role of elders, although certain individuals, like my daughters, were born with wisdom beyond their years, connecting the family through the ages. This wisdom emerges from lives lived before them over many generations. In my life's work in the forest, I have learned that elders of many species, including humans, also connect the forest, providing an adaptive genetic scaffolding for change and resilience among the whole community. In the forest, the foundational species are the trees, and the elders of this foundation are the biggest and oldest trees. Elder trees provide an anchor for the diverse structure of the many-sized trees in their neighborhoods. These elders are important not just as habitat for the many plant, animal, fungal, and microbial creatures that live in the forest, but also the people who depend on the woods for their cultures and livelihoods.

The elder Douglas fir trees in my home forests of British Columbia, Canada, form symbioses with thousands of underground mycorrhizal fungal species, as do tree species in forests around the world. The first mycorrhizal fungi were detected in fossil records dating back about 400 million years, and are considered to have facilitated the migration of plants from the sea onto land. These mutualistic mycorrhizal fungi gather limited nutrients and water from the soil and trade them for photosynthetic carbon from the trees. Some of the fungi in today's forests today are late successional species associated with mature forests, and some are early successional species associated with younger forests, but all serve to connect individual trees within the forests. A single elder Douglas fir tree, for example, can be connected to hundreds of other trees, either of the same or different species, by the

sheer magnitude of its massive root system and diverse fungal community. These subterranean connections form a mycorrhizal network, now known colloquially as the "Wood Wide Web," with a topology similar to that of neural networks, stream networks in watersheds, and the internet. In the Wood Wide Web, trees can be thought to serve as the nodes of the network, while fungi act as the vertices.[1]

The Wood Wide Web is a busy network, where the fungal links serve as pathways for the back-and-forth transport of carbon, water, and nutrients among trees. Among the shifting dynamics of growing trees, the taller, replete, and illuminated elders can shuttle a net amount of resources along a source-sink gradient to shorter, shaded, understory trees. The more resourceful the source tree, and the more needy the sink tree, the greater the net transfer of resources to the latter. In some forests, these trees also trade defense signals to warn each other of potential danger, thus increasing the resilience of the whole community. Some trees shuttle allelochemicals, or poisons, through the network if the neighboring tree species is an unwanted intruder. Elder trees are able to recognize neighbors that are genetically related, or that are kin, and they can send more or less resources to other trees to either favor or disfavor them, depending on the safety of the environment.[2] I have taken to calling these elders "Mother Trees" because they appear to be nurturing their young. Mother Trees thus connect the forest through space and time, just like elders connect human families across generations.

Mother Trees, particularly the ancient cedars and spruces of the Pacific West Coast, may also transmit nutrients through the forest with their massive fungal networks, thereby feeding the entire ecosystem. In my lab, Dr. Teresa Ryan of the Tsimshian First Nation, Ph.D. candidate Allen Larocque, and I are investigating these processes. Here is how we currently think it works: In the Pacific West Coast of British Columbia, salmon caught in fish traps built by the Aboriginal people at the mouth of marine spawning rivers are eaten by grizzlies and wolves. These predators transport their catch to safe, warm, dry benches under Mother Trees growing along the river banks in the forest. There, the bears safely eat the innards, leaving the carcasses to decay and nutrients to seep into the roots of the trees. The salmon nitrogen is acquired by the mycorrhizal networks and fertilizes the Mother Trees, which



Spatially explicit network model showing linkages between interior Douglas fir trees via shared colonization by *Rhizopogon vesiculosus* and *R. vinicolor* genets. Circles represent tree nodes, sized according to the tree's diameter, and colored with four different shades of yellow or green that increase in darkness with increasing age class. Lines represent the Euclidean distances between trees that are linked. Line width increases with the number of links between tree pairs (for example repeated links through multiple fungal genets). An arrow points to the most highly connected tree, which was linked to forty-seven other trees through eight *R. vesiculosus* genets and three *R. vinicolor* genets inside the plot. Some tree nodes and their links may be obscured by overlapping features.

we think then transmit the salmon nitrogen from tree to tree to tree through their fungal connections, deep into the forest.

The trees metabolize the nitrogen, facilitating their growth, and store it in their tissue (as shown by tree rings) for centuries. The salmon nitrogen in the tissues of the trees promotes the health and productivity of the forest. In turn, these luxurious forests shade and nurture the salmon rivers, modulating the water temperature and transmitting nutrients to the ebb tides through seepage, thus forming a positive feedback loop that promotes the health and productivity of the fish. The parts of the trees composed with salmon nitrogen—namely, the bark and roots—are harvested by the Northwest Coast First Nations, including the Tsimshian and Nuu-chah-nulth, to make clothing, art, and tools, including those used for the salmon harvest. Elder trees, or Mother Trees, play a crucial role in the closing of this circle. The health of the forest is thus tied to the health of the salmon, as they are cycled back to the rivers, the oceans, and the people. The integrity of this circle of life depends on what the First Nations call *reciprocity*, an exchange of mutual respect. Mother Trees play a crucial role in the closing of this circle, but this process is also an important example of how people can be sustainably embedded with the complex adaptive system of the forest.

Since the mid-1850s, great swaths of North American forests have been felled at the hands of European colonizers, first out of fear of the dark woods, then to make way for agriculture, and then for the profits they return as timber. The scale of changes that Europeans brought to these forests are in sharp contrast to those made by the Aboriginals, whose felling of trees is designed to enhance wildlife habitat, clear trade corridors, and protect against intruders; typically, the cutting of the forest is intended to support their local livelihoods in and with the forest. Thus, the varied forests of North America were shaped by the Aboriginal nations according to their needs. When European settlers arrived to colonize North America, the forests were instead cleared in their entirety for settlements and agriculture—and the elder trees were particularly sought after. Eventually, forestry practices were adopted from Germany, where forest management science had been honed and adapted to ensure regeneration in the local environment, and to meet social needs.[3] Even though the forests of North America were very different, European practices were

typically applied with little thought to the peculiarities of the climate, soil, or species. Since the latter decades of the twentieth century, these practices have converged on a market basis into the common industrial practices of clearcutting and the planting of commercial tree species. This is true even in the mighty salmon forests of the Pacific Coast. These practices—lacking in any form of reciprocity—are rapidly dismantling the circle of life by undercutting biodiversity, productivity, and biogeochemical cycles.

There are responses to this situation within our reach. Here I suggest just four important trajectories for restoration and reparation. First, modern consumer societies need to recognize their relationship with nature. Many Aboriginal nations of North America acted as successful stewards of forests, rivers, and salmon for millennia; their practices were built on respect and reciprocity, honoring their place in nature. As scientific studies begin to recognize that these linkages, once ignored, not only exist, but are crucial to human and forest well-being, it is imperative that we fundamentally transform the modern scientific image of nature as a resource. Second, we humans need to maintain our connections in this web, especially as the stresses resulting from climate change increase. This can be done through the conservation of biodiversity, not only of species, but structures and functions as well. Third, conservation needs to honor the elders. This means fighting to keep elders alive and safe so that their genes and wisdom can be passed down through the generations. Finally, humans need to honor diversity. It is through our differences—whether social, botanical, or genetic—that productivity, creativity, adaptivity, and resilience are nurtured and maintained. It is also through her diversity that Mother Earth will adapt to and help regulate modern anthropogenic crises.

Images and annotations courtesy of Kevin Beiler.

1 Kevin Beiler et al., "Architecture of the Wood-Wide Web: *Rhizopogon* spp. Genets Link Multiple Douglas-Fir Cohorts," *New Phytologist* 185 (2010): 543–53.
2 Brian Pickles et al., "Transfer of ^{13}C between Paired Douglas-fir Seedlings Reveals Plant Kinship Effects and Uptake of Exudates by Ectomycorrhizas," *New Phytologist* (2016).
3 Editors' note: For a critical reading of the history of German forest science, see James C. Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven: Yale University Press, 1998), 11–52.

Life and Death of Data

Excerpts from a Data Documentary at the Arnold Arboretum

by Yanni Alexander Loukissas

In collections of scientific and cultural history that are too big to see, data act as virtual handles for rare and delicate artifacts from the past. At the Arnold Arboretum, a long-lived collection of trees, vines, and shrubs managed by Harvard University, landscapes from around the world and across time are stitched together by data. In my view such data are worthy of study themselves. Created in varied social and technological eras, they register the organizational structures and values of their time. Through a combination of data visualization and interviews with Arboretum staff, the *Life and Death of Data*, an online data documentary, illuminates what data can teach us about their own social and material histories, as well as how to study collections and landscapes digitally.

Equal parts urban forest, museum, and open laboratory, the Arnold Arboretum is one of the most comprehensive and well-documented—not to mention privileged—collections of trees, shrubs, and woody vines in the world. Across 142 years and 281 acres within the Boston neighborhood of Jamaica Plain, 70,000 plants have resided at the Arboretum. Each organism has been born into a social and technological era, its care and curation managed through the instruments and organizational structures deployed during its lifetime. Today, the

Fig. 01. The Arnold Arboretum seen from a kite balloon held by the author.

vitality of the Arboretum landscape relies upon its virtuality. BG-BASE, a digital database of plant information organized by data about nomenclature and provenance, is at the center of contemporary institutional quandaries about the significance of the collection, historically and at present.

As a place of longstanding scientific and aesthetic interest, opportunities abound at the Arboretum for reflection on the changing meaning of data in practices of collection, conservation, and imagination. Indeed, it would be difficult to understand the Arnold Arboretum without accounting for its data, which have been woven through the development and use of Harvard's living collection since its founding in 1872. The Arboretum is an open educational resource in which data have long served as a means of access by a range of expert and non-expert communities, a venerable organization that has weathered many successive eras of data collection and an institution that manifests the striking ontological status of data in our time. Housing databases of both the living and the dead, the Arboretum is a place in which being is a function of information. For data shape ideas about the value of individual organisms at the Arboretum and, in turn, register how those values change over time.

What follows are excerpts from an online data documentary at http://lifeanddeathofdata.org. The stories of two plant specimens, *Prunus sargentii* and *Tsuga caroliniana*, illuminate the meaning and value of data at the Arboretum; they are not independent artifacts, but rather indices of local knowledge.

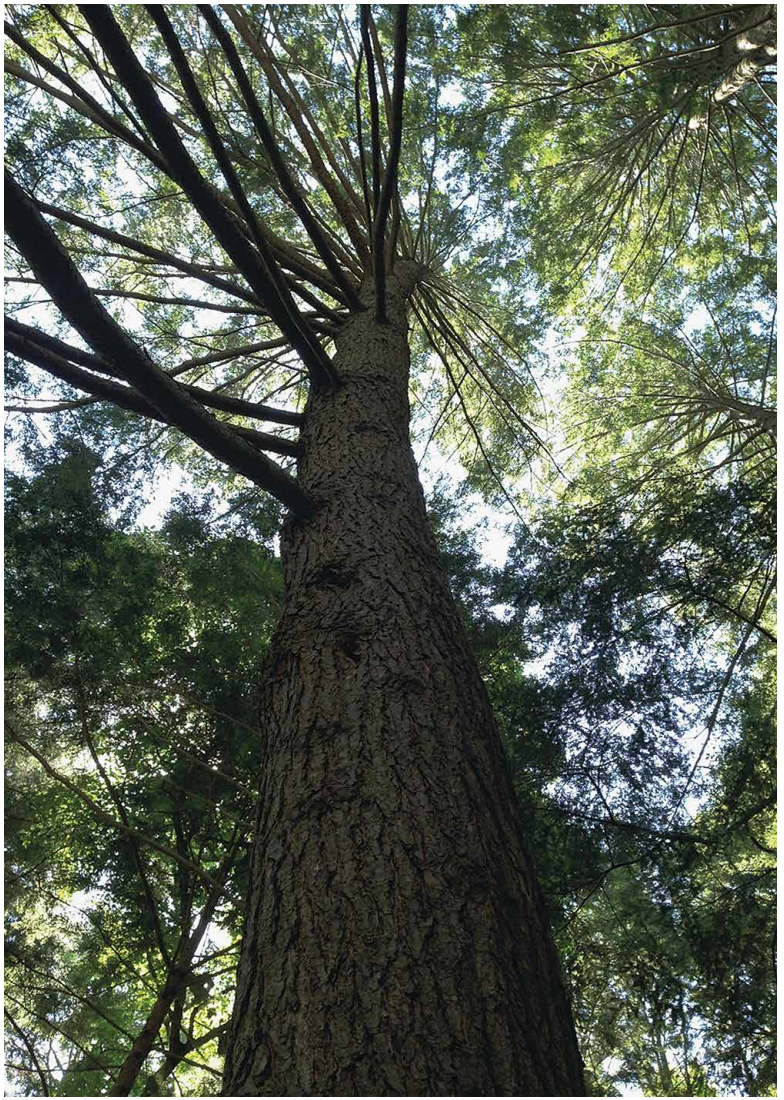


Fig. 02. A hemlock tree at the Arboretum. Image by the author.

Prunus sargentii

In 1940, a leap year, a cherry tree from Japan was accessioned into the Arboretum's collection. Its Latin name, *Prunus sargentii*, honors C.S. Sargent, founding director of the institution. Moreover, its data indicate that the plant was collected directly by Sargent. However, he had long since died at the time of this accession. Moreover, wild plants from Japan hadn't been taken in at the Arboretum since the mid-1920s. What is likely is that the plant was grown from a cutting of one of Sargent's original specimens, unearthed from its native soil in the late nineteenth century. Indeed, the character "z" in its "provenance type" data field indicates the status of the tree as a "wild cutting." Michael Dosmann, the Arboretum's curator of living collections, sees such data as useful for tracking the echoes of historical expeditions launched by the Arboretum. But "z" is a classification of disputed value, for wild plants and wild cuttings are genetically identical. The marker "z" is a social distinction rather than a biological one.

Visualization can be used to track changes in provenance type across the history of the collection [Fig. 03.]. In this image, a green dot represents a plant collected in the wild, a yellow dot signifies a cutting from a wild plant (a category of dubious value to some Arboretum staff), a black dot indicates a cultivated plant, and a grey dot stands in for a plant from an unknown origin (far more common than one might expect). Variations across these provenance-related colors reveal shifts in the organizational mission of the Arboretum, between wide-ranging scientific exploration and local horticulture.

The distribution of green, yellow, black, and grey dots faintly demarcates three eras of collecting at the Arboretum

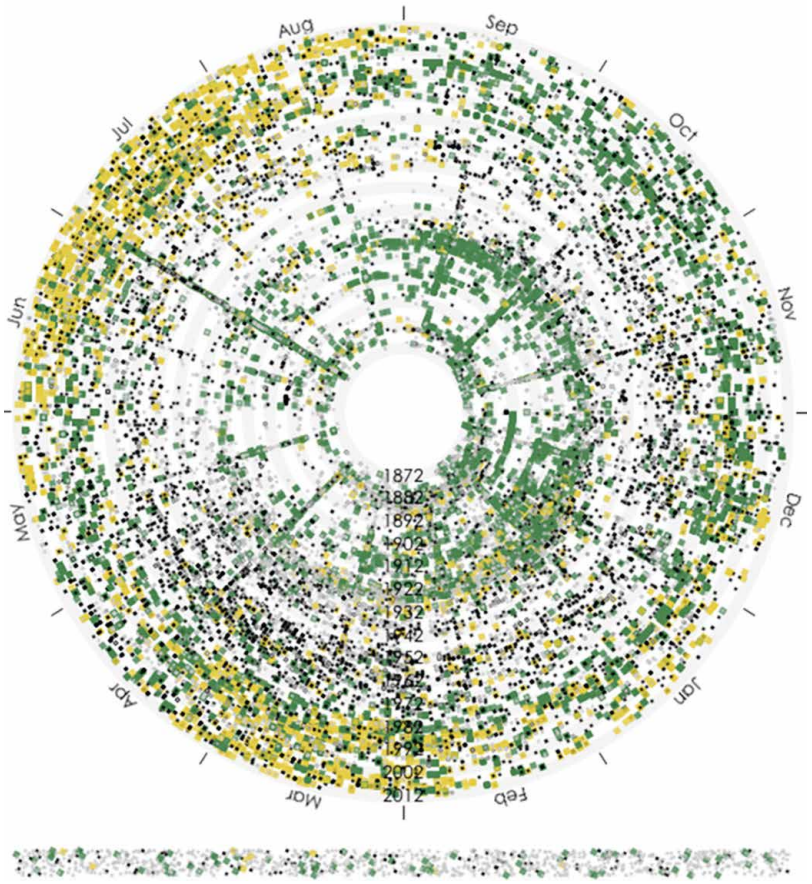


Fig. 03. Radial timeline of the Arnold Arboretum. Image by the author.

identified by Dosmann. In the late nineteenth and early twentieth century, Sargent led the institution in a global project of scientific fieldwork to collect distantly related species from around the world as evidence to support Darwin's theory of evolution. However, it turned out that the Arboretum was inadvertently collecting invasive bugs along with the imported

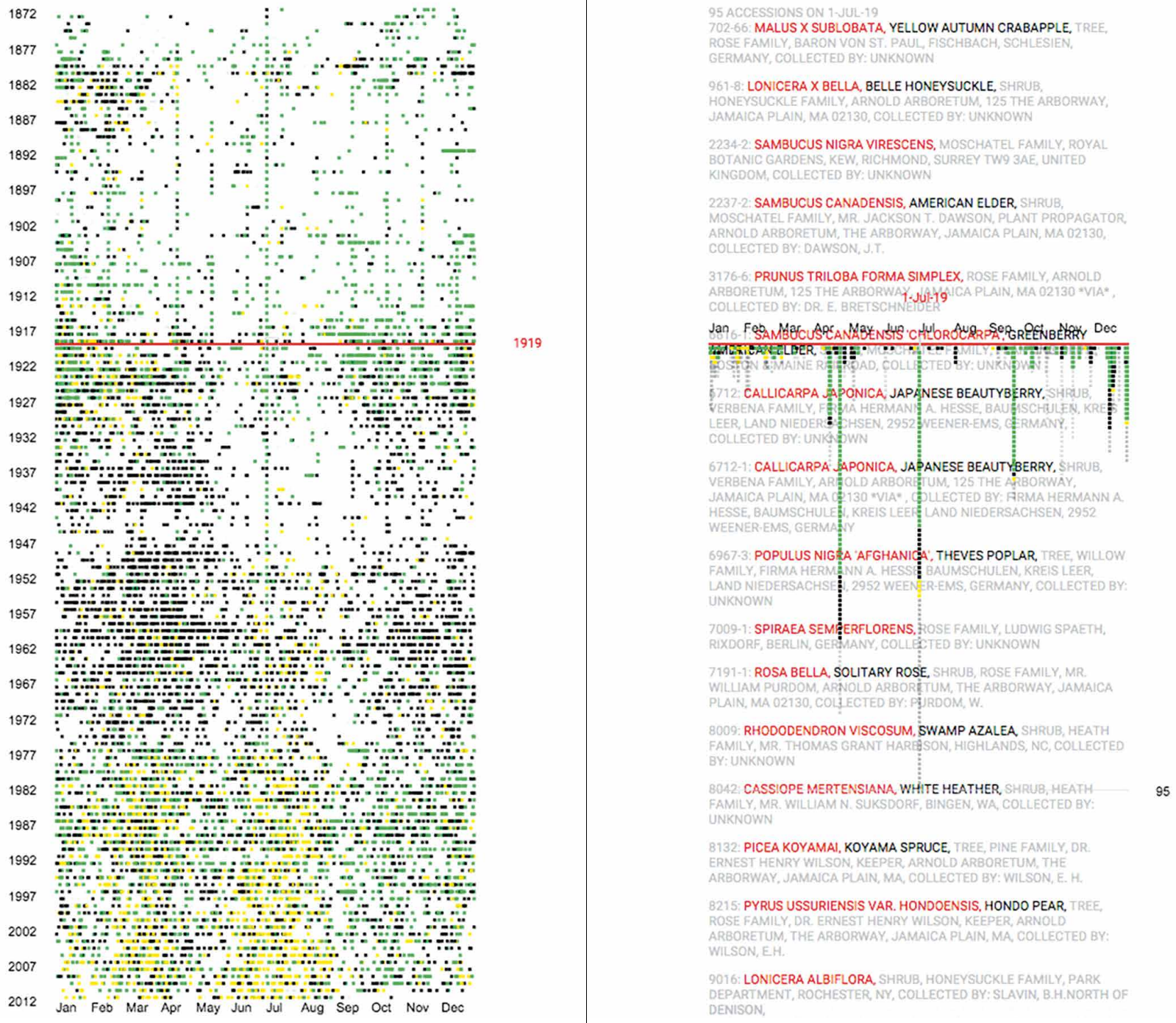


Fig. 04. Section cut through linear timeline of Arboretum accessions.
Image by the author and K. Denis.

plants. Subsequently, wild collecting decreased substantially as Sargent waged a pitched battle with the United States Department of Agriculture in the 1910s and 1920s.

The ensuing middle years of the twentieth century are sometimes known at the Arboretum as the Wyman era, for the eponymous period-defining horticulturist. During this time, the Arboretum displaced its mission of scientific research to the Cambridge campus, centering it at the Harvard herbarium, a much broader collection made up entirely of dried plants collected from the wild. Dosmann explains that the expansive grounds in Jamaica Plain became a "showcase garden," a place to display the horticultural trends of the day. It wasn't until the early 1970s—in a reevaluation of the mission of the collection associated with its centennial—that the Arboretum reinitiated its broad expedition work. Since this renewal, fieldwork has been expanded through new relationships with institutions in Asia and reframed around the emergent and imperative questions of global climate change. Accession data register these shifts, highlighting in particular the relationship between the two defining arms of the Arboretum, scholarship and horticulture, and the way that relationship has changed over time.

Tsuga caroliniana

As an evocative example of the disagreements that sometimes arise over the meaning and use of Arboretum data, consider the case of the hemlock: a local tree that has been in rapid decline all over the eastern United States due to a non-native insect, the hemlock woolly adelgid. In the late 1990s, a large

unaccessioned stand of hemlocks in the Arboretum became infested. A note in the accession record for one Carolina Hemlock reads "plants producing very heavy seed crop, heavily infested with wooly adelgid." Although these trees had been residents on the institution's grounds for decades, they were only accessioned into the collection in order for the infestation to be tracked and treated with Imidacloprid, a powerful insecticide. Cutting a cross section through the visualization in 1998 suggests that the blighted hemlock accessions might have made that year a peak time of expansion for the Arboretum, but only from the perspective of the data.

Controversy still surrounds the decision to make the feral stand of hemlocks part of the collection. Del Tredici continues

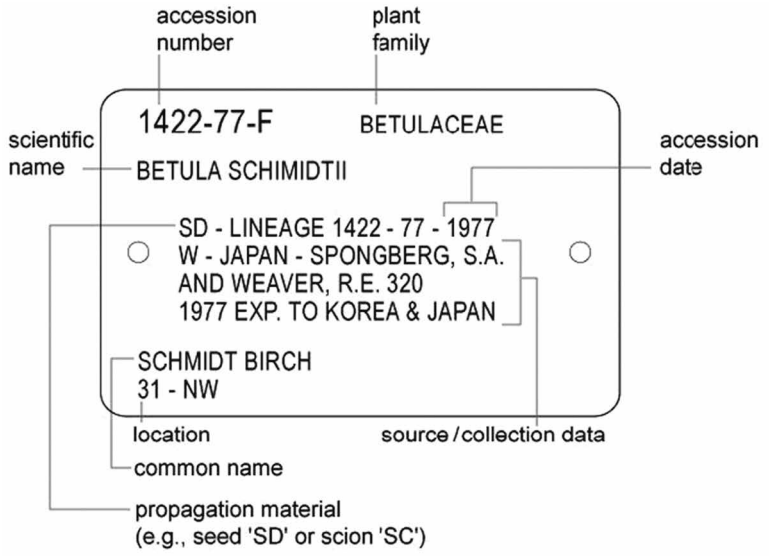


Fig. 05. Arboretum tag diagram. Image courtesy of the Arnold Arboretum.

Fig. 06. A card catalog containing accession information. Image by the author.

to see the trees as invaluable for studying the infestation process. "It was only by accessioning the plants that we could track their decline over time and/or the insecticidal treatment of those plants we decided to treat." Meanwhile, Arboretum director William Friedman looks on the hemlocks of questionable provenance as inherently undesirable, for they lack essential data about their ancestry that would make them reliable subjects of scientific study. Instead of treating them, why not replace them with trees of real research significance? Such disagreements highlight the unstable place of data in the curation of collections. Sometimes data are simply looked upon as good-enough tools to support direct work with a collection: organizing artifacts, notes, and relationships among them in a convenient manner. But without reliable data, the emergent form of the collection can disappear altogether, their contents scattered in an epistemological wild.

Coexisting concerns about the necessity of data and their inherent instability over time reinforce a lesson that endures across shifts in technology: data must be part of a knowledge ecology. Scientists, specimens, and information infrastructures are part of a network of actors, all necessary to generate, verify, and sustain what an institution knows. Traditional scholarship has analyzed such networks through case studies of discrete events or controversies. In contrast, visualization can offer longitudinal views of historical change. By using data to frame the life of an institution of science and technology over time, we can call attention to their structural characteristics in addition to its salient incidents.

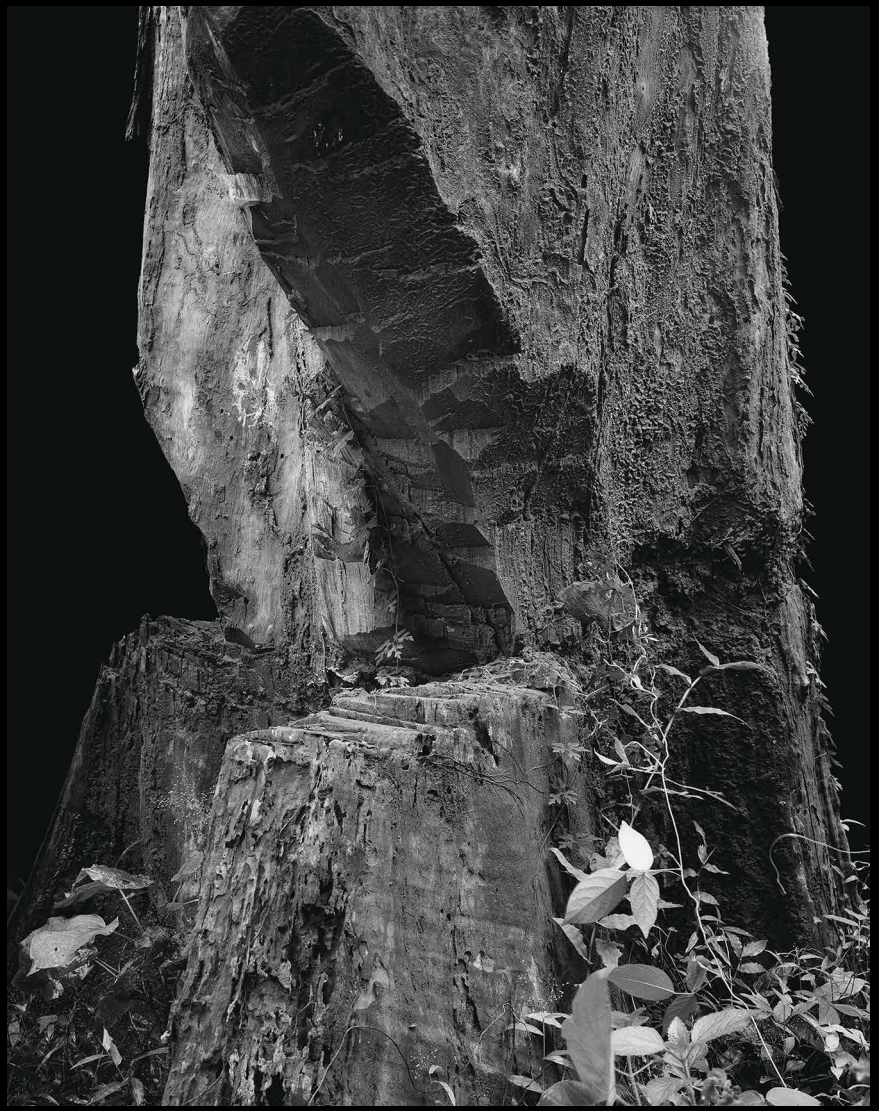
For a more academic account of this material, see Yanni A. Loukissas, "A Place for Big Data: Close and Distant Readings of the Arnold Arboretum," *Big Data & Society* (2016): 1–20.

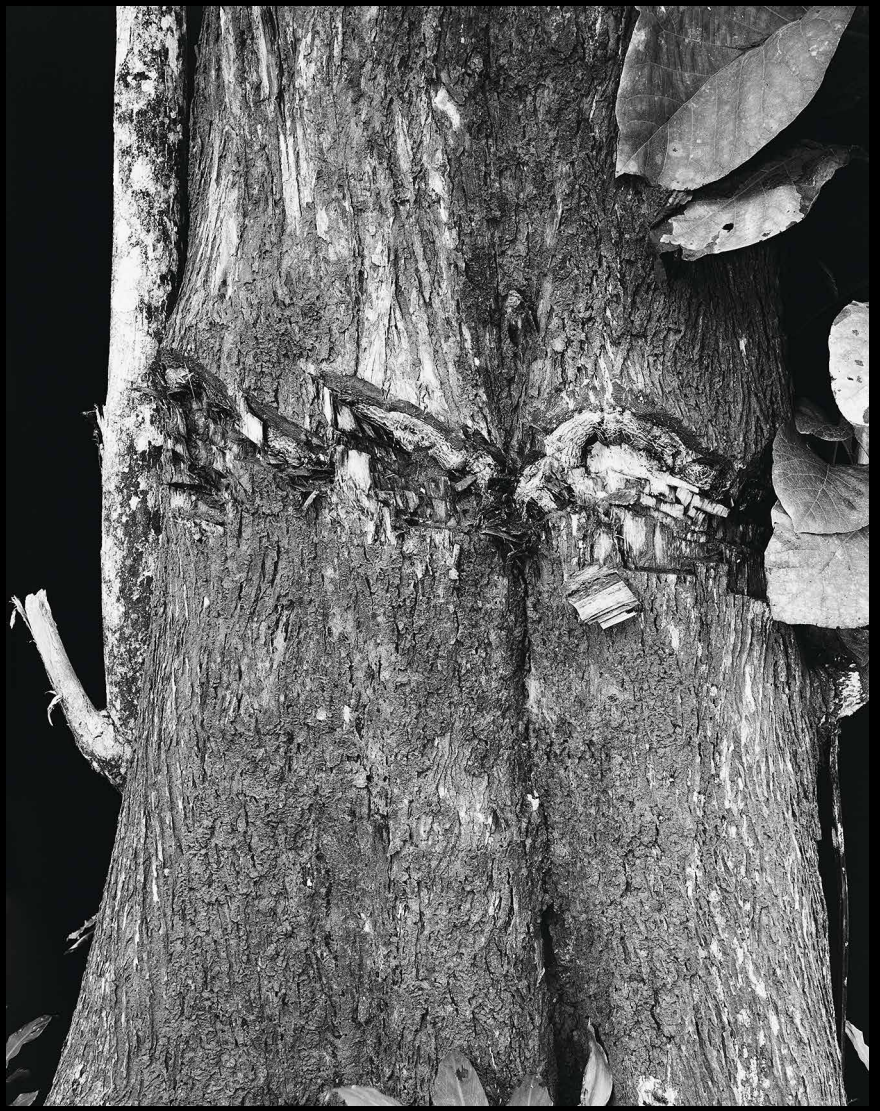
Shannon Castleman: Tree Wounds (2010–11)

The *Tree Wounds* series began during photographer Shannon Castleman's first visit to Muna Island, Southeast Sulawesi, Indonesia, when she began to notice enormous cuts on many of the older teak trees in a conservation forest. Muna's conservation forests consist of older teak plantations that have been awarded *konservasi* or "conservation" forest status—not as a means to protect local biodiversity (which was devastated by timber planting in the nineteenth and twentieth centuries), but because older plantations help maintain the groundwater table for the island. However, wood remains an important resource for the local population. To circumnavigate the illegality of felling teak in *konservasi* forests, impoverished villagers have developed a technique of incremental logging—by slowly "wounding" the trees' trunks with an axe. Thus, whenever a participating villager passes by a large teak tree, he or she will hit it only a few times before continuing on. Finally, after this incremental process undertaken by many villagers, once the tree falls or dies no one is to blame. A few months after Shannon's first visit to the island, she returned to wander the edges of the forests, taking portraits of all the wounded trees she encountered.

The series was originally created for *The Migrant Ecologies Project,* a collaboration with the artist Lucy Davis, where the duo attempted to trace the origins of the wood of a 1950s teak bed bought in a junk store in Singapore using DNA timber-tracking technology. Lucy Davis re-narrates other aspects of their subsequent journey to Muna Island in the third volume of this publication series, *Reverse Hallucinations in the Archipelago*.

All images courtesy of the artist.





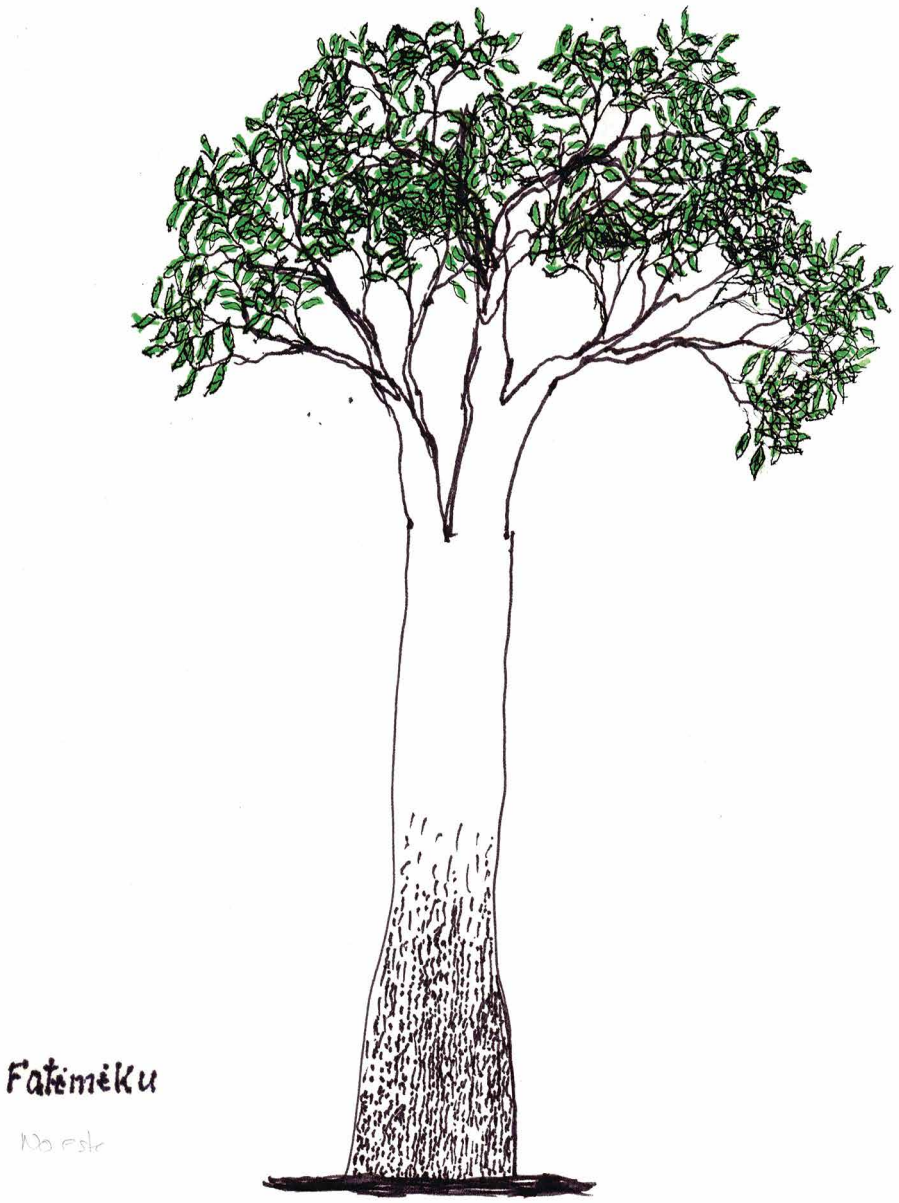


Fig. 01. Abel Rodríguez, drawing from the *Studies of Trees* series.
Courtesy of the artist and the Tropenbos International Colombia's Archive.

The Ancestral Tree of Plenty

After an Oral History told by Abel Rodríguez,
introduced in collaboration with Carlos A. Rodríguez
and Catalina Vargas Tovar, translated by Olga Bowles

The myths of the Indigenous groups in the Amazon refer to the origin of water and the forest by alluding to an ancestral tree. Around the world, many stories of creation mention this tree of life, also known as the tree of plenty for its relationships, but it is especially present in stories from the tropical forest region due to the diversity of wild and cultivated plants.

Each ethnic group in the Amazon has its own version of the narrative. This ancestral tree is referred to as the tree *above*, the *water* tree, the *underground* tree, the *spiritual* tree, the *grandfather* tree, and the tree of *creation*. The story passes through the roots, branches, flowers, fruits, and seeds; it also talks about the tree family, the trunk, bark, color, resin, smell, and some kinds of associated venom. Each branch contains explanations about the composition of the tropical forest, and its sets and sequences of trees, according to anatomical and physiological elements. In other words, the order of the forest is the order given by the ancestral tree. Today, satellites reveal that the rivers, which conjoin the Amazon basin actually have the shape of an enormous fallen tree.

What follows is one account of this story, told by Abel Rodríguez, also known as Mogaje Guihu, an Indigenous knowledge-holder of the Nonuya from the Middle Caquetá River region in the Colombian northeastern Amazon, who

shares his version of the primitive tree of plenty. He explains how, at the beginning, the different fruits of the forest were unreachable and human beings were striving for survival like other animals. In the story we are told of the discovery of the first axe (there is a second axe of iron that takes place in another episode of this story) and the felling of the tree.

We discover how the tree of plenty became the promise of abundance for everyone; the distribution of cultivated plants among the different ethnic groups is also based on this original tree. This story narrates the origin of agriculture, the production and negotiation practices for people living in the Amazon forest, and the origin of many rituals related to abundance, but also alludes to issues such as labor, violence, and disease. By unfolding ecological and social interactions, the story establishes delicate relationships among different perspectives of nature and culture. Resonating on ethical, ecological, social, and spiritual levels, this is a story of exuberant cultural and bio-diversity.

The People of the Center is the denomination for the ethnic groups from the Middle Caquetá Region, including the Uitoto, Andoque, Nonuya, Muinane, and others, who are people of tobacco, coca, and cassava. Those plants are the pillars of their culture and knowledge, for both women and for men.

According to Colombian ethnologist and ethnolinguist Juan Alvaro Echeverri, in an interview with a Uitoto elder from the region, the stories from before the introduction to agriculture refer to an ancestral and primitive line of people called,

> *Igaraparaná*, whom he calls the descendants of Monaiya Jurama; that is, the descendants of the people from the beginnings (Monaiya Jurama is a mythic person who existed before the introduction of agriculture): Before [my forefathers existed], [other people] came from Chorrera, they came from Monaiya Jurama. Monaiya Jurama cut that line for us. […] That is why all the people from Chorrera speak a lot about Monaiya Jurama; that is why they tell a lot about the Tree of Abundance. We, in contrast, as we came out from here, we speak of pure tobacco, of all the things that are cultivated fruits. All those other stories are abolished in us.[1]

Each aspect of the story narrated by Abel Rodríguez solicits various layers of interpretation. The episode of the finding of the tree, the requesting of the axe from the grandfather of the axe, and the felling of the Tree of Abundance can be understood as a simple story, as a cultural history of the territory, as a means to solve problems related to social organization and agricultural cycles, and even as a means to heal certain diseases (for example, the reviving of the son in the last episode).

The story of the Tree of Abundance marks the beginning of a new era for the People of the Center, the beginning of well-being, and alludes to the distribution of the territory and rivers among the different ethnic groups and the origin of rituals celebrating abundance. This is probably why Abel highlights the story as one of the most important narratives in his culture. Many other stories follow this one, but the finding and felling of this tree marks the moment in which the *humanization* of the forest begins.

1 Juan Alvaro Echeverri, *The People of the Center of the World: A Study in Culture, History, and Orality in the Colombian Amazon*, unpublished dissertation, The Graduate Faculty of Political and Social Science of the New School for Social Research, New York City, February 1997, http://www.bdigital.unal.edu.co/1600/1/THE_PEOPLE_OF_THE_CENTER_OF_THE_WORLD.pdf. The editors thank Gabriele Herzog-Schröder for this reference.

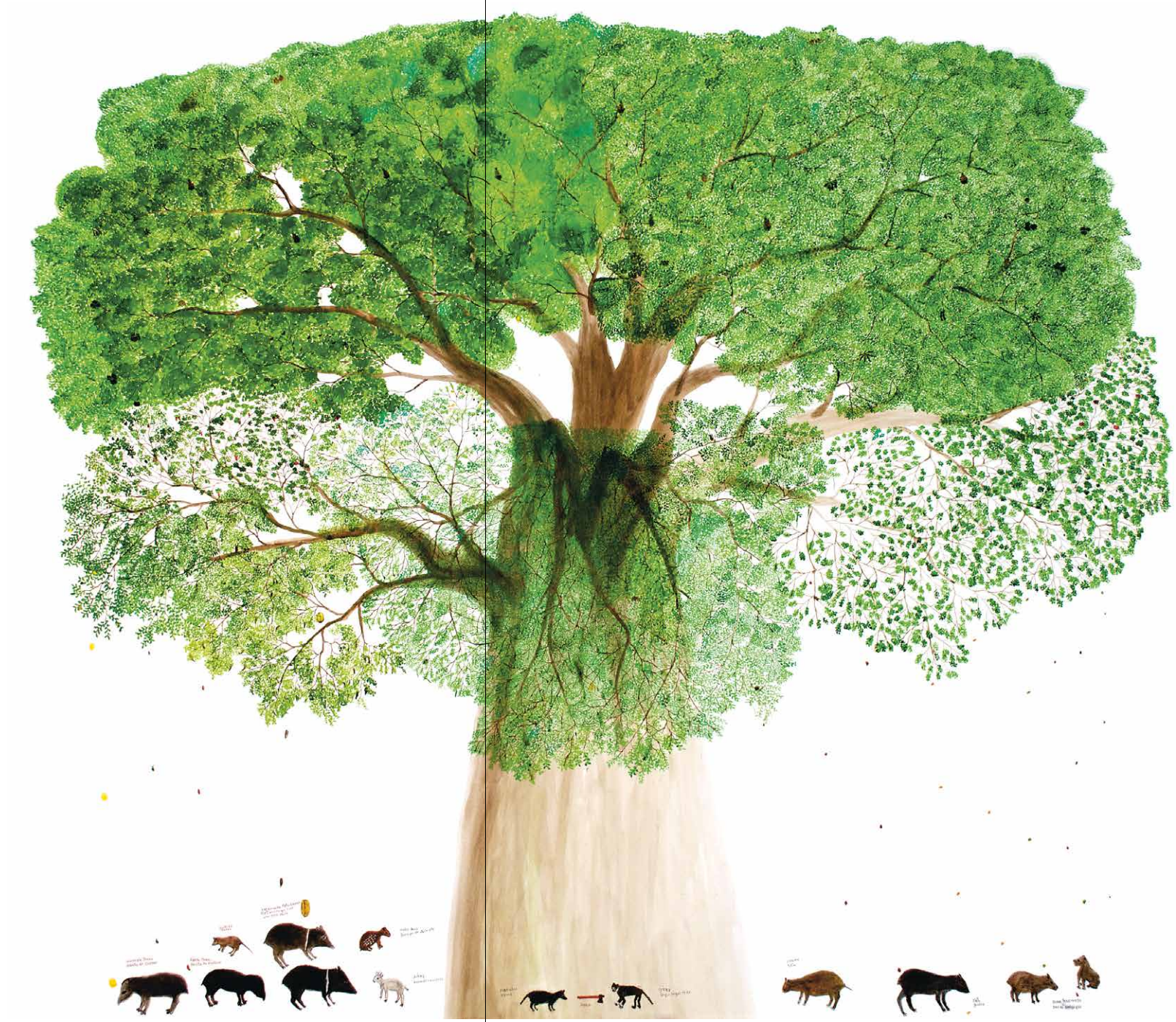


Fig. 02. Abel Rodríguez, *The Tree of Life and Abundance.*
Courtesy of the artist and the Tropenbos International Colombia's Archive.

* * *

It was in the Muinane territory, where I grew up, that I heard the story of this tree. In the center, part of the *chagra* [cultivated plot], worked a living being named Galliti, which can mean "open legs." Galliti struggled to learn and to discover the axe. I'll tell you a little about him and then we can talk about the tree. He worked the *chagra* with his axe. At this time, this tree, thanks to the creator who formed it, produced fruits—not only wild fruit, but edible ones as well, but no one knew that this tree existed, producing many kinds of fruit. Ripe fruits kept falling, but no one noticed, no one saw.

The inhabitants of that part didn't know and bore hunger, but had the presentiment that there had to be something to eat in the jungle, or somewhere. Galliti, working with his axe, had planted many things from which he lived; he ate; he had dances and everything.

They said: "This tribe is well and has advanced, but what about us? When? Where? How? Who's going to help us be like that, too?" And they suffered.

After so many talks like this, some of them would go into the jungle to look for food and then one man found this tree, whose edible fruits were rotting. But he didn't know if the fruits were edible. He came closer, observed, and grabbed a seed and

a fruit. He didn't bite into any of it because he was afraid of being poisoned, but at least he tasted a little by licking the fruit, and it first tasted sweet and then of another flavor. But he nevertheless remained unsure if the fruit was edible. So he left and when he arrived where the other inhabitants, his companions, were, he told them about the tree. They went to look, and sure enough, the tree was loaded with fruits of many kinds and shapes, in bunches, single, and what not. But they wondered what this might be. Could they eat it? They wondered.

The creatures at the base of the tree gathered and fell asleep waiting and thinking about how to bring down the fruits, whether to tear down the branches, knock down the tree or climb it. But because they didn't know how to do any of this they couldn't. Instead they waited for the fruits to fall so they could eat.

So, the tree has several branches. According to the story each limb was for a tribe, like for the East, the West, the North, and South. The limbs were thus placed. In the center of the canopy it was like saying the tribes of the center. That was the story. Each tribe placed itself under a limb. Then the story of the tree spread throughout the whole world, one can say, and they asked themselves what it meant.

At the end they concluded that it must be a tree that was there to provide nourishment, and that it was created and placed there for these tribes by our father. For us, over here in the *chagra*, there is another ground tree, another tree like this one, producing food in the same way. The limbs of the two trees approached each other, of the tree below and the tree above, almost touching. In the space underneath, lived the man named Open Legs, Galliti, who was the wisest man in the world. He was the one who worked with the axe.

In that moment, this animal here arrives, named *Namu* [*kinkajou,* a rainforest mammal also known as the "honey bear"], which means "Son of the Sun and of Abundance," and as such, as the son of abundance and work, he knew this tree was there to provide food. [Don Abel points at the drawing.] That this was not a poisonous tree. One day he told his woman: "We're going to go towards the point of the World."

That's what we call it; we don't say West. There, there is some abundance. "Let's go see what people see as difficult. Let's see if it's difficult. It can't be difficult…"

Those two had two sons. They took a large *maraca* [*Theobroma bicolor,* a kind of fruit] and gave advice to their children by saying: We are going up to the point of the world. They say it's very far. I suppose it's far. I'm going to go there with your mother, but the two of you are going to stay because it's too far for going with you and you don't walk fast and hard. Your food is going to be this fruit, this *maraca*. Pay attention; listen well. We're going very far and the two of you are staying here. Don't break this fruit too soon. When you're very hungry, smell the *maraca,* and then you pass it over to your brother for him to smell. Keep playing with it. Don't eat too soon. Listen to me well and understand. Look, when the sun is at half past noon, or almost at one o'clock, like this [Don Abel demonstrates with his forearm], there will be a bird called *picón*. He is the one who gives the signal to eat. Everyone will eat at that time. Different kinds of birds, *azulejo picón*, *pechi-rayado*, *pava*, another *pava*, *gallito de cielo*, *patiamarilla,* and *pirirí*; all these birds are going to eat at this time in a *pepiadero* [tree during fruiting period]. That's when also you may break the *maraca* in two equal halves and eat one half. Put the other half aside so you can eat again later around six, before going to bed.

Keep the seeds; don't chew them; don't waste them because they have an owner.

The oldest son agreed and said, "That's how it will be." The younger son was listening, but gave no answer. "Don't forget, because if you eat too early and we haven't arrived, you may become weak with hunger and something can happen. So to avoid any risks, you have to listen to me and obey, not so much for me, but for your sake." Thus the father advised them and gave them that *maraca*.

At five in the morning sharp the two left and the children stayed behind. They sat down and played, tossing the fruit back and forth.

Around nine in the morning, something happened, what for us is part of the malign, the deceiving, and the envious—that has many forms. When the father was advising the two sons, he was listening. He is always present; when good things are said, he is there listening in order to sabotage the idea.

This is what happened and he thought, "If I show myself like I am and contradict them, they will not listen to me. If I take the form of the father, they'll listen even less. The mother? No. So how can I take what their father left them?"

In his evil thoughts, he materialized into a *picón* bird. Then he sat on a tree branch and started to sing. When the older son heard the song, he thought that this wasn't the bird his father had told them about, that this was not the proper signalling bird. It seemed like a different one. To keep his brother from hearing the bird, he invented a faster, louder game. Nevertheless, the boy was aware of the fruit and was ready to eat.

Fig. 03. Abel Rodriguez, from the series *Annual Cycle of the Plants of the Maloca*.
Courtesy of the artist and the Tropenbos International Colombia's Archive.

When he heard the bird he stopped and said, "Listen, what's that? That's the signal of the *picón* our father told us about. The time has arrived. What do we do? Let's cut the *maraca* and eat."

But the older one told him: "No, that's not the right bird; that's a different one. Besides, the sun is still over here, in the morning hours. When the sun is past noon, the bird that will sing then will be the right one; that's what father said. We cannot yet eat; it's not time yet. What if father doesn't return soon? Who knows where he is."

"But I'm very hungry. I can't take it anymore, bearing the hunger and only smelling and smelling. My belly is empty. If you don't want to eat, I will. Where is the fruit?" And he ran to the *maloca* [communal house] and looked and looked. The other called from outside. He heard nothing so he thought, "Perhaps my brother has cut and is eating and is going to leave me without my part." So he went in. The younger brother had looked everywhere, had climbed the rafters, looked in baskets and did not find anything.

"You are going to fall down, be careful!"

"Where did you hide the fruit? I want to eat and you are denying me. How can this be? Tell me where you hid the fruit so I can eat, and if you don't want to eat, endure."

So, in order to please his little brother, the older one climbed up and brought down the fruit. He broke the fruit over a stick and started to eat. "I'm going to be careful not to eat the seeds; I'll just suck the flesh and make a little pile for the owner to pick up; I'll be careful with this."

When he was almost done, his brother asked for his part and he said, "There is your part," pointing to the other half, "I'm eating mine. You have no reason to taste mine." They finished at the same time; that's what happened. When the time

arrived, the proper *picón* sang at 12:30, almost one o'clock, when the sun turned over, as we say.

At that moment, the two *kinkajous* arrived and all these people [Don Abel points to animals at the base of the tree, Fig. 02.] were standing, waiting, each looking upwards, wondering what would fall, for whom, and when. Suddenly, a large rotten yucca fell and hit one of the *kinkajous* in the waist and hurt him. That's how he acquired his musk. That's how it went. Those able to get the falling fruits ate, and those unable to get them didn't. The weaker ones, the elderly, the children, were starving to death.

When the Son of the Sun, the powerful and well-known one arrived, they all rejoiced at the thought that he would solve their problems, because he knew how to find fruits. He asked what they were doing.

"We are waiting!"

"Waiting for what? You're wasting your time. You should climb and bring fruit down and eat."

"You go up."

He looked and looked, grabbed the trunk, and started to climb little by little. When he arrived at the top, he ate until he was full, and climbed back down.

"But you didn't bring any down for us."

"It's hard to bring down; it's high, dangerous; one might fall, so I ate two fruits and came back down."

"If it's hard for you to climb, what do you expect of us? What can we do? The neighboring trees are very small and we cannot reach the other one. You, as Son of the Sun, know how this must be done."

"This is easy; we get an axe and cut it down."

"Where are we going to get an axe?"

"What do you mean, where? The axe is right there at the border of the World; you can see its shining light."

"Who's going to get it?"

"What do you mean? We have to collaborate. The one who is fastest and healthy, who hasn't had relations with women, that is the person who has to bring it." Those who were there looked at each other.

"All of us have done that."

"Think about it. If you want to solve this, find someone. I know that there is a person here who is very proud, who likes to make fun of people; it's the hummingbird. He says he flies very fast. Let's see if it's true. Let him go."

To make fun of the hummingbird, they sent him. They gave him honey to suck, tobacco, coca, and food.

"Go get the axe to bring down the tree so we can eat, because if you don't, we will die waiting; we will all die."

"If you can't, I can," said the hummingbird.

"You have to go this very night and return before dawn."

The hummingbird got ready right away. He put on a blue crown and he put on a *mamayo* [large collar] around his neck—I don't know another word for it—to give him power. He put it on and took off, we can say, around ten at night. He had to be back by three in the morning. He had about five hours of travel.

He took off. He could see the light of our father at the end of the World. That light. He went in its direction. He flew and flew but couldn't get there, didn't even come close. He made every effort, but by the time the sun came up he hadn't arrived, so the hummingbird turned back.

When he arrived, he told the others he could see the light, but that it was too far.

"I couldn't get there; it's too far."

"What do you mean too far? You can see the light. How can it be far?"

"You can see it, but the distance is very long. You are all incapable. Why are you talking? You don't know and you are also incapable, you have to take a bath and get a prayer so that the time doesn't prolong."

"Let's not waste time. Let's choose a young, strong one who can walk there."

Nobody.

They all held their heads down, as if they weren't there.

"I'm saying time is running out. We need to choose a person soon. We are running out of time." So, they said: "Better you, who knows, Son of the Sun. You go."

"If I wanted to go, I would be there already. I'm looking for someone who can collaborate and do us that favor."

"There is no one. The one we trusted couldn't do it, much less the others. We don't have that reach."

They all voted for him: "You, you, you; it's going to be you; you go."

"Well, yes, to avoid delays, I'll go. Who's going to come with me?"

This guy over here [Don Abel points to a monkey at the base of the tree, Fig. 02.], the *zogui zogui* monkey, whose name in our tongue is *gaay,* was getting ready.

The monkey sat down to think. "If someone comes with me, I'll go. But I won't go by myself. What if I repeat the story of the hummingbird? I would like to go—but wearing this." He put on strands of white beads around his wrists and his

Fig. 04. Abel Rodriguez, from the series *Annual Cycle of the Rainforest*.
Courtesy of the artist and the Tropenbos International Colombia's Archive.

Fig. 05. Abel Rodriguez, from the series *Annual Cycle of the Flooded Rainforest*.
Courtesy of the artist and the Tropenbos International Colombia's Archive.

Fig. 06. Abel Rodriguez, from the series *Annual Cycle of the Flooded Rainforest*.
Courtesy of the artist and the Tropenbos International Colombia's Archive.

neck and painted himself with a traditional dye. When the *kinkajou* asked who would go with him, the monkey said, "I will go."

"Will you be able? If you're going to be like me, there will be no problem."

"I don't know; I'm not proud enough to say that I am this and this and that, but I think I can accompany you. I'm not as fast, but I must do something." The *kinkajou* saw the monkey had a good spirit, serene and fresh. So he said, "Let's go! I hope he is a man like I am."

They prepared their *ambil* [ritual tobacco paste], coca, and the food they were going to take.

"What are you taking?" the *kinkajou* asked.

"I'm taking this," the monkey said, touching the beads wrapped around his wrists. "It's not a luxury; but it has some value."

They left and after three steps into the patio, they went underground and came out where the creator was, the grandfather of the axe.

"Grandfather!"

He opened his eyes and said: "Who is calling me grandfather?"

The *kinkajou* said, "I am."

"What is your name?"

"My name is Heart of Caimo [*Pouteria caimito*]."

"You are the Son of the Sun, right?"

"Yes, you said it and I am."

"And you?"

"I am accompanying him."

"What is your name?"

"During the strong summer, I get up early to awaken the fruit plantings; my name is *Gaay*."

"Why did you come?"

"We came for something special."

"What is it?"

"Material for work."

"What is it called?"

"Axe."

"Axe? Ah! You want an axe? To what end?"

"We want to learn to work. My people, the tribe over there, don't know how to work, how to fell with an axe. Here are the products of our labor: here's the coca, here's the tobacco, here's the *ambil*."

Gaay removed the beads from his neck and offered them.

"These are all I have. Our people, our children, are dying of hunger. We cannot care for them. We wish to obtain food for our family."

"I cannot deny you that. You may have the axe." He took the axe and gave it to them.

"When you arrive at the place where you live, take out a hummingbird's heart [pomegranate tree]." The axe is carved with the wood of that tree, which is why it looks red, because they carved it with this unbreakable wood.

"After you're done carving, sharpen the axe, and teach them to fell. The rest you already know."

"Yes, Grandfather, we know already. Our problem is going to be what follows. All we needed was this."

They returned after chewing some coca. They say they pulled the land towards them in order to make the return short, only one step. When they arrived back at the patio they said: "We brought this."

A reception took place. It is said they had nothing; they had no *chagra*, no yucca, no coca, no *ambil*, but still, they prepared these things for the reception of the axe. Everyone was happy. They had an inauguration, all that.

Meanwhile, the *kinkajou* carved. And after carving, he sharpened.

"Done. Here is the axe."

He put the axe down like you see here [Don Abel points to the axe in Fig. 02.].

"If you wish to eat, abundantly, you must fell. Once the fruits fall, they are rotten, not good for eating. The good stuff is above. If you wish to eat enough, fell. If not, it's going to waste; when it falls, it's no good."

The *titi* monkey and the tapir said, "We cannot, we cannot."

"What are we going to do with you? Your teeth are your axe. Why don't you fell with that?"

"Because we cannot open our mouths wide enough. When the tree is small, we can."

The *kinkajou* gave the axe to the *zogui zogui* monkey and told him: "You start; you have a good hand."

"I'm not the best, but I'll do it."

"You do one side; I'll do the other."

They agreed and the monkey started to chop. When he was half-way done, he said "I'm tired now. You work while I rest."

"How can you be tired by a little stick like this? *Balso* is not hard [balsa tree]; it breaks by itself." The *kinkajou* worked with the axe until six in the afternoon, when he was able to bring down the tree.

"Here is the axe, so you can keep working. You saw how

it was felled." He told to his woman: "Gather *caimo*, grape; I'm going to gather *maraca* and pineapple because we cannot gather anything more. Let them gather the rest so they can eat. Since they lost their people, now they need to grow."

They returned home.

In a future moment, the children were agonizing. The only warmth they felt was in their chests. The rest of their bodies were cold, like death.

On the way, the Son of the Sun told the woman: "Listen, I feel something. I have a presentiment. I don't know what might have happened at home. Don't rest. Let's go without stopping, in one march, without resting. I feel something in my heart; it's signaling me. Something sad." As they returned, his heart was moved. The woman kept falling behind. He arrived home first.

When he arrived, all he heard was silence and he wondered, "Could the boys have gone to sleep, or what happened?"

He called to his son from the patio: "Son, light a candle. It's very dark."

Silence.

A little thing moved about, a ghost.

"What happened?"

He opened the door and entered the hearth. He felt something on the floor and stopped. He turned around and lit the fire. When he looked, he saw both sons on the floor, one here and one there. He saw the *maraca* seeds were licked clean and chewed up.

"Oh, no! These two! What happened? They didn't do as I said. Something happened. Someone deceived them.

That's why this happened. Well, this is to learn one more point. It's a lesson."

When the woman arrived, he said, "Look, our children. There they are." She put her load down. He said: "Don't cry. Nothing has happened. They're resting from so much play."

She started to cry.

"Don't cry. There's life. We're not alone; there is our father, our creator. He who gave us life has to give life again, that is his duty."

He took the *caimo* and squeezed some drops in his mouth. He called up thoughts of life being put in place anew until he moved a toe, his middle finger, and he breathed. When he breathed, he swallowed. He took other fruits and squeezed them.

The children revived. After they had fully come back to life, he started asking what had happened. The older boy, in good health, told him: "Father, what happened is that the *picón* bird sang too early. My little brother hurried, he scolded me, and wanted to hit me. To avoid a fight, I took down the fruit and we ate before the right time. When the right hour you had told us arrived, we had nothing. I thought we were going to die of hunger. If you had arrived one hour later, I think we would've been called."

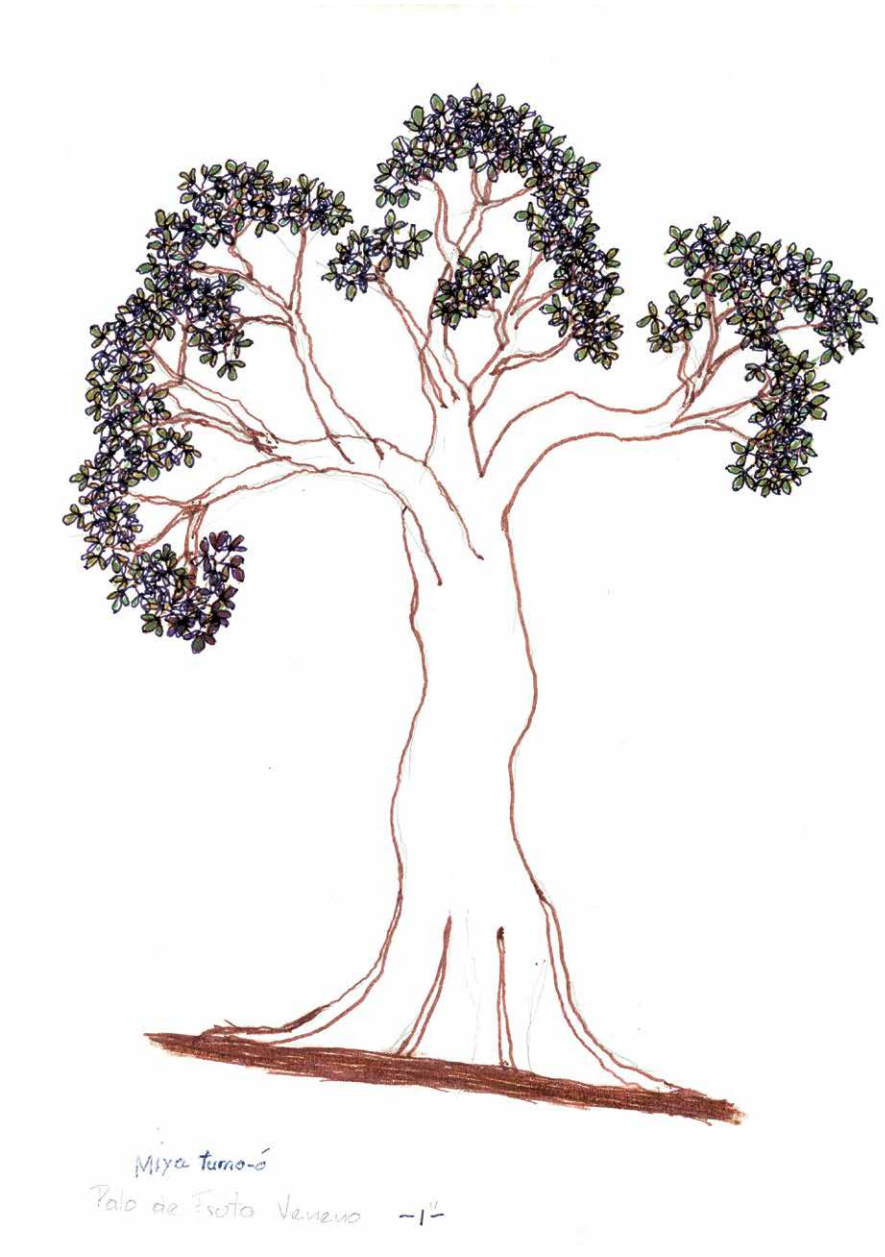


Fig. 07. Abel Rodríguez, drawing from the *Studies of Trees* series.
Courtesy of the artist and the Tropenbos International Colombia's Archive.

The Political Nature of the Forest: A Botanic Archaeology of Genocide

by Paulo Tavares

In colonial and modern imaginaries, the Indigenous peoples of Amazonia have always been defined by categories of incompleteness, absence, and lack: as societies without faith, law, and writing; societies without agriculture, domesticated animals, and resource management systems; societies without market economies and complex governmental institutions. They were societies in a state of nature, societies without history.[1] One of the most conspicuous arguments supporting this view was the alleged nonexistence of urban complexes in the forest landscape, both in the ancient past, as archaeological evidence, and in the modern present, as large-scale spatial infrastructures. Supposedly constrained by the environmental conditions of the tropics, technological limitations and "subsistence economies," forest peoples thus also were said to lack that most remarkable product of civilization—the city. They were non-urban societies, in the sense that they could not develop the technological, spatial, cultural, and political structures that characterize urban formations.

The cartographies presented in this essay challenge this colonial perspective. They are part of an investigation into the genocidal campaign conducted against the Indigenous peoples of Amazonia by the Brazilian State during the military dictatorship of the 1970s and 1980s. Through an archaeology of the violence as it registers in maps, documents, and the forest's botanic fabric, this research reveals a radically different

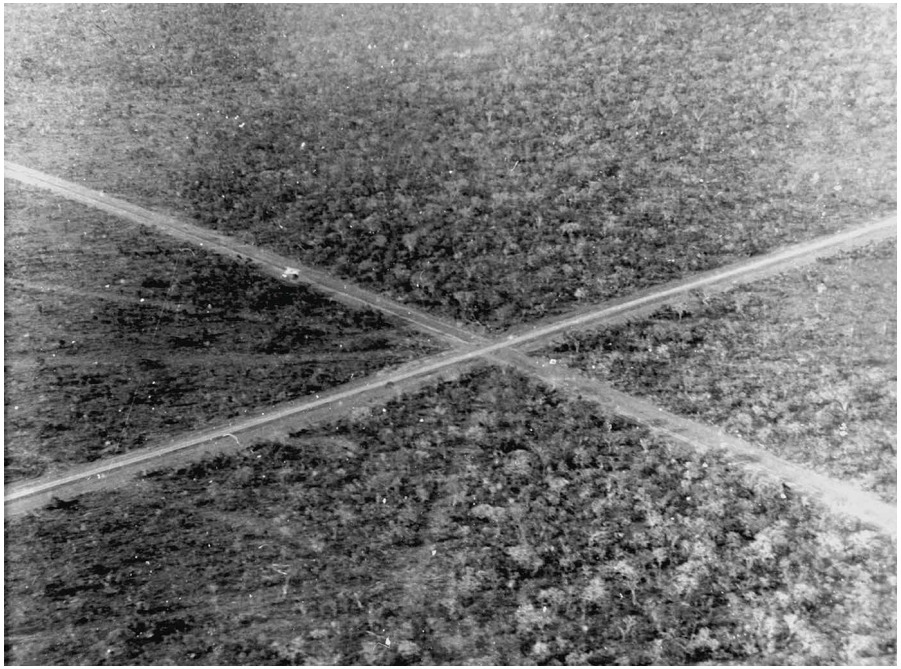
See pages 156–57 for image annotations.

image of the nature of Amazonia. By carefully studying this evidence we see that the forest is to a great extent a designed construction that results from the various ways Indigenous societies engage, manipulate, and transform the land.

Terra Nullius – Tabula Rasa

Explaining the concept of his design for the master plan of Brasília, the modernist capital of Brazil built from scratch in the hinterland plateaus in the late 1950s, urbanist Lúcio Costa wrote: "[The city] was born out of the primary gesture of one who marks or takes possession of a place—two axes crossing at a right angle, the very sign of the cross."[2] Only in the early 1970s, when Brazil was under military dictatorship, did Brasília become the *de facto* center of national political power. By that time, the colonial program (both symbolic and functional) embodied in the modernist design of the city—an urban cross demarcating the conquest of a territory—was rapidly expanding toward the depths of Amazonia.

Like their colonial predecessors, modern strategists and planners defined Amazonia as a void space characterized by chronic lack: demographic emptiness, technological underdevelopment, economic stagnation, territorial isolation. In the book *Geopolitics of Brazil* (1967), General Golbery do Couto e Silva, the most influential intellectual author of the Brazilian National Security Doctrine, described Amazonia as a giant "island" floating at the margins of national society and outside the geometries of the state.[3] This neo-colonial perspective led the military dictatorship (1964–85) to design a basin-wide strategy to "occupy and integrate" Amazonia, which Golbery described as a "geopolitical maneuver for the integration of the national territory." This strategy was translated into a series of radical experiments in spatial planning deployed as if the extremely diverse and complex socio-natural environs of the rainforest could be planned and modified as a whole: a homogenous *terra nullius/tabula rasa* to be rationally domesticated,



colonized, and re-engineered. With the aid of sophisticated mapping technologies developed by the Cold War military-industrial complex, the forest was conceived and visualized as a limitless resource terrain open for capitalist exploits, on which a series of cartographic imaginaries, government discourses, and spatial strategies would be projected and implemented. This process in turn led to dramatic, violent changes in both the natural and social landscapes of Amazonia.

The Politics of Erasure

In order to accomplish that plan, the military government sought to "pacify" the Native communities whose territories were located in strategic zones designated for development projects such as cities, mines, dams, plantations, and cattle farms. As the state policies directed at Indigenous peoples became aligned with the doctrine of national security, the campaigns of "pacification" became increasingly militarized, thus aggravating the structural violence against the Amerindian

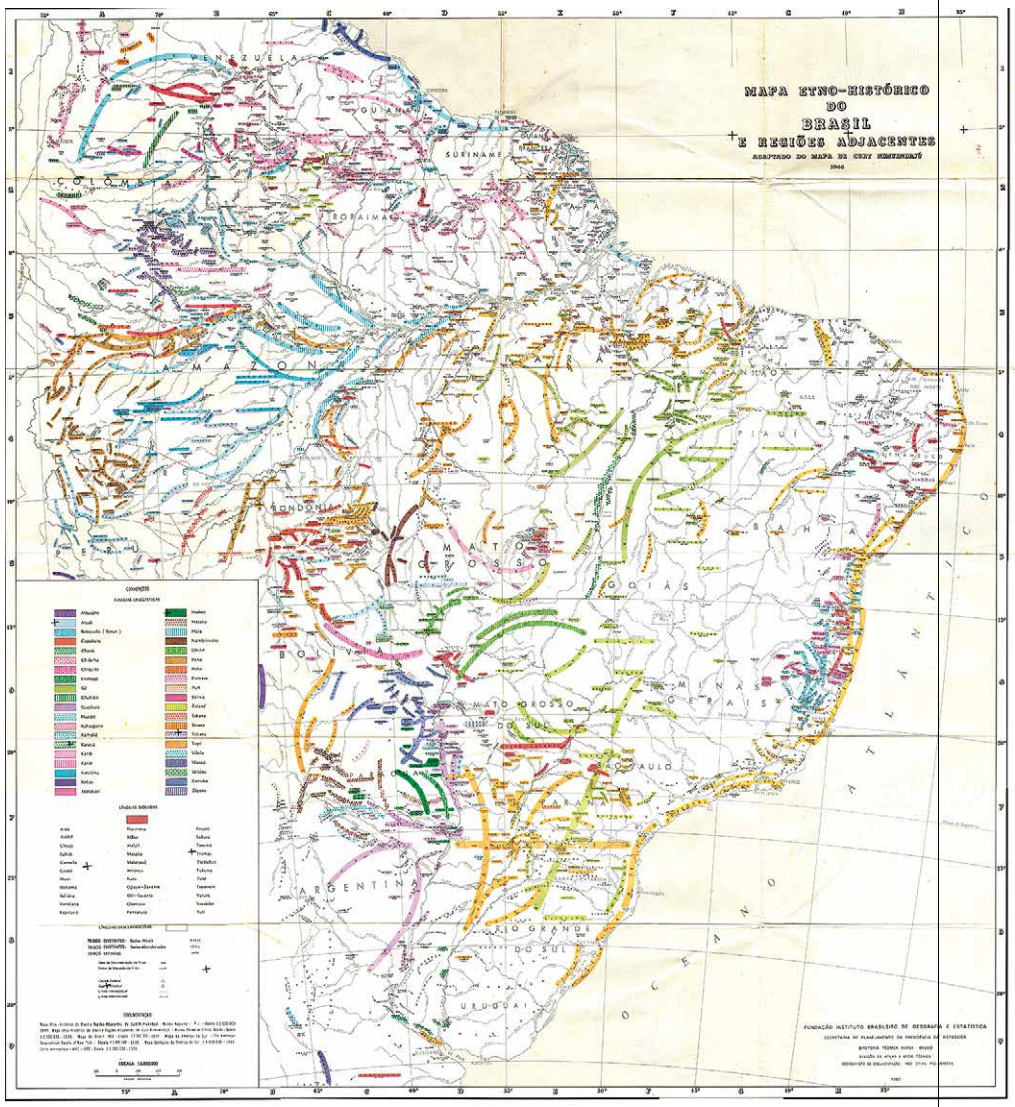
population that shaped the colonial and modern history of Brazil. As documented in the final report of the Comissão Nacional da Verdade, a truth commission established in Brazil in 2012 to investigate grave human rights violations perpetrated by state agents during the military regime, "pacification" involved compulsory removals, forced transfers, systematic land

expropriation, massacres, arbitrary imprisonment, torture, and repression of political activity. These actions were combined in a lethal ecology that caused massive dispossession and displacement, leading to severe demographic reductions, cultural disintegration, and the near-extermination of entire Indigenous groups. When mapped together, they draw the contours of a broader strategy to "produce demographic voids." The multiple and entangled forms of violence and rights violations by which this strategy was conducted on the ground was "neither sporadic nor accidental, [but] systemic," the report concludes, "insofar as they resulted directly from structural state policies," and "even when directed to individuals they targeted a people as a whole and as such."[4]

The colonial perception that the forest hinterlands constituted a vast *terra nullius* sparsely populated by primitive tribes was translated into an official state policy designed to generate territorial voids, *de jure* and *de facto*—that is, by law and on the territory—which aimed at eliminating the existence of Indigenous peoples both as a subject of rights and as a people. As stated in the Comissão Nacional da Verdade report, "In order to liberate land for colonization and the construction of infrastructural projects, [this politics] led not only to formal attempts of denying the existence of certain indigenous peoples in certain regions, but also to means of making this erasure reality."[5]

The Missing Villages

One of the longest and most vicious operations of the "politics of erasure" was deployed against the Waimiri Atroari people, a Carib group of central Amazonia. Their land, a region rich in mineral deposits, was mapped as a key "pole of development" within the Generals' strategy to occupy the frontier. In the late 1960s, after centuries of violent clashes and failed attempts to colonize their territory, the government created the "Waimiri Atroari Attraction Front" (FAWA), a pacification operation aimed at curbing Indigenous resistance and resettling the population to make space for highways, the Balbina mega-dam, mining enclaves, and agricultural projects. Over the next two decades, FAWA conducted a sweeping campaign of forced removals and transfers, displacing the Waimiri Atroari from their traditional villages and confining them into state-controlled settlements. More than 2,000 Indians were killed during the pacification process, either by direct actions of state forces and private militias, such as massacres and aerial chemical attacks, or indirectly by diseases brought by the soldiers, workers, and settlers. This caused the decimation of ninety percent of the Indigenous population and the destruction of an unknown number of villages, leading to dramatic



transformations in the Waimiri Atroari territory and the near extermination of their modes of life and inhabitation.[6]

Rigorously geometric, the architecture of the Waimiri Atroari villages traditionally consist of a single communal house constructed in a circular shape roughly eighteen to fifty meters wide, situated within a large ellipsoid plaza surrounded by gardens of fruit and nut trees and small fields of swidden agriculture. As the forest clearings expand around the central

nucleus, the village is gradually encircled by another ring that can extend over 300 meters in width. *Mydy taha*, or "big house," the term used by the Waimiri Atroari to refer to their villages, designates this entire complex, encompassing the residential structure, the plaza, the gardens, and adjacent swiddens. Before the process of resettlement, this basic socio-spatial cell was highly mobile. Villages were periodically abandoned and re-erected somewhere else, performing a constant movement through the forest landscape. Fallow swiddens tend to re-attract quantities of game and concentrate species of fruit trees and medicinal plants, so the abandoned villages continued to be utilized for many years. Archaeological studies also demonstrate that the new settlements were most probably located in areas that had already been inhabited in the past, which are generally identifiable by the presence of highly fertile anthropogenic soils known as "dark earths."[7]

Distributed along the margins of rivers and streams, networks of autonomous villages formed regional clusters organized in a larger territorial system interconnected by several routes, which the Waimiri Atroari call *umá*. Although relatively distant from each other and politically independent, the villages were socially and spatially integrated through cultural interactions and material exchanges, making the Waimiri Atroari land a very dynamic and populated territory sustained by a wide, intricate, and well-defined infrastructure of land and fluvial communications.

To assume that this extensive territorial infrastructure could have completely vanished without leaving any ruins would be yet another act of erasure of the socio-historical agency of Indigenous peoples, perpetrating and perpetuating the military dictatorship's genocidal politics by other means. Such an assumption would only reassert the colonial ideology according to which Amazonia consisted of an empty territory dominated by luxurious, pristine nature, and populated by small tribes of savages whose modes of engaging with the environment were so underdeveloped that they produced no significant modifications in the territory—and consequentially

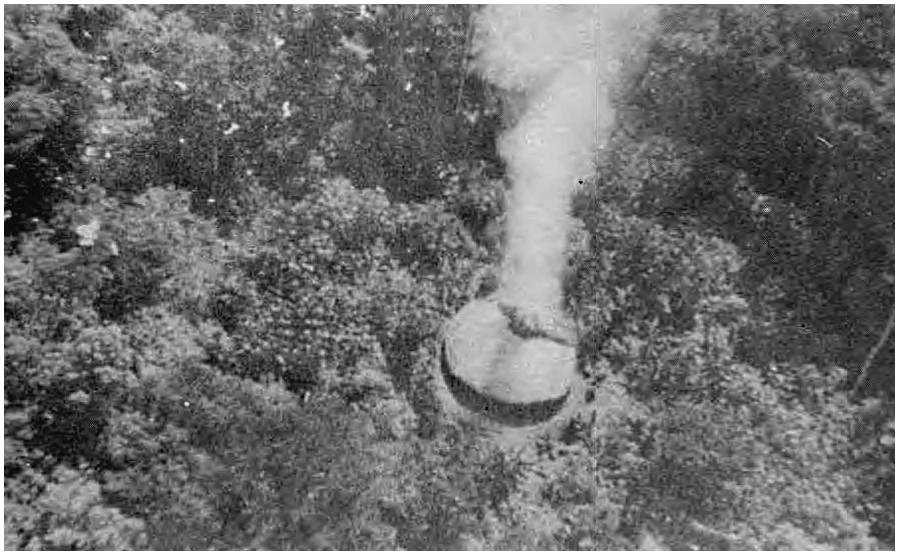
left no traceable signs in the landscape. In other words, inasmuch as Indigenous technologies and spatial practices are considered incapable of transforming and engineering the land, being subjected to rather than mastering the forest environment, there is no "architectural record" that bears witness to the massive destruction of the Waimiri Atroari territory. But how could devastation on such a scale, which almost exterminated the Waimiri Atroari population and destroyed an extensive network of settlements, gardens, and trails, leave no remains, no marks in the terrain? How could numerous villages have disappeared without any recognizable archaeological signature on the ground?

Botanic Archaeology

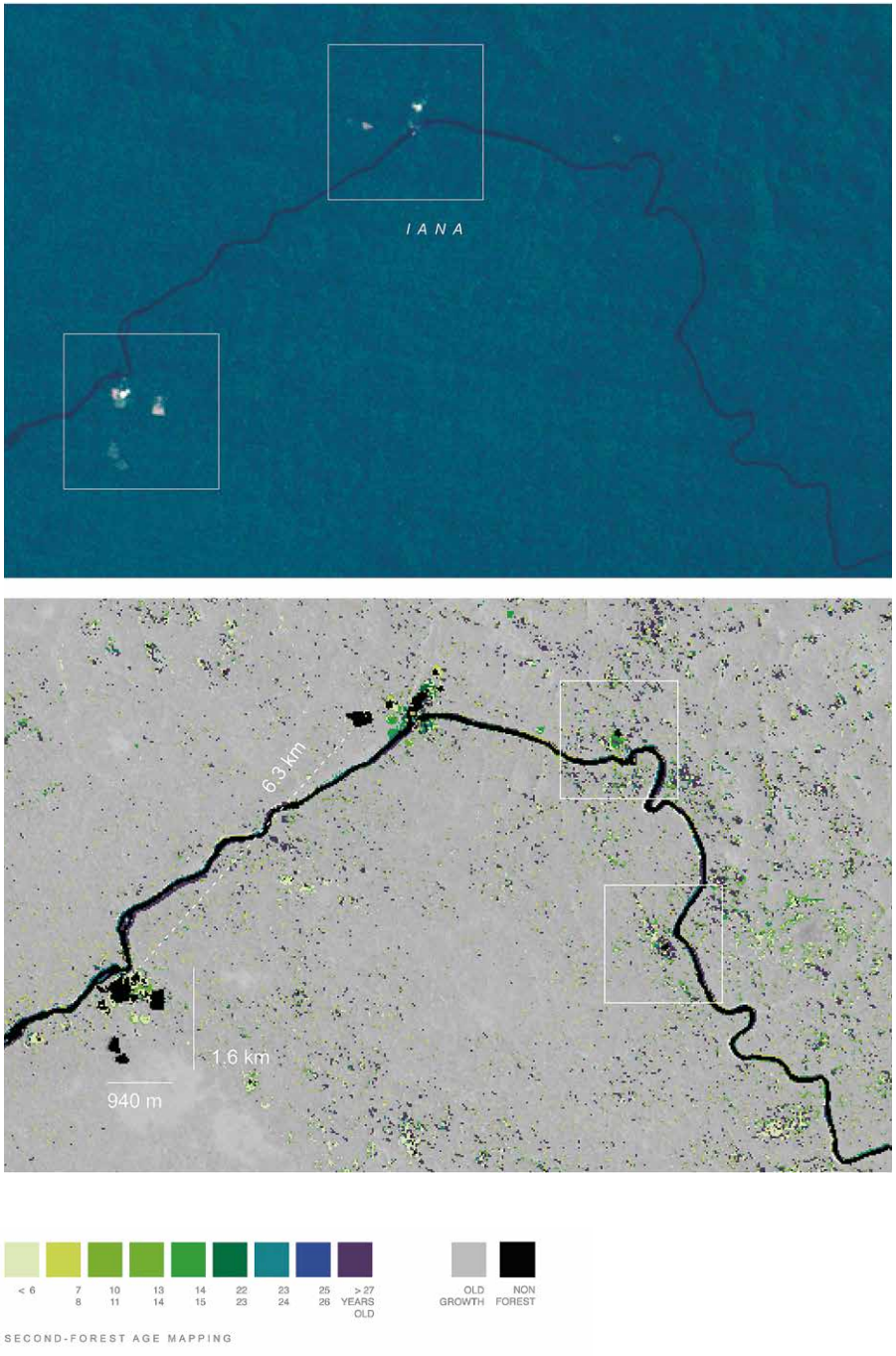
There is little concrete evidence of the planning and execution of evictions and massacres of the Waimiri Atroari, and there exists no proper map of the location, number, or size of the villages that were destroyed or forcibly abandoned. This absence of evidence has often supported claims that, in contrast to opponents of the military regime who were tortured and murdered in the cities, Indigenous communities were not targeted because of political motivations.[8] And yet, it was in the deep hinterlands, where the Generals launched a wholesale campaign of annexation of Indigenous territories over which the state did not exert full control, that gross human rights violations were perpetrated in the most widespread, unrestrained, and brutal manner, exposing the profound colonial roots upon which Brazilian national society was forged in the twentieth century. At the same time, colonial violence was mostly unseen, underreported, and unaccounted for as part of the terror through which the dictatorship ruled, at best considered collateral damage of a rapid process of modernization that spread chaotically over the forest.

Contesting this historical narrative, from 2012 to 2013, together with researchers from the Forensic Architecture

agency, I conducted an investigation on the state-led genocidal campaign deployed against the Waimiri Atroari.[9] The main objective was to identify the ruins of villages erased by the politics of pacification, providing a spatial conceptualization of the violence and a cartographic analysis of its scale. To locate archaeological evidence of the destruction, the project used remote sensing technologies originally developed to map global climate change, principally methodologies designed to establish forest age, which allow researchers to trace nearly imperceptible differences in the botanical structure and composition of the vegetation.



Contemporary satellite imagery is most commonly diffused in the public domain as "true-color" composites, that is, they are encoded to represent the terrain as closely as possible to the colors perceived by a human observer in direct contact with the landscape. However, such devices operate over a much broader sensory space beyond the spectrum of human optics, and capture not only a flat, photograph-like image of the Earth, but a series of environmental information detectable only through the machine's vision. The data harvested by this multi-spectral view of the environment can be coded to map specific features in the landscape and conduct fine-grain



interpretations of socio-ecological processes as they register in land cover and soil transformations.

In relation to the mapping of tropical forests, satellite imagery data can be translated into another set of imagery that indexes the brightness, greenness, and wetness of the terrain by calculating variations in surface reflexivity, concentrations of photosynthetically active vegetation, and moisture conditions of the soil. The botanical constitution and structure of the forest—differences in canopy configuration and density; varying rates of photosynthesis; the relationships between vegetation typology, biomass, and soil drainage—all correspond to singular patterns of reflection and absorption of electromagnetic waves, and this information is stored in the spectral properties of each pixel that composes the image. When analyzed across a consistent image archive, it is possible to trace the spectral history of the pixels in relation to these indexes, and the resultant spatial distribution of the data maps disturbances in the forest environment with accuracy, distinguishing secondary from old-growth vegetation by attributing specific ages to areas of the forest. Through this "archaeology" of the spectral properties of the pixel, a direct link between remote sensing data and the forest life cycle can be drawn, thereby identifying anthropogenic interference in forest zones that, at first glance, may appear as pristine natural environments.

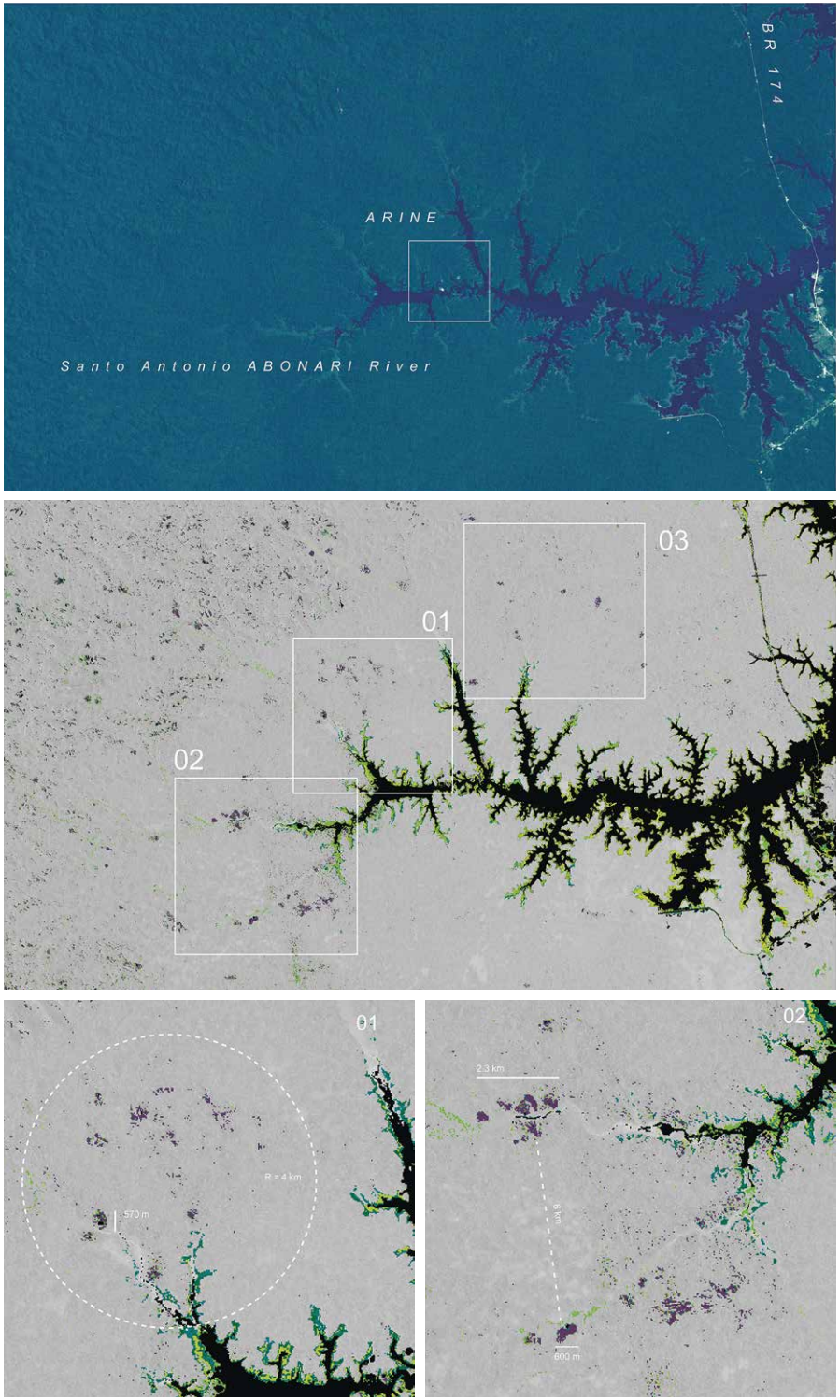
Forest-age cartographic techniques evolved in the pursuit of mapping global climate change. Forests with different ages harbour distinct tree species, types of stems, leaves and roots, which translate into variable amounts of biomass carbon stocks. By reading forests according to growth phases, it is possible to visualize and analyze how variations in the botanical composition through the forest life cycle interact with the planetary carbon cycle.

The cartographies presented in this study use the same technology to trace spatial patterns of violence. When applied in the Waimiri Atroari territory, forest-age/carbon-stock mappings reveal significant disturbances in the forest structure. A series of small, oval-shaped secondary forest

formations more than thirty years old are clearly detectable, forming various clusters of young patches of vegetation located in the margins of major streams. The size of these plots varies, the widest as large as 700 meters, while some agglomerations extend for kilometers and are organized into regional arrangements that cover much larger areas. Analyzed in relation to the signature of contemporary villages in the forest landscape, the size and shape of these secondary forest formations, as well as their singular disposition in relation to each other and the river channels, are remarkably consistent with past and present modes of inhabitation of the Waimiri Atroari. The geographic distribution of the data shows that the oval-shaped patches were not localized interventions, but in fact occupied vast extensions of a complex and densely populated territory.

The nomadic architecture of the *mydy taha* with its multiple rings of swiddens, gardens, and fallows—marking the historical movement of occupation and abandonment, forest clearings, and re-growth performed by the villages—left a traceable footprint in the landscape, whose archaeological record can be identified in the botanical structure of the forest. These secondary forest formations, which began to grow in the 1970s when the violence was most intense, evidence the location of villages that were destroyed or forcibly evicted.

The apparent impossibility of finding architectural remains of the Waimiri Atroari settlements, the seeming disappearance of the villages' ruins into the forest, requires a shift in the methods of reading the terrain and harvesting environmental data, as the very nature of these ruins is radically different from traditional archaeological evidence. When the forest is interpreted as an archaeological resource on its own terms, and patterns of distribution and composition of the living vegetation are read as inscriptions of social history, the architecture of the villages erased by the politics of pacification appear registered in the forest fabric. Their geography demonstrates that the Brazilian State was not intervening upon an empty territory, revealing instead the strategic plan to disrupt, transform, and



annihilate modes of inhabiting the forest that were considered inimical to the project of national development.

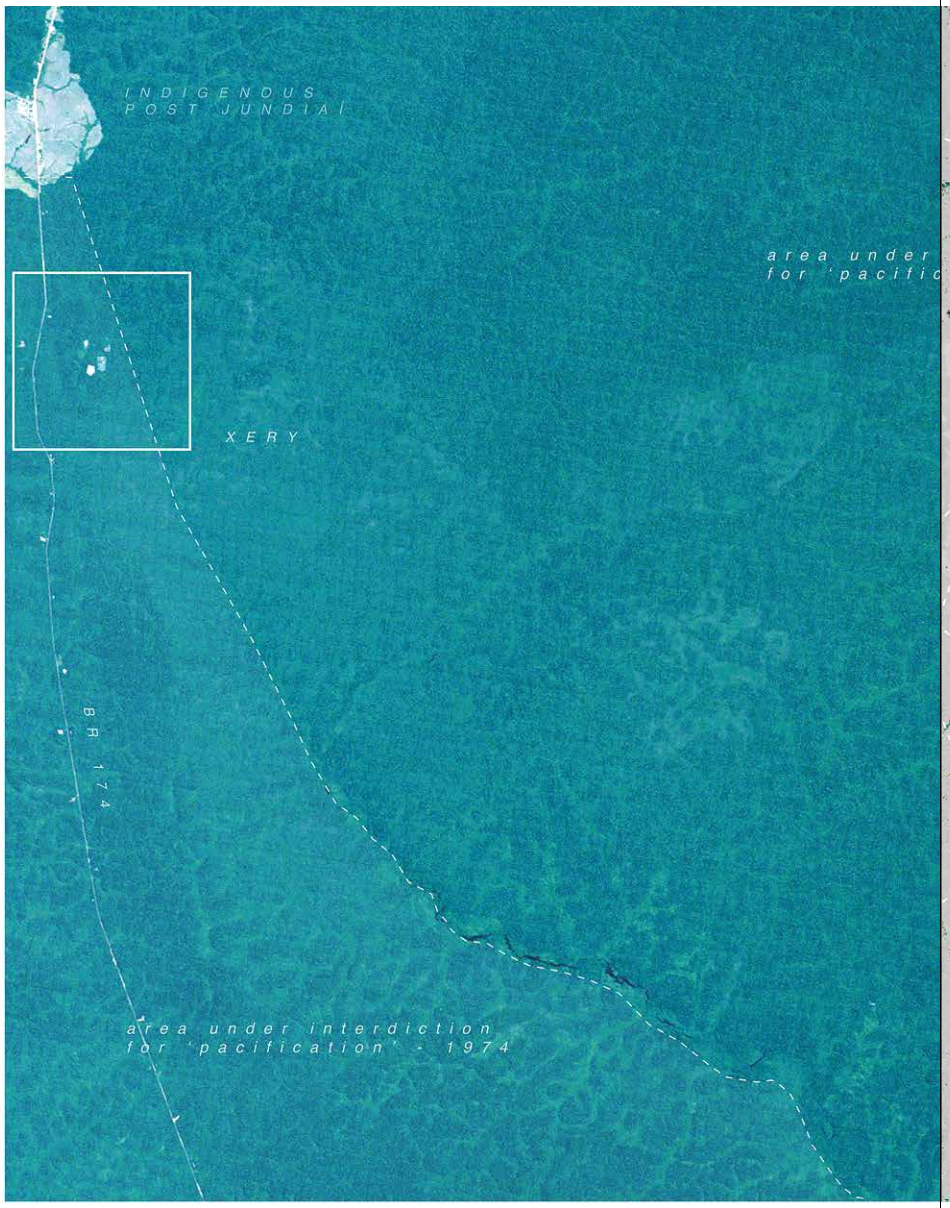
The botanic evidence of genocide also uncovers an image of Amazonia that radically opposes the colonial ideology fostered by the military regime, according to which the forest was a de-populated, underdeveloped, primitive territory. This ideological edifice was inherited from evolutionist descriptions that portrayed Amazonia as a pristine natural environment inhabited by collectives that were incapable of transforming the landscape. Countering this narrative, the maps reveal signatures of highly manipulated environments. The violent reconfiguration of this socio-ecological architecture was the means by which the state assumed tighter control over the Waimiri Atroari territory, and despite the lack of all other possible forms of evidence, the history of violence and its victims survives in the memory of the living forests of Amazonia.

The Designed Nature of the Forest

The capacity of this remote-sensing archaeology to look into the past of the forest is limited by the scope of the satellite image archive, which started to become more consistent after the development of the first multispectral scanners in the early 1970s. Therefore, the maximum "excavation depth" possible to reach through these image-based techniques is restricted to the latter decades of the twentieth century. If this impediment could be overcome, the geographic pattern of secondary forest formations in the Waimiri Atroari territory would probably appear much more widespread and denser, rendering visible a much longer history of anthropogenic interventions in the botanical structure of the forest engendered by the perennial cycle of occupation and the abandonment of a multitude of Indigenous villages. Following the colonial trajectory of demographic decimation experienced by the Waimiri Atroari in reverse, the further back we could observe the past of these forests, the more complex and extensive the spatial distribution of "forest ruins" would be.

Nonetheless, standard cartographic interpretations portray these forests as undisturbed environments, classifying the entire area as an unbroken mass of old-growth forests or high forests, terms used to designate forestlands that display a primary character and have not been modified by human action in neither the recent nor remote past. This "optical blindness" in mapping is to a large extent the spatial correlative of an "epistemological

myopia" that has historically conditioned the ways by which modern sciences have interpreted the nature of Amazonia. In a wide array of fields—ethnography, biology, archaeology, geography, etc.—as well as in Western culture more generally, there is a consistent assumption that Indigenous societies exerted no influence on the species composition and biological diversity of Amazonia. Recent ethnobotanical and archaeological studies have demonstrated that nothing could be further from the truth. Not only do the modes of inhabitation of forest peoples leave a clear signature in the landscape, as the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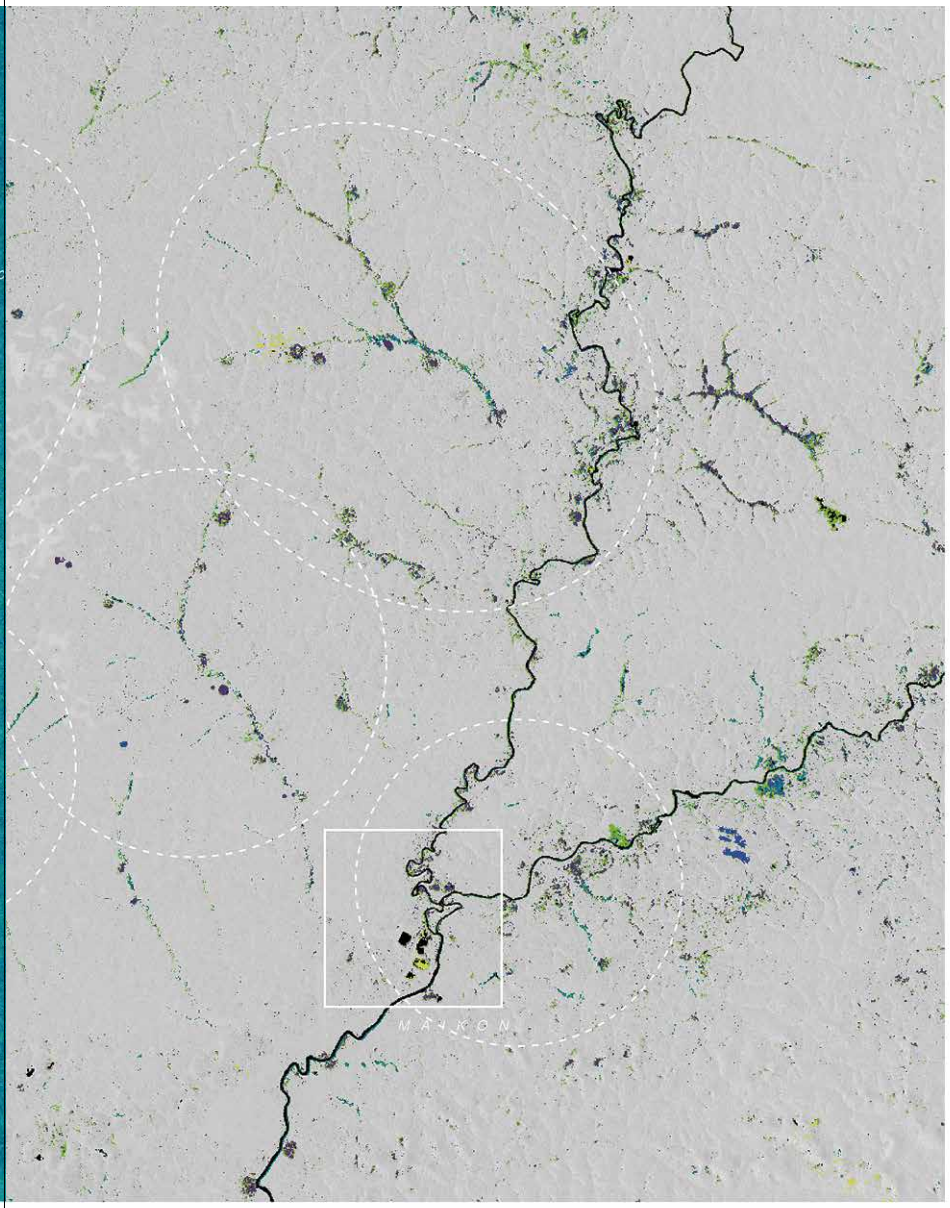

MAÏKÓN

archaeology of the missing villages reveal, but they also play a remarkable function in shaping the vegetative associations and species contents of the forest.[10]

Indigenous landscape management systems in Amazonia are traditionally formed by several pockets of swidden in various stages of use distributed inside the forest, and each field tends to contain an impressive number of plants and cultivars.[11] When the forest re-grows over this tapestry of plants and gradually reclaims the site of abandoned villages, it is a different kind of forest that emerges, with particular species of trees and plants sown by the activities of the villagers and animals that are attracted to former settlements. Many societies native to Amazonia recognize that swiddens and other manipulated zones function as attractors of important dispersal agents, and deliberately manage certain types of plants to increase their presence and thus enhance the seed distribution and germination of particular species. The resultant composition of forest that grows over an abandoned field is similar to an orchard that continues to be utilized and often bears important symbolic connotations for Indigenous peoples, configuring a living, populated architectural element within a larger urban infrastructure composed of ancient and new villages.

Since these secondary forest formations appear to be as natural as old-growth forests and contain similar rates of biodiversity, the untrained eye can barely detect them in the landscape. Yet, they are the product of long-term social engagement with the environment, or, in the definition of ethnobotanist William Balée, they are "cultural forests," anthropogenic botanical constructions forged by specific types of interaction between cultural and natural dynamics that harbour "inscriptions, stories, and memories in the living vegetation itself."[12] Fallow forests originating from Indigenous land management systems "represent a kind of indigenous reforestation," Balée argues, "insofar as species richness of high forests is being replaced by equivalently rich secondary forests through cultural mediation."[13] Therefore,

such systems act towards the enhancement rather than depletion of biodiversity, and hence we tend to see these human artifacts as pristine nature, for to a large extent they are proper "natural" forests.

The mappings of village ruins are evidence of the socio-historical process of "architectural construction" of the forest, which was nearly destroyed by the politics of erasure devised by the military dictatorship. Besides the political nature of the violence directed against Indigenous modes of inhabitation, this archaeology reveals that the nature of the forest is in itself political, that Amazonia is the product of social-spatial arrangements that are sustained by—and by themselves sustain—the life of the forest. The extermination of the former is conducive to the destruction of the latter, inasmuch as biological and social diversity, nature and culture, are structurally interdependent in Amazonia.

Images of Nature – Landscapes of Violence

In a ground-breaking study published in 1989, Balée estimated that at least 11.8 percent of Amazonia is composed of anthropogenic forests. This is the equivalent of imagining a territory larger than France covered by an extremely biodiverse environment engineered by Indigenous landscape managing systems.[14] Since then, new archaeological findings have demonstrated that this figure is probably much higher, thus confirming that the past of the Earth's most biodiverse territory is as rich in culture as in nature. In other words, the rainforest's botanical structure and biological composition is to a great extent an "urban heritage" of Indigenous designs.

Amazonia has long figured as the quintessential representation of nature in the imaginary and epistemic constructions of Western culture and sciences, but as the archaeology of the recent and the deep past of the forest reveals, this image of nature is in fact a product of colonial violence. Rather than evidence of lack, the alleged absence of architectural evidence

in the forest landscape indicates limitations in the ways that modern knowledge has interpreted the humanized landscapes of Amazonia. The fabrication of this epistemology was intimately connected to colonial imaginaries that functioned as one of the most powerful and enduring instruments in the historical extermination of Indigenous peoples.

The forest ruins show that violence has been a determining factor in shaping the representations and environs of Amazonia, at the same time as they make visible how dominant notions of society and nature served to inform and legitimize such violence. As we investigate and learn the histories of these living ruins, they start to reveal alternative modes of conceiving and organizing the relations between populations and environments, describing spatial technologies that were capable of "producing nature." These biodiversity-enhancing designs are very much alive in the memory and everyday practices of forest peoples. The protection of their land rights thus also means the design of a more resilient planetary ecological system in face of ruinous anthropogenic climate change.

De-Colonizing the City

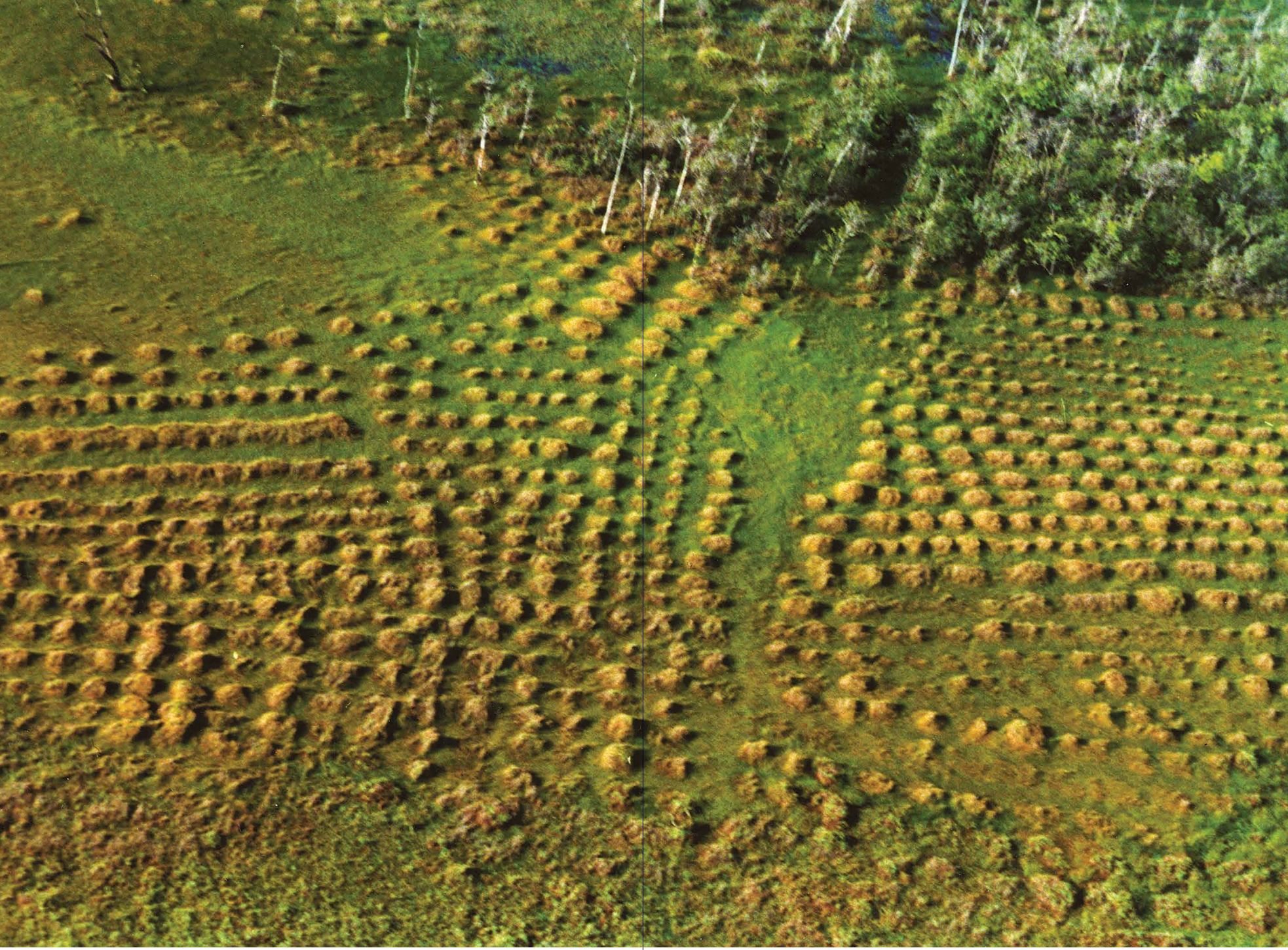
Observing the architecture of Indigenous modes of inhabitation in Amazonia requires a radical shift in perspective and an exercise in the decolonization of the gaze. Instead of seeing the absence of the city, it is the very concept of the city that has to be widened and transformed. The spatial distribution of tree and plant species, the geometry of the canopy, the mosaic patterns of forest formations, mild variations in relief and topography, differences in soil composition, etc., are all indexes of specific forms of social assemblages, "architectural records" that are the product of complex interactions between human actions, environmental forces, and the agency of other nonhuman entities—themselves co-participants in the "design of the forest."

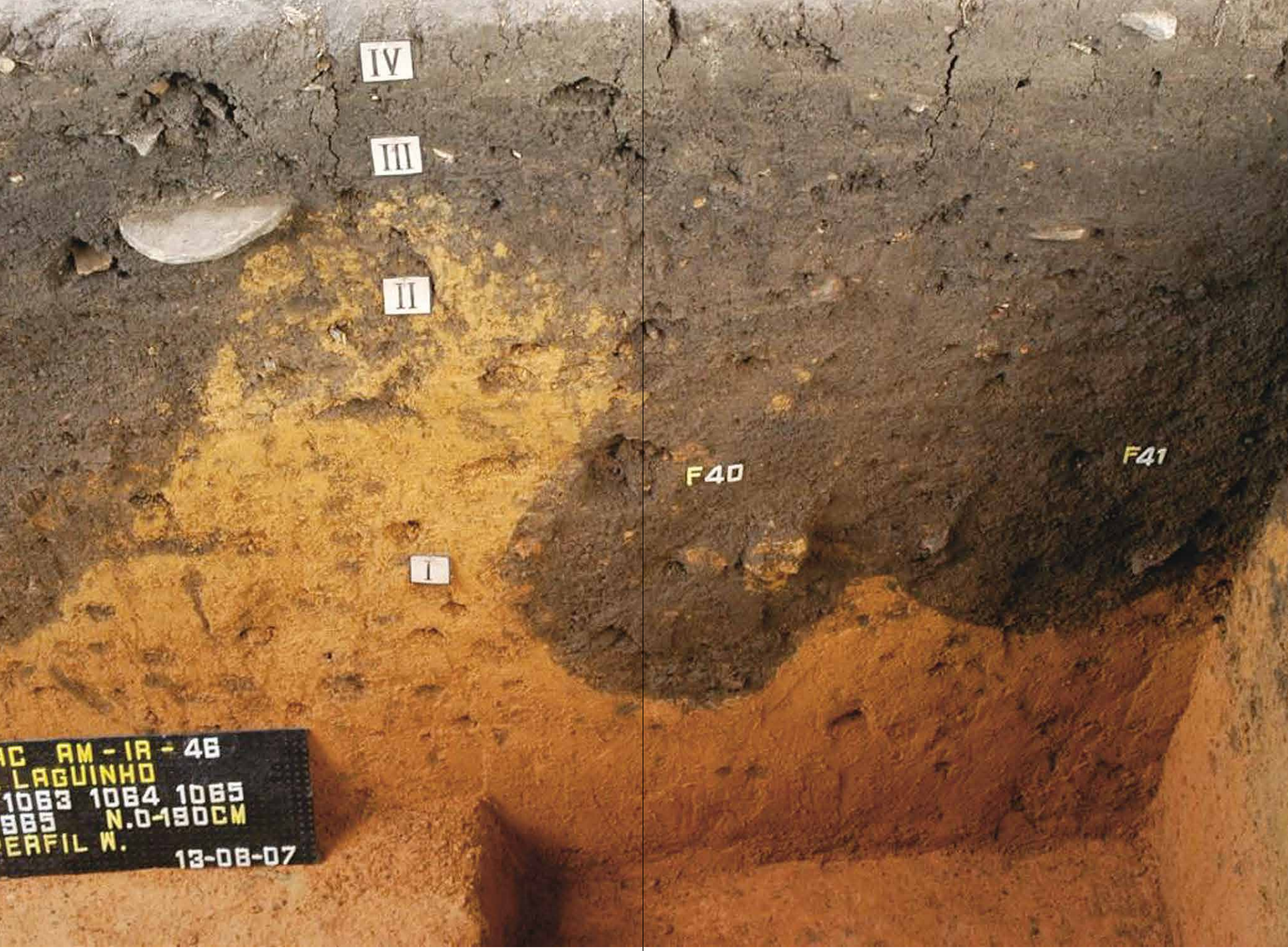
Just as architects read the city as a historical palimpsest produced by social forces that become coded into material

form—layers upon layers of ruins constituting a living fabric of social relations—Amazonia must be interpreted through the syntax of urban design, or else the concept of the urban must be crafted anew to incorporate the constructed nature presented by the forest. The relation between figure and ground is subverted, insofar as that which was defined as the surroundings—the antithesis to, or outside space of, the civic—are incorporated as a constituent part of an "expanded polis," within which humans and nonhumans cohabit in a common political space. In this process an entire new concept of the urban is made visible, one whose contours encompass a multi-species polity that we may initially find difficult to recognize because for too long our perspective has been confined to the epistemic enclosures of the Western city.

The radical other the forest presents is not a completely natural landscape, the absolute negation or antithesis to the culturally saturated urban environment. It is an altogether different form of architecture itself, one that challenges the colonial foundations of hegemonic categories of knowledge by revealing the power structures they sustain, and the violence they inflict.

1 See Pierre Clastres, *Society Against The State: Essays in Political Anthropology* (New York: Zone Books, 1987), and *Archeology of Violence* (Los Angeles: Semiotext(e), 2010).
2 Lúcio Costa, *Memorial do Plano Piloto de Brasília*, 1957. (The original document is in the DF Archive, Brasilia.)
3 Golbery do Couto e Silva, *Geopolítica do Brasil* (Rio de Janeiro: Livraria J. Olympio, 1967).
4 Comissão Nacional da Verdade, *Final Report, Volume II: Thematic Texts,* December 2014, 198, 217.
5 Ibid., 205.
6 Ibid.
7 William Milliken et al., *Ethnobotany of the Waimiri Atroari Indians of Brazil* (Chicago: University of Chicago Press, 1992).
8 As one of the coordinators of the Brazilian truth commission stated to the press in 2012, Indigenous groups "were not resisting in the political sense, since they did not know exactly what the dictatorship was. […] In a certain way their resistance was naïve, only to preserve their lands, […] but they were treated with extreme violence." Guilherme Balza, "Comissão da Verdade apura mortes de índios que podem quintuplicar vítimas da ditadura," *UOL Notícias,* 12 November 2012,

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9 See http://www.forensic-architecture.org.

10 William L. Balée, *Cultural Forests of the Amazon: A Historical Ecology of People and Their Landscapes* (Tuscaloosa: The University of Alabama Press, 2013). My accounts on the cultural nature of the Amazonian forests are also based on an extensive interview with the ethnobotanist Nigel Smith.

11 The Kayapó people of southeast Amazonia, for example, can recognize at least twelve cultivars of bananas in a single clearing; the Tukano people of northwest Amazonia have names for over 130 types of manioc. The Waimiri Atroari recognize over eighty percent of tree and vine species in densely forested areas as directly useful, and among the Ka'apor of eastern Amazonia this number can reach 100 percent. See Milliken et al., *Ethnobotany of the Waimiri Atroari Indians of Brazil*.

12 Balée, *Cultural Forests of the Amazon*, 2.

13 Ibid.

14 Balée, "The Culture of Amazonian Forests," *Advances in Economic Botany* 7 (1989): 1–21.

Fig. 01. (pages 126–27) *Geoglyph Culture*. Throughout the deforested areas of southwest Amazonia, one of the regions most severely affected by the colonization schemes implemented during the 1970s and 1980s, hundreds of geometric earthworks have been identified.

Fig. 02. (page 129) *Colonial Modern Frontiers*. Ground zero of Brasília, circa 1957. "[This city] was born out of the primary gesture of one who marks or takes possession of a place: two axes crossing at a right angle, the very sign of the cross," wrote urbanist Lúcio Costa about his conceptual design for the modernist capital of Brazil. On the frontiers of the Third World, modernization and colonialism became practically synonymous. Modernist architecture was one of the most powerful avatars of this colonial imaginary. Photograph by Mario Fontenelle. Courtesy of the Public Archive of the Federal District, Brasília.

Fig. 03. (page 130) *Terra Nullius – Tabula Rasa*. The city of Sinop, one of the key "poles of development" designed by the military regime, today the logistic-urban center of the soya plantation complex in southern Amazonia, at an early stage of construction in the early 1970s. Courtesy of Sinop Municipal Archive.

Fig. 04. (page 132) *Plurinational Territory*. Ethnohistoric map of Brazil designed by ethnologist Curt Nimuendajú in 1944. The color-coding represents different Amerindian ethnolinguistic groups, showing the extreme socio-diversity formed by various Indigenous nations that populated the Brazilian territory. To homogenize and "de-plurinationalize" this diverse territory was one of the most noxious objectives of the nationalist project of the Brazilian military regime. Courtesy of Archive Curt Nimuendajú.

Fig. 05. (page 135) *The Missing Villages*. An aerial photograph taken by FAWA in October 1974 in the region of the Alalaú River. This image is perhaps the only evidence of the destruction of Waimiri Atroari villages. According to FAWA, the Waimiri Atroari burned their own houses "fearing retaliation from the people who were at the plane." However, testimonies collected by the Brazilian truth commission revealed that villages were frequently attacked by aerial chemical bombardments and arson. Courtesy of FUNAI.

Fig. 06. (pages 136–37) *Urban Clusters*. Sculpted landscapes of raised fields punctuate the flooded Savannahs of the French Guiana Coast, northern Amazonia. Nearly invisible from the ground, these large agricultural clusters (ca. 1000 years BP) were uncovered through the multi-channel "photographic-archaeologies" produced by Stéphen Rostain in the 1980s. Image courtesy of Stéphen Rostain.

Fig. 07. (page 138) *Forest Archaeology*. Secondary-forest age mapping applied in the region of the Alalaú River in the center of the Waimiri Atroari territory, showing the footprint of contemporary Indigenous villages and potential satellite settlements indicating past occupation. Images courtesy of the author.

Fig. 08. (page 141) *Forest Archaeology*. Secondary-forest age mapping applied in the region of the water reservoir of the Balbina dam, upper Abonari River. Several oval-shaped secondary-forest formations older than thirty years are clearly identifiable. Images courtesy of the author.

Fig. 09. (page 143) *Mydy Taha*. Waimiri Atroari village photographed in 1968.

Fig. 10. (pages 144–45) *Constructed Forest*. Maps of Waimiri Atroari village clusters that existed before the violence in the upper Alalaú River. Images courtesy of the author.

Fig. 11. (pages 148–49) *Forest Garden*. A palm-tree garden in the Tapajós Forest, eastern Amazonia. Palm trees, especially fire-resistant species of palm trees, are one of the most telling traces of past human interference in the forest landscape. Deeply incorporated into material culture, palm-tree gardens are successively inhabited and abandoned, signaling the existence of long-term cycles of human-interference in the forest structure. Photo courtesy of Armin Linke and Giulia Bruno.

Fig. 12. (pages 152–53) *Terrain Evidence*. One of the hundreds of artificial mound complexes that have been found in the Upano River valley, Ecuadorian Amazon. Similar to the geoglyphs (geometric urban patterns), they could only be identified after the forest was cleared. Image courtesy of archaeologist Stéphen Rostain.

Fig. 13. (pages 154–55) *Soil Evidence*. *Terra preta de índio*—dark-earth profile clearly demarcated within a trench excavated by archaeologist Eduardo Neves in central Amazonia. So-called *terras pretas*, or "dark earths," anthropogenic black soils that are highly fertile and rich in carbon compounds, constitute archaeological indexes of Indigenous soil fertilization. Contemporary settlements tend to be situated in areas rich in dark earth, demonstrating continuous, long-term human occupation. Image courtesy of Eduardo Neves.

Leaving the Forest

Eduardo Kohn (EK) in conversation with Anna-Sophie Springer (AS) & Etienne Turpin (ET)

> When I say Earth, Kees, I mean people. Men. You worry about deer and trees and fibrewood, fine, that's your thing. But I like to see things in perspective, from the top down, and the top, so far, is humans. We're here, now; and so this world's going to go our way. Like it or not, it's a fact you have to face; it happens to be the way things are.
>
> — Ursula K. Le Guin, *The Word for World is Forest,* 1972

In Ursula K. Le Guin's 1972 science fiction novel, *The Word for World is Forest,* colonization and ecological destruction are intertwined realities.[1] Originally published in response to the Vietnam War, the book imagines a future planet Earth deforested to a degree that its lands resemble "dry beaches"—or, deserts where large animals can no longer dwell. Wood has become a resource more valuable than gold, and it is hauled in from distant jungle planets, which through this pursuit are "cleaned up and cleaned out"—in other words, destroyed, enslaved, and "un-worlded." Forty years later, Le Guin's future-fictional projection finds its existential echo in the struggle with the postnatural implications of the Anthropocene. Given such theories as the sixth mass extinction caused by accelerated habitat loss due to human impact, the importance of maintaining forests as enclaves of biodiversity and climatological equilibria couldn't be more evident. And yet, only a mere twenty percent of the world's original old-growth forests today remain intact. Of course, changing climates and ecological shifts are characteristic of the planet's geo-history—many ancient, wild forests have been supplanted by other landscapes through natural causes in the past—but never before have woodlands been cleared so rapidly and in such vast regions as during the past four centuries, since the beginning of modern exploration, imperialism, and industrialization.

At the same time, plant growth and forests remain a pillar in the pledged efforts to mitigate climate catastrophes.[2] In 2014 (in the same week this interview was recorded) the Intergovernmental Panel on Climate Change (IPCC) working group once again emphasized the urgency of limiting the rise in global temperatures to no more than two degrees Celsius above pre-industrial levels—a boundary that was also intensely fought for during the Paris COP21 climate summit in November 2015.[3] At this point, however, when we have reached a permanent state of 400 ppm of CO_2 in the atmosphere, it is not clear whether even the most radical changes in the energy sector would help to maintain this boundary—and if so, then only within a limited window of time for governments to enforce such drastic changes.[4] Besides the need to eliminate energy sources that emit carbon dioxide, the IPCC explicitly emphasized the promotion of plants that absorb CO_2 from the atmosphere as one effective counter-measure. While there is clear evidence that greenhouse gases released through human activity are responsible for the climate fluctuations of the last 200 years, and every schoolchild learns about trees' ability to soak up carbon emissions, deforestation itself currently causes around fifteen percent of the CO_2 set free each year—not to forget the "hidden" greenhouse gas emissions caused when mega dams flood forests.[5] And whereas forest regrowth is occurring in Europe and certain areas of North America, it is the tropical zone—home to the richest ecosystems on earth (with seventy-five to eighty percent of all plant and animal species)—that continues to be exposed to the most severe and probably most irreversible sylvan destruction. To give only one example of recent acceleration, in Myanmar so many trees were logged over the last few decades that the country's current deforestation rates are estimated to be just behind Brazil and Indonesia, the two countries with the highest annual rates of forest reduction.[6] But as human agency in the Anthropocene greedily absorbs and deeply transforms nature, the understanding of what it means to be "human" is being deeply challenged, raising a series of ethical questions about future living on this planet. Taking *forest* as another word for *world*—an environment that according to botanist and forest savant Diana Beresford-Kroeger "forecasts our future in every breath it takes"—what can we learn from the global forest about human intelligence and the trajectories of these entangled worlds?[7]

To discuss these concerns, we spoke with the anthropologist Eduardo Kohn, author of *How Forests Think: Towards an Anthropology Beyond the Human* (2014).[8] Having learned from human-nonhuman interactions in the Ecuadorian rainforest, Kohn tries to "think-with" the tropical rainforest of Ecuador's Upper Amazon, one of the most complex assemblages of organisms on Earth, in order to reconsider the myth of human centrality, and to thus reimagine how we can see the world and its multispecies relations differently. Affirming that life and thought are one and the same, he argues that humans are not the only living entities capable of thinking, even though this deep-rooted and crucial distinction has been used to set humanity apart from other lifeforms.

Portraying the forest as both "beyond" and "sustaining" the human, Kohn argues that even if verbal symbolic language is indeed a distinctly human mode of sense making, there are other forms of representation that sustain nonhuman life and their relational webs. That animals—and perhaps even entire forests—*think* is a reality conditioned by continuities among multispecies life-worlds that are variously connected through intertwined semiotic systems. In order for the human to "become a little more 'worldly'," Kohn urges us to attempt to think beyond our "all-too-human" worlds—a defamiliarization that situates human life back within a more general and diverse network of other lifeforms. He suggests that by imagining how we can understand concepts like kind, context, difference, self, relation, and form differently, new possibilities for flourishing emerge. While the postnatural regime of the industrialized forest turns a complex ecosystem into an object measured, parsed, and standardized for human purposes on a grand scale, the animated forest mediated by Kohn reminds us that other worlds are not only possible, but that they already exist.

E T

Let's start with your distinction between ontology and culture, which you emphasize several times in *How Forests Think*. Can we begin with a discussion of what's at stake in this separation?

E K

I use the term ontology in a particular, perhaps idiosyncratic, way, one that I don't necessarily share with other anthropologists. Basically, a lot of my work has emerged from a dissatisfaction with the dominant analytical framework in our field (and more broadly in the social sciences and humanities). We are very good at talking about one kind of reality, a human one, which in very broad strokes you could call a "cultural" reality. By this I mean anything that's historically or socially constructed, or the product of systems or institutions of knowledge, or meaning, or technology—that sort of thing. These sorts of "circular systems" may bring in nonhuman elements like computers or microbes, but they nonetheless have a conventional circularity to them that is the hallmark of what I call symbolic thinking. Anthropology and related fields have been very good at exposing this kind of reality, and this has had important political implications. Franz Boas was really fighting against scientific racism in his celebration of historical context and culture.[9] Boas was quite nuanced in his treatment of biology and environmental context. Today, however, this contextual approach has gotten to the point where it has become very difficult to say anything about that which lies outside of contexts that exhibit the formal properties of culture.

One of the goals of my work has been to find ways to explore these domains beyond culture. In the areas where I work people have to deal with nonhuman beings all the time, and they can't manage these interactions through human culture alone. Culture as an analytical concept—I mean culture very broadly here—breaks down as a tool.

So my goal has been to try to understand how to speak to something beyond culture. You could think of that "beyond" as ontology. I'm not saying that culture isn't ontological, but rather that ontology itself is a kind of reality that's sometimes discontinuous with our experience of it, and in that sense it's a reality beyond us as humans. I'm not really committed to the term "ontology"; I'm just trying to get at a sense of reality that is beyond what's analytically familiar to us.

A S

Is this a position you share with Eduardo Viveiros de Castro?[10] I'm thinking that there's a certain figure/ground inversion in both of your projects, which, in a way, transforms what could be considered the backdrop or ground of human reality into a figure of its own, an agency, or an ecology.

E K

In my case there are certain kinds of formal properties that are not always context-specific, where the idea of figure and ground doesn't really apply. Not that there isn't historical context in the environmental sense, and not that there isn't historical context in the human sense, and not that those don't interact—but when we turn to explanations of context or of figure/ground, we often project assumptions of context from the human onto the nonhuman.

A S

Obviously, you're not making an argument for some kind of geographical determinism. But can you be more specific about why it's important in your work to shift the cut, or to move the assumed boundary, between the human and the nonhuman?

E K

Well, I think we first need to be precise about what exactly culture and the symbolic are. Once you can see language as taking part of a much broader semiotic field (for example, language as a special form of representation that's nested within a broader one) then you can see the relationship between this thing that is distinctively human and other things that are not.

A S

Then what happens to the transcendence often implied by human ideation?

E K

Basically, we're forced to make a choice. Transcendence, we are told, is bad. We want to get rid of a "God figure" that dictates everything, or a "Nature figure" that grounds everything. The only alternative, it seems, is immanence. But immanence exhibits many of the properties of culture—you have a relational system wherein everything is produced by that system of relations.

The point I want to make by using the concept of "emergence" is that transcendence and immanence aren't the only choices. With emergence you have a way of integrating nested phenomena: some are of a higher logical order than others in the sense that you need to have certain things in place before others can follow. To have symbols, for instance, you need to have indices. But you don't need symbols to have indices. That kind of logical distinction creates a very different kind of topology, and I use the term "hierarchy" in my book as a provocation regarding this topology.

A S

Is your work an intervention in or a critique of Latour's flat ontology, then? All agents have agency, but they aren't all equally positioned to have influence.

E K

Bruno Latour has been reading my book and we've been having great conversations about it. He's the one person whom I explicitly criticize in the book, but he's also thinking seriously with me. One of the places he's pushing me—and it's a serious political problem—is on the kind of ontological claims I'm making. Mine is a "this is how the world is" ontology, so to speak—*this* is how forests think—and Latour suggests that this kind of claim necessarily excludes other possibilities.

Elizabeth Povinelli, an anthropologist who is part of this conversation, has also criticized me for insisting on a formal definition of what "selves" are, implying that I basically shut out Aboriginal Australian, even Amazonian worlds where rocks, for example, may also be selves. I admit that this is really problematic, and I haven't resolved the problem. But instead of becoming defensive, I want to sit with it. Both Latour and Povinelli have pushed me on this. I don't want to back down or patch it over, but I do recognize that it's a problem.

Here's my take on ontology. Imagine that you're a surfer. You can have many different ideas of what a wave is like, but if you want to ride a wave, you have to harness it. That's really what interests me about ontology. I'm interested in what we can harness within the world; part of that is being right about what the world is.

A S

Which would also include a spirit world and what it is as well?

E K

Yes, spirits have a reality whose generality can be accessed in many different ways.

E T

Can you say a bit more about the "living thought," and about your use of C. S. Peirce to narrate this problem philosophically?

E K

Peirce came after; the ethnography came first. I think that's the wonderful thing about anthropology. It's a particular method for getting into an experiential world. That's what has informed everything I do. I don't think I'd read any Peirce before I went to the field. I went to the particular village where I eventually did the bulk of my fieldwork, first in 1992 and then again in 1994. I was listening to people telling stories about hunting—I spoke some Quichua already—and I realized that they were using an imitative language and creating simulations of forest experience. I said: "This is really weird; this form of speaking isn't really inside language or culture and this is what I want to focus on." I was very much into the problem of nature and culture, but I was really dissatisfied with the anthropological frameworks that I knew. At the time, there was fascinating work being done by both anthropologists and geographers, especially in the Amazon, on the anthropogenic forest, which inspired me. Basically, they would go to "virgin" forests and find that trees were growing in rows because there used to be a garden there. I was very much taken by these studies, and I was always documenting things that were planted, looking for deep histories. But the way these studies are taken up in anthropology was always the same: "See, there's no nature. It's all culture." I think this is the completely wrong way to do it! Actually, these forests are places where all sorts of nonhuman logics dominate in certain, less obvious ways. Not that there aren't people doing things there. But humans often operate on the forest's terms, or on terms that are not properly human.

A S

You mean that just because humans have made their mark, their logics don't necessarily dictate the dynamics?

E K

Right, and I realized that this onomatopoeic language was another kind of bizarre entry into that nonhuman logic. I saw that the people were simulating experiences, but that these practices couldn't be entirely cultural because imitation doesn't quite work that way. So I had some sense of the nonhuman at play here, but I didn't have a conceptual framework to support any of this, except for some articles on poetics. [Roman] Jakobson had some essays I'd been reading. Also, there was a really interesting dissertation—it's since become a book—by Janis Nuckolls on imitative language in lowland Quichua.[11] It was only later when I was doing a postdoc at Berkeley that I started to read Peirce and realized how helpful he would be for me.

A S

As we were reading *How Forests Think*, we talked about how carefully you must have decided which events to write about in order to show the processes through which thought can be understood as nonhuman, as opposed to other events you must have decided to exclude. In fact, absence—by way of the *not-yet* and the *not-anymore*, but also the *unnoticeable*—is an important concept for you. The walking-stick insect you describe, for example, embodies an existence at the threshold of presence and absence. Could you talk about what makes absence so important regarding the evolution of selves and their various relationships to difference and differing, and, perhaps, deferring?

E K

It's interesting to see how indebted post-structuralism is to structuralism. In post-structuralism, "difference" seems to be such an important concept. But for someone like Peirce, difference is a secondary piece of the puzzle, not the starting point. He has a non-dualistic framework in which dualism fits, although it's not primary. A lot of the humanistic approaches that I'm struggling against assume a kind of dualistic metaphysics—resistance as agency for Latour, the equation of semiosis with difference in Saussurian semiotics—all of this is part of a dualistic tradition, even for these people who are trying to escape dualism.

A S

And what about absence?

E K

I resist saying that my idea of absence comes from any particular theory because I'm hoping to think with the world. Having said that, it is strongly influenced by Terrence Deacon; absence is at the heart of his theory in *Incomplete Nature*.[12] Basically, for him, what life riffs on time and again is incompleteness. Life is always unfolding in reference to something that it is not; it has an *absential* feature, whether you think of it in terms of *telos,* or future, or a sign re-presenting an object, or the self related to the other it is not. This absential logic requires its own analytics.

But, as I said above about Pierce, ethnography came first. The point of my book is that there's something special about this field site in the Amazon. You have a place that is teeming with life—tons of it. In order to get something out of that complex environment, you have to get into the logic that structures that tangle. In temperate agriculture, by contrast, you can radically simplify an ecosystem and effectively extract things from it. Here, however, the thoughts or the properties of the forest are a demanding, thinking logic, and if you want to do something with the forest you have to get into that logic. This stuff—the absential features, the semiosis, the living thoughts—bubbles up and comes out. So the idea is that this stuff is actually thinking itself *through* those who are, for whatever reason, forced to engage the forest on its own terms.

A S

The dominant tendency, even today, is still to anthropomorphize nonhuman practices. How does your writing work with images to prevent the reader from projecting human agency onto the nonhuman agents you describe?

E K

There's a kind of thinking in pictures going on in my book. I think in images. Philosophers often do this as well. For example, there's Wittgenstein's lion, or Derrida's cat. These images act as productive kernels that are brought into play, over and over again. That's what I was doing. My first example is the jaguar looking back: *don't put yourself in the position where you can't look back, or else the jaguar won't see you as another self*.

I was giving a talk at a university and someone challenged me, saying, "Well, isn't this all just a cultural system?" My response was, "Oh, you think that how people see the jaguar seeing the world is a cultural product? Well, go out in the forest. When you're

out in the forest, you have to get how the jaguar sees the world right, or else…" This example gets at something. In the field, I was often taken by the way that certain images stuck with me; I don't always know why some made it into the book and others didn't. Images become important thought-registers for my work. But other images are still with me, and their potential isn't yet exhausted.

E T

This reminds me of Deleuze's pursuit, particularly in *Difference and Repetition*, of a thought-without-image, which is the result of his extensive critique of the so-called image of thought in Western philosophy.[13] But he does not end there. Later, with Guattari, in *A Thousand Plateaus*, images proliferate, and become serial, generative, immersive, almost kaleidoscopic.[14] I'm curious about how the image relates to your call for the decolonization of thought. How do you go about decolonizing thought when you're operating within such a colonial discipline? What images are available to pursue this work?

E K

In part, Viveiros de Castro, when calling for the decolonization of thought, is saying that there are other kinds of worlds. And these other alter-worlds generate concepts. We have to be constantly attuned to how our established Western concepts interact with the concepts that come from those worlds. So, for him, a "cannibal metaphysics" is both the metaphysics of so-called "cannibals," which credits these "cannibals" with having a sophisticated metaphysics, but it's also a way of breaking up and cannibalizing our Western metaphysical thinking…[15]

E T

In the way that you would cannibalize a car, for example, for spare parts…

E K

Exactly. I think that's a really productive thing. But thinking with alterity is complicated in our field. Basically, anthropology as you note, has in many ways been complicit in colonial projects. Nostalgically mourning a past that we—the West—have destroyed is also part of a modernization project. I take that kind of critique launched against those anthropologists still interested in alterity seriously, and it's important. But it doesn't mean that anthropology, as a project, is totally bankrupt. Anthropology still provides a special method—ethnography—for being "made over" by different worlds. In any case, one of the ways this critique was taken up was to say, "Okay, well, anthropology's focus on otherness is problematic because we can never get at the Other. The moment we engage this otherness, we change it, and so this otherness is either a construction or we have no right to engage with it." Meanwhile, there's been a move to push anthropology away from otherness and toward "ourselves," whatever that means. But the effect of this latter move is to actually push colonization to its logical limits. Killing off whatever alterity may remain is a Final Solution of sorts.

E T

So, following again from Viveiros de Castro, what do you see as the possibility for decolonizing thought?

E K

My take on the decolonization of thought is that there's something inherently human in a form of thinking that makes everything human-like, or language-like. Everyone does it—the Runa do it, just as I do.[16] In some ways, what I'm arguing for are ways of thinking that mitigate this humanizing tendency. You know, I try to be precise about my terminology but in this case I'm using a strategic openness, and in my book I wanted to retain both of these meanings of decolonization—decolonizing thought as with Viveiros de Castro *and* decolonizing thought as moving beyond the human.

E T

Doesn't this rather inevitably lead us back to Claude Lévi-Strauss and his concept of a "savage thought"? Is there a danger in anthropology of, say, self-colonization?

E K

Lévi-Strauss lends himself to a wonderful variety of readings, so I highlight certain things in *La pensée sauvage* that interest me, such as thought-run-wild, or thought that exceeds the human in various ways because it isn't governed by means-ends relations.[17] It's related to this paradox that we are constantly, as you say, self-colonizing by the way that we think, and yet we also have this potential for thought that is unfettered or undomesticated. How is this kind of thought given dignity? In this respect at least, Viveiros de Castro is operating in a Lévi-Straussian vein by focusing on non-Western concepts. I would add that we are generating concepts in relation to the world while we're being made over by the world insofar as thoughts are part of the world.

E T

I'd like to ask, for a moment, about the work of Georges Bataille, because you are especially interested in the concept of generality.[18] In your book, you insist that generality is a decisive character, or quality, for thinking with the forest; in fact, you claim that generality is a constituent feature of reality. Can you elaborate on this remark?

E K

Of course we humans categorize things, but it's not just humans who do this. Semiotic life is doing this all the time; it's creating "kinds." It's producing "generals." But the further claim—the Peircean claim—is that generality is a basic property of the world itself. I use this concept because I can see it so clearly both ethnographically and in terms of natural history.

A S

That idea also connects to some questions I have about collecting and curation. How do these practices of collecting, clearly a significant part of your work, unfold from this concept of generality?

E K

I did tons of collecting for this book. I have over 1,500 specimens of plants, which are now in various museums. There's something really interesting about collecting because it gets at something that isn't just culture. I mean, it is of course, but it's also really its own kind of thing. In the field I generally avoided asking structured questions, like "tell me about spirits, or tell me myths." However, one structured thing I did do was to go into the forest and collect. What I like about collecting is that it jumps contexts in interesting ways. I'm aware that collecting produces a particular form of knowledge; you're trying to get a grid, to get some samples, and soon on. It was of course very comforting for me to find the established literatures and nomenclatures for the beings of the forest. I was very aware that I was engaging in my own attempt to stabilize or domesticate knowledge, and yet it still allowed

me to link all sorts of things in ways that don't necessarily have to pass through one human context.

A S

A major question for me, given my research, is how to decolonize the forest from the perspectives and the practices of those living in the city.

E K

My book is, in the Latourian sense, a product of purification, insofar as I went to a particular place where certain qualities get amplified.[19] There are many Runa, living elsewhere, who are no longer subsistence hunters; I just went with the ones who are so that I could see the forest in a particular way. And, just to reveal my own naturalistic tendencies, I do think the world would be better off with more rainforests. But, in the epilogue of the book I ask how we can continue to think like a forest even when we're not in the forest. This is a question that I think is addressed very eloquently at UC Santa Cruz—by Anna Tsing and Donna Haraway especially—and the solution is to sit with a messy world of "blasted landscapes," in Tsing's words, or in the "mud," in Haraway's words.[20] It's about being honest about these sordid histories and entanglements between humans and nonhumans. I totally agree with this position, but I think that what happens when you do this, analytically, is that entanglement and history achieve a kind of superiority which colonizes our thinking and keeps us from seeing things that could stand out if they were freed from the standard logical constraints of historical or cultural analysis. This is what I'm trying to capacitate, and it's sometimes easier to see in places where you're forced to see it.

The thing about this project is that I'm developing these concepts through ethnography, and giving some sense to the kinds of political possibilities at stake. I'm very much interested in how to mobilize some of this stuff for the times we are calling the Anthropocene. I want to try to figure this out ethnographically. Once I start getting too much into the abstract world thinking loses traction for me. I'm trying to think about what an ecological ethics for the Anthropocene might look like, and I'm developing this with people in Ecuador who are thinking politically with forests.

E T

Yates McKee has suggested that survival is the art of inhabiting the future.[21] I believe you trace the contours of this future, or these futures, through a kind of morphodynamics. For example, you suggest that form follows practice, and that the efficacy of form is not a result of intentionality, but the co-production of practices.

E K

Practice is a word that is loaded with intentionality. Form for me gets at a logic that isn't necessarily alive, semiotic, or intentional. And life is constantly harnessing this logic, or this formal "self-organizing" quality where patterns just fall out—"self"-organizing is a bit of a misnomer because there is no *self* here. I was trying to isolate moments where this kind of thing happens, but it's complicated. You can't just say that structures come out of practices, or that practice is form. Crystals crystallize and snowflakes form patterns without any kind of intention or practice, and it's in this kind of falling-into-place, where form "falls out," that we find a seemingly effortless logic, which people and other beings of the forest are harnessing.

While I was writing this book I was practicing Aikido. I can't say I was great at it, but I got enough of it to feel how to do things with form: How do you enter into someone else's structure or allow them to destabilize themselves so that their structure becomes part of your structure? When you do this right, it's effortless and elegant. Humans are involved in this structure-play all the time. We're always harnessing form. That's what I'm trying to get at. Form doesn't necessarily come from us. It's something that we find our way into.

A S

But humans find their way into certain materialist assemblages that are extremely violent. We can, of course, celebrate a kind of materialist poetics, but if we take your example of rubber plantations, there's an extreme violence that accompanies these logics.

E K

The formal properties of rubber get amplified when you have to engage with it on its own terms. Now we've pulled out the rubber; it can now be mono-cultured in Southeast Asia, so you can have a completely different engagement with it.[22] You don't need to engage it through a natural, complicated ecology that amplifies a certain kind of form. By changing the context, humans can better exploit the properties they want. This was done by cutting out the complex interaction between the rubber trees and parasites. At one point the entire rubber economy had to have a forest-like logic to it. But once you can find a way to get the rubber out of that form and into another configuration you no longer need to think with the forest. Of course, I'm not saying that the previous, more complicated ecology entailed any less violence; in fact, the rubber boom was a period of extreme violence in the Amazon that directly affected many people from Ávila.[23]

A S

As a final question, how does your work move among the forest as a "site," its various human (and nonhuman) inhabitants, and those of us reading your work in other places?

E K

What's so special about ways of living with complex Amazonian forest ecologies is that it requires a kind of thinking with forests. This may be out of necessity and it may not be part of an ethical or political project, but thinking with the forest can be a source for an ecological ethics for these times we are calling the Anthropocene. My current work in the Amazon is a collaborative attempt to hold open spaces where this is happening.

1 Ursula K. Le Guin, *The Word for World is Forest* (New York: Tor, 1972).

2 Erik Meijaard, "Deforestation Makes Indonesia Hotter, Reduces Quality of Life," *Mongabay.com*, 26 March 2014, https://news.mongabay.com/2014/03/deforestation-makes-indonesia-hotter-reduces-quality-of-life.

3 See IPCC, *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, ed. R.K. Pachauri and L.A. Meyer (Geneva: IPCC, 2014), http://www.ipcc.ch/pdf/assessmentreport/ar5/syr/SYR_AR5_FINAL_full.pdf. See also, "Why 2°C?" Cop21 Climate Change Conference, http://www.cop21.gouv.fr/en/why-2c.

4 Brian Kahn, "Earth's CO2 passes the 400 PPM Threshold—Maybe Permanently," *Scientific American*, 27 September 2016, https://www.scientificamerican.com/article/earth-s-co2-passes-the-400-ppm-threshold-maybe-permanently.

5 Shaun Lovejoy, "Scaling Fluctuation Analysis and Statistical Hypothesis Testing of Anthropogenic Warming," *Climate Dynamics* 42, no. 9 (2014): 2339–51, http://link.springer.com/article/10.1007/s00382-014-2128-2; Philip Fearnside, "Greenhouse Gas Emissions from Hydroelectric Dams in Tropical Forests,"

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6 Aye Sapay Phyu, "Myanmar Third-Worst for Deforestation Rate, Says UN," *Myanmar Times*, 11 September 2015, http://www.mmtimes.com/index.php/national-news/16436-myanmar-third-worst-for-deforestation-rate-says-un.html.

7 Diana Beresford-Kroeger, *The Global Forest* (London: Penguin Books, 2010); see also, Eben Kirksey, *Freedom in Entangled Worlds: West Papua and the Architecture of Global Power* (Durham: Duke University Press, 2012).

8 Eduardo Kohn, *How Forests Think: Toward an Anthropology Beyond the Human* (Berkeley and Los Angeles: University of California Press, 2013).

9 "Franz Boas," *Wikipedia*, https://en.wikipedia.org/wiki/Franz_Boas.

10 Eduardo Viveiros de Castro, *The Inconstancy of the Indian Soul: The Encounter of Catholics and Cannibals in 16th-Century Brazil,* trans. Gregory Duff Morton (Chicago: Prickly Paradigm Press, 2011).

11 Janis B. Nuckolls, *Sounds Like Life: Sound-Symbolic Grammar, Performance, and Cognition in Pastaza Quechua* (Oxford: Oxford University Press, 1996).

12 Terrence W. Deacon, *Incomplete Nature: How Mind Emerged from Matter* (New York and London: W.W. Norton & Company, 2012).

13 Gilles Deleuze, *Difference and Repetition*, trans. Paul Patton (New York: Columbia University Press, 1995).

14 Gilles Deleuze and Félix Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia*, trans. Brian Massumi (Minneapolis: University of Minnesota Press, 1987).

15 Eduardo Viveiros de Castro, *Cannibal Metaphysics,* ed. and trans. Peter Skafish (Minneapolis and London: Univocal, 2014).

16 The Runa are a Quichua-speaking people in Ecuador's Upper Amazon. See Kohn, *How Forests Think.*

17 Claude Lévi-Strauss, *The Savage Mind* (Chicago: University of Chicago Press, 1968).

18 Georges Bataille, *The Accursed Share: Volume One*, trans. Robert Hurley (New York: Zone Books, 1991).

19 On purification, see Bruno Latour, *We Have Never Been Modern* (Cambridge: Harvard University Press, 1993).

20 Anna Lowenhaupt Tsing, *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins* (Princeton: Princeton University Press, 2015); Donna J. Haraway, *Manifestly Haraway* (Minneapolis: University of Minnesota Press, 2016).

21 Yates McKee, "On Survival: Climate Change and Uncanny Landscape in the Photography of Subhankar Banerjee," in *Impasses of the Post-Global: Theory in the Era of Climate Change, Volume 2*, ed. Henry Sussman (Ann Arbor: Open Humanities Press, 2012), 78–107.

22 See, for example, Greg Grandin, *Fordlandia: The Rise and Fall of Henry Ford's Forgotten Jungle City* (New York: Metropolitan Books, 2009); and Richard P. Tucker, *Insatiable Appetite*: *The United States and the Ecological Degradation of the Tropical World* (Berkeley and Los Angeles: University of California Press, 2000).

23 For a striking cinematic account of the history of the rubber trade as a key aspect of colonization, see *The Embrace of the Serpent*, directed by Ciro Guerra (2015).

Wildwuchs, or the Worth of the Urban Wild

Report by Silvan Linden

An extensive felling of trees occurred in Berlin at the end of January 2016 along the banks of the Landwehrkanal between Potsdamer Brücke and Flottwellstrasse, a stretch of roughly 700 meters. The intervention was commissioned by the *Grünflächenamt* [Parks Department] of Berlin-Mitte, altogether targeting fourteen large trees along a longer section between Flottwellstrasse and Marshall-Brücke (2,500 meters), and five more in the section up to Potsdamer Brücke. Three of these trees were registered "street trees," and four were documented in the cadastre of the city's Water and Navigation Department (WSA); two of them were poplars with a stem diameter of over one meter, and eight more were over fifty centimeters wide; and, three of them were in fact growing in a different district, since the area in question is located right on the border between Mitte and Kreuzberg. The logging took place without notifying the general public or involving any other party—a clear violation of the *Mediationsvereinbarung Landwehrkanal* [Landwehrkanal Agreement] signed in 2013 after a lengthy process of mediation and detailed regulation of the treatment of the trees in this area. The Parks Department insisted that the trees were threatening the safety of pedestrians and traffic, stating that they were *Wildwuchs* ["wild" trees of uncontrolled growth] and not "proper" street trees. The department also announced that they had no knowledge of the Agreement, which at the time had, in fact, already been signed by the district's mayor three years ago. In October 2016, the district municipality sent a letter to the WSA in order to retrospectively justify the procedure. Curiously, this

← A section from the cadastral survey map of trees with the marked felled trees. Red: felling; green: registered street trees.

Numbered stumps of the felled trees viewed westward from the border of Mitte district.

was done by linking it to the draft of a concept, which at that time did not yet exist—although it had been meanwhile commissioned by the Federal Office of Hydrology. Rather questionably, this letter states that the Parks Department acted correctly, albeit "by intuition."

The Landwehrkanal Agreement was first negotiated in 2007 when the WSA planned to cut down more than two hundred trees along the Landwehrkanal in Kreuzberg, as part of the restoration of the canal banks, which are property of the Federal Government. Fierce civil protests ensued, followed by many years of disputes, concluding with mediation and the Landwehrkanal Agreement which in December 2013 was signed by the WSA, the citizens' initiative *Bäume am Landwehrkanal* [Trees on the Landwehrkanal], the NABU [Nature and Biodiversity Conservation Union], the BUND [the Organization for Environment and Nature Conservation Germany, also known as Friends of the Earth Germany], and other waterway navigation associations. The Landwehrkanal Agreement precisely regulates and minimizes any interference with existing trees, biotopes, and the water supply. Since the document was signed, the WSA made a real effort to respect the agreement, both by communicating intensely with the public, and through the practical restoration work of the canal banks.

Today, Mitte's Parks Department is left with a mere fifth of the staff and a third of the budget originally available before the reunification of Berlin, and both assets are steadily decreasing. Many specific projects are handed out to private companies, making impossible any conscientious planning and steady maintenance. Moreover, the department is prioritizing an ideological line of heritage preservation that privileges reconstruction over ecological considerations. Spontaneous vegetation and unplanned green areas, whose vast appreciation was one of the achievements of urban ecology in the 1970s and 1980s, are today considered worthless *Wildwuchs*. Under this logic, the aforementioned poplar, several decades old and with a diameter of 150 centimeters, is defined as a mere "seedling."

The Berlin government is currently under a great deal of pressure since declaring its commitment to provide necessary housing to accommodate rapid population growth in the city. During the past ten years, the development of *Ausgleichsflächen* [ecological compensation areas] appointed by the Berlin Landscape Program to compensate for developed areas—became the rule rather than the exception. For example, to offset the building of a large cooperative housing project, "Möckernkiez," on an eight-acre *Ausgleichsfläche* near Potsdamer Platz, only 300,000 Euros was given, equivalent to merely 650 Euros per apartment. These funds are earmarked for specific purposes, but are also used by the Parks Department to restore monuments of nineteenth-century pomp. In order to underline its commitment for street trees, the Berlin administration launched the campaign *Stadtbäume für Berlin* [City Trees for Berlin]. This initiative entails the planting of 10,000 new trees (the total number in Berlin is 440,000) using private donations. However, over the past nine years, they were able to raise only 700,000 Euros—translating to a mere 600 new trees.

Since this case of the nineteen trees, the District of Mitte has showed no intention to respect the Mediation Agreement in the future. For this reason, in November 2016, the association Trees on the Landwehrkanal hired a lawyer to represent them. As a first step, he formally asked for a statement from the head of Mitte's Parks Department, Harald Büttner. In January 2017, Büttner stated in his reply that he did not consider the Agreement a legally binding contract. Unless the current, newly elected Green Party district mayor takes a more constructive stance on the matter, the initiative will call on a judge to decide on the legal status of the Agreement.

All images courtesy of the author.

Continuation of the view in previous photo. Foreground: The poplar with a trunk diameter of 150 centimeters, as well as the alleged damage caused to the sidewalk by its roots. Background: The Marshall-Brücke; further up on the canal five more felled trees, including a registered poplar with a trunk diameter of 120 centimeters.

Sandra Bartoli: The Old Trees of Berlin's Forests (2014–15)

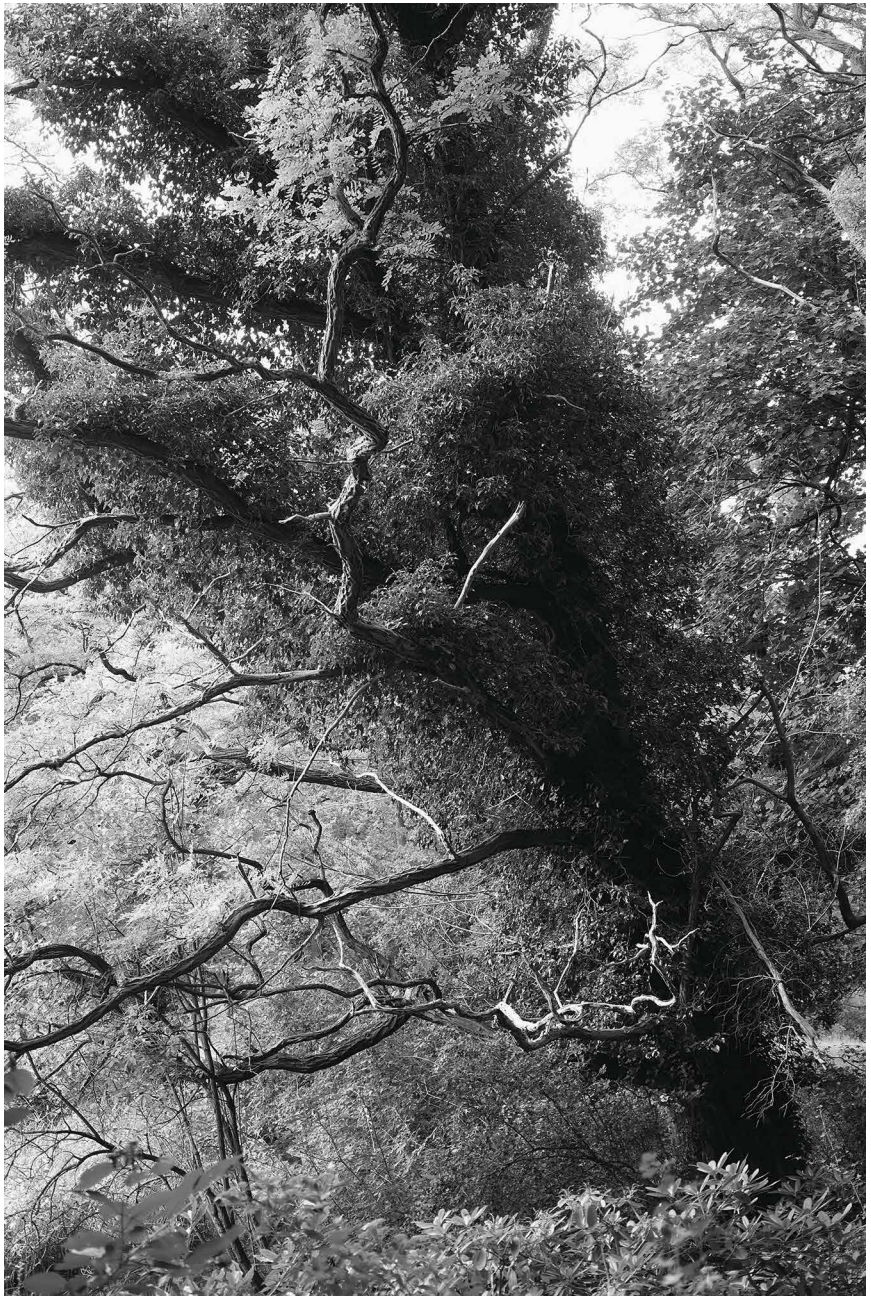
After the Second World War, the Tiergarten forest in the center of Berlin was almost completely felled to provide firewood during the winters of 1946 and 1947. After these events, only 700 of the formerly 200,000 old trees remained standing. Beginning in 1949, the Tiergarten was replanted. Today, one can still count approximately 320 trees pre-dating the War, some of these well over 500 years old. Especially in the last twenty years, those old trees have often become the victims of overly zealous protocols of security and cleansing from a forestry management agency with little sensitivity to these grand, long-living creatures. The trees that have survived stand out by way of their dramatic scale; being taller and larger than anything else around them, they constitute cooling, dense cores of biomass in the midst of a much younger forest. Intertwined in an intelligently networked habitat organized to inhabit radical expanses of time, these trees form an autonomous, parallel city bound to always outlast the more familiar, human construct.

This series of photographs focuses on the old trees growing in the Tiergarten, and the Pfaueninsel, an island in Berlin-Wannsee in the city's southwest, where many oaks, elms, and alders are over 400 years old, stemming from a time when the island was a wild forest. These eminent trees are proudly celebrated and taken care of, dominating the landscape of the entire island with their beautifully ruinous composure and physiology.

Compared to the neuron-driven animals and humans, trees live in a completely different temporality. They move very slowly and are virtually immortal, like the root system of the Pando tree in Utah, estimated to be 80,000 years old.

All images courtesy of the artist. With many thanks to Angela von Lührte, Stephan Rodtheut, Maria-Sofie Rohner, and Jan Uhlig.

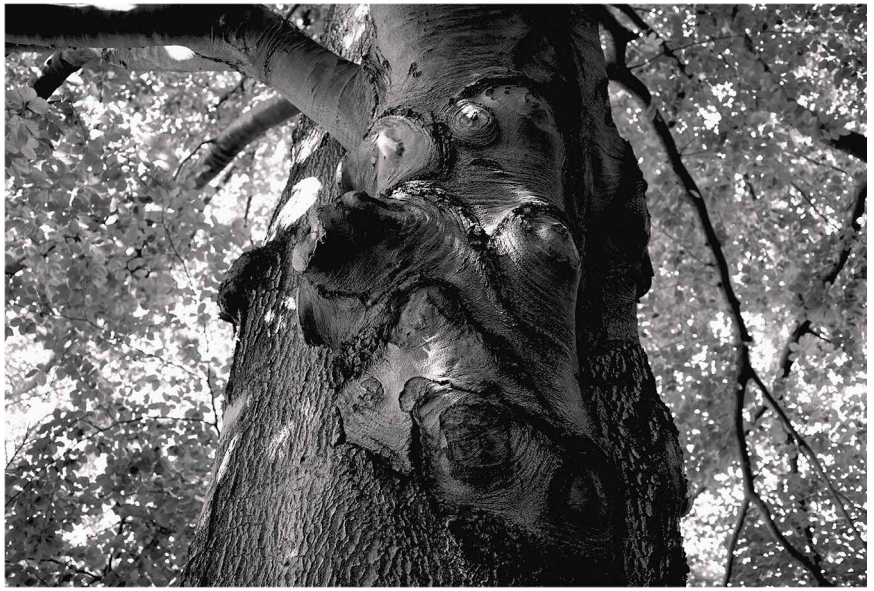
Tiergarten: *Fagus sylvatica*
← Pfaueninsel: *Quercus robur*



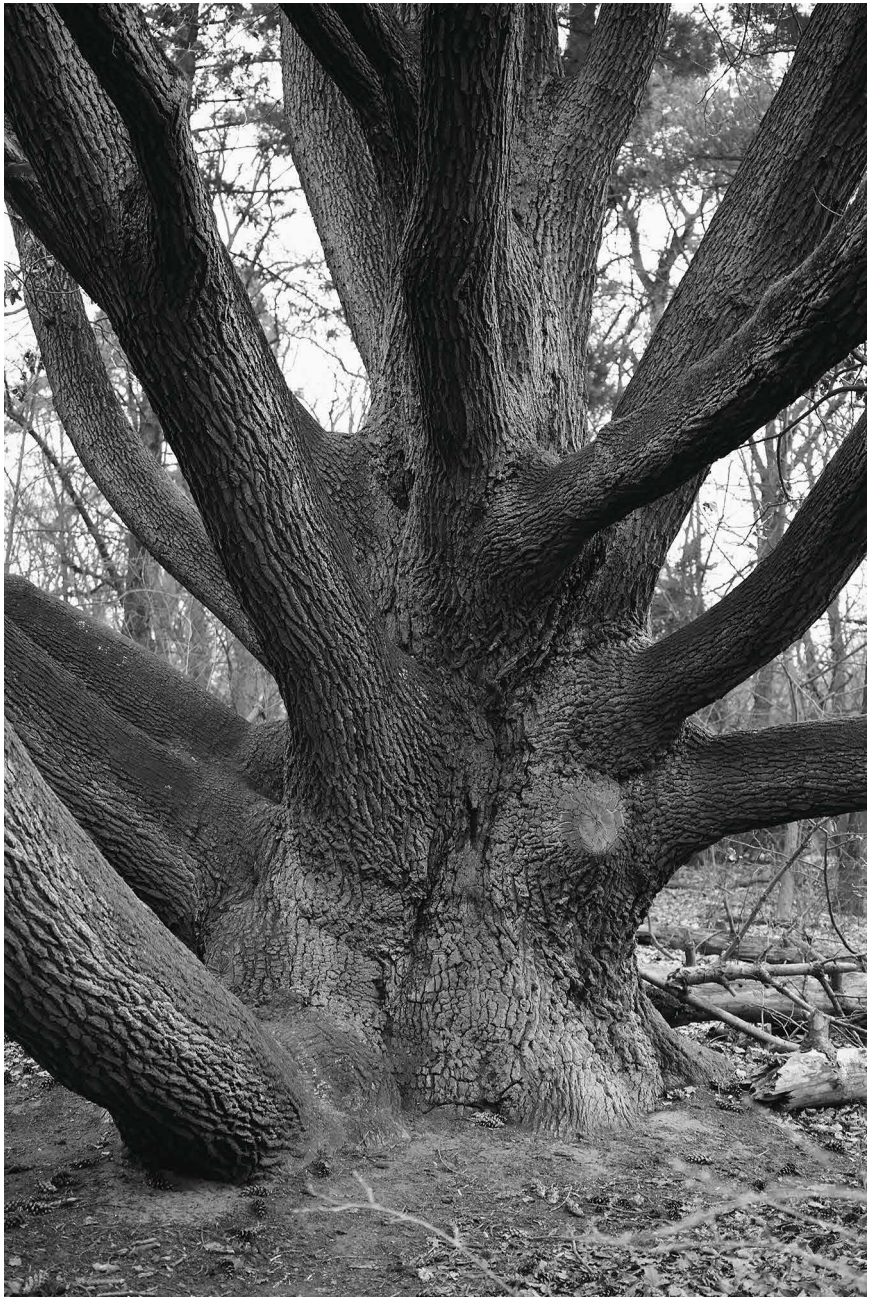
Pfaueninsel: *Robinia pseudoacacia*

Tiergarten: *Populus alba*

Tiergarten: *Platanus x hispanica*



Tiergarten: *Fagus sylvatica*



← ↑ Pfaueninsel: *Quercus robur*

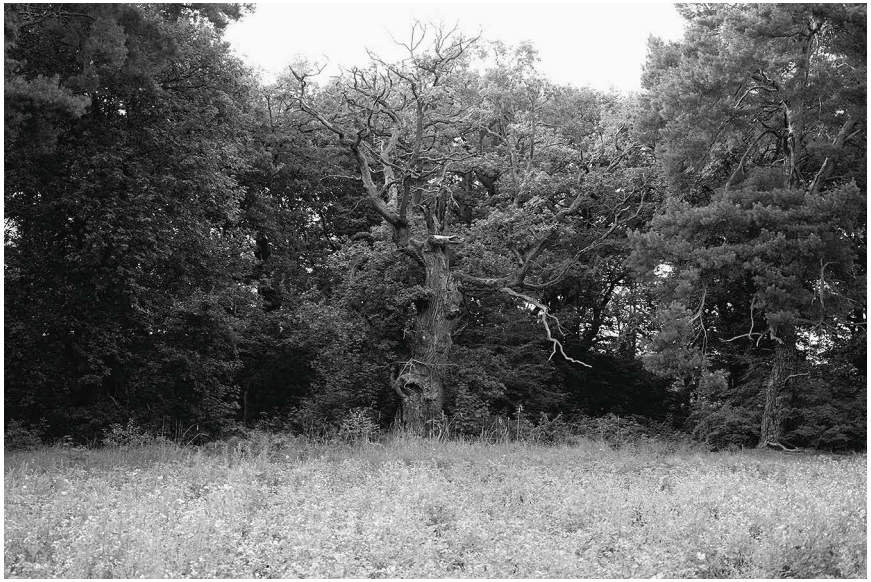
Pfaueninsel: *Fagus sylvatica, Pinus sylvestris, Quercus robur*

Pfaueninsel: *Pinus sylvestris*

Tiergarten: *Quercus petraea*

Species of the Old Trees in Tiergarten

Acer platanoides (Norway maple)
Acer pseudoplatanus (Sycamore maple)
Aesculus hippocastanum (Horse-chestnut)
Carpinus betulus (European hornbeam)
Fagus sylvatica (European beech)
Fraxinus excelsior (European ash)
Platanus x hispanica (London plane)
Populus alba (Silverleaf poplar)
Quercus petraea (Cornish oak)
Quercus robur (English oak)
Quercus rubra (Northern red oak)
Tilia spec. (Linden specimen)
Tilia platyphyllos (Large-leaved linden)
Ulmus spec. (Linden specimen)
Ulmus laevis (European white elm)



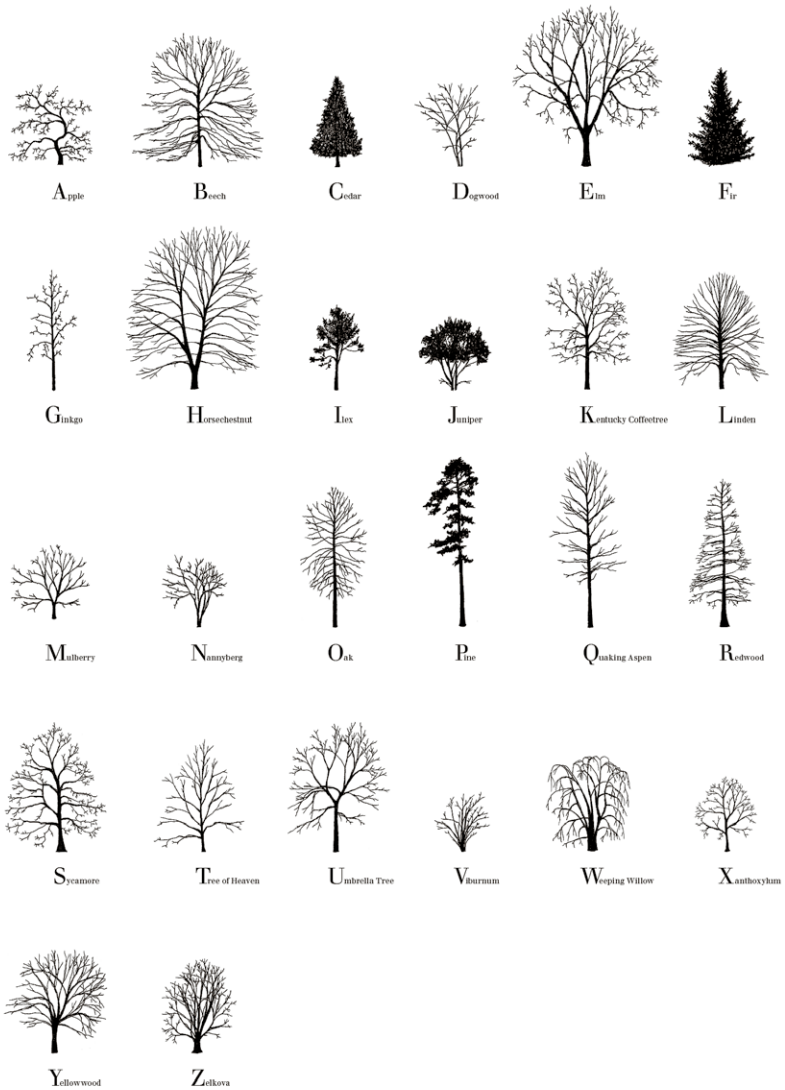
Pfaueninsel: *Quercus robur*

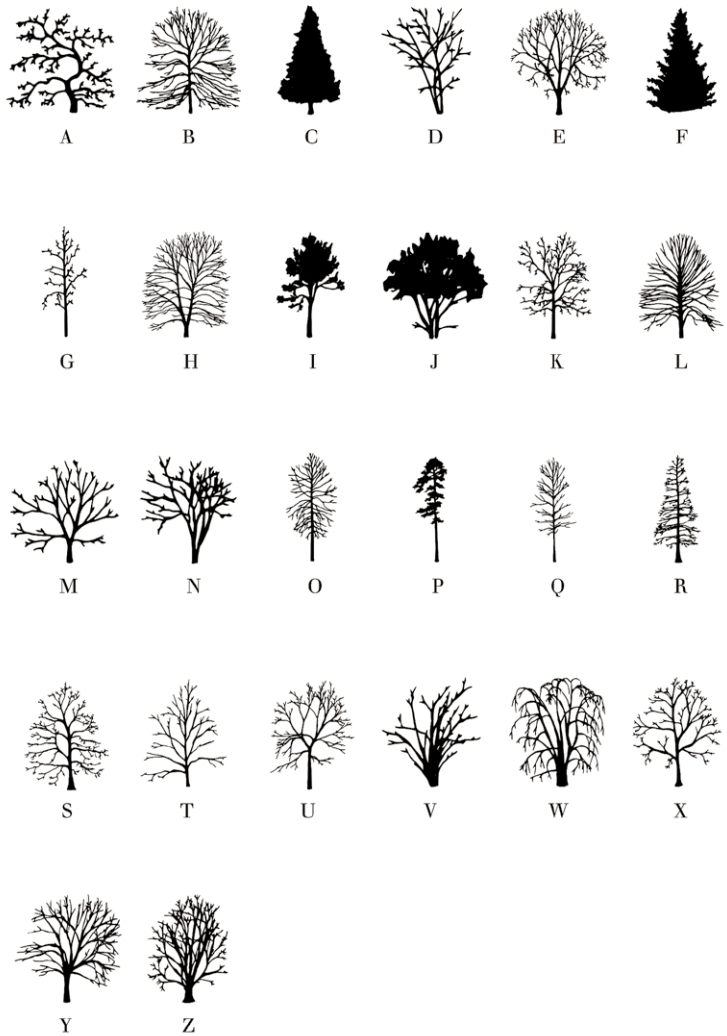
Species of the Old Trees on Pfaueninsel

Acer platanoides (Norway maple)
Acer pseudoplatanus (Sycamore maple)
Alnus glutinosa (European alder)
Carpinus betulus (European hornbeam)
Fagus sylvatica (European beech)
Pinus sylvestris (Scots pine)
Quercus petraea (Cornish oak)
Quercus robur (English oak)
Robinia pseudoacacia (Black locust)
Tilia cordata (Small-leaved linden)
Tilia platyphyllos (Large-leaved linden)
Ulmus glabra (Scots elm)
Ulmus laevis (European white elm)
Ulmus minor (Field elm)

Tiergarten: *Fagus sylvatica*

Katie Holten: Tree Alphabet (2015)





Contributors

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KEVIN BEILER currently works as a researcher in the Centre for Econics and Ecosystem Management at Eberswalde University for Sustainable Development, Germany. His research has focused on forest ecosystems with an emphasis in forest fungal ecology, spatial analysis, and complexity and network science. He was born among treeless tundra in Bethel, Alaska, but grew up in isolated mountain regions of the southeast and mid-Atlantic United States, which instilled in him a deep appreciation for the sights, smells, and sounds of forests. His educational background includes a B.Sc. in Biology/Ecology from Northern Arizona University, U.S.A, and a Ph.D. in Forest Sciences from the University of British Columbia, Canada. A highlight from his Ph.D. work was the use of molecular tools to create the first map of the so-called "Wood Wide Web," or interaction networks of trees linked below ground through shared mycorrhizal fungal partners, at the forest stand scale. He lives with his family in Berlin.

SHANNON CASTLEMAN is currently a Visiting Assistant Professor at Virginia Commonwealth University in Richmond, Virginia. She is a member of the Migrant Ecologies Project, an umbrella for arts and ecology initiatives in Southeast Asia. From 2006 to 2013 she served as an Assistant Professor of Photography and Digital Imaging at the School of Art, Design and Media at Nanyang Technological University (NTU) in Singapore. In 2013, she was also Visiting Faculty of Interdisciplinary Studies at San Francisco Art Institute. Before joining NTU she taught photography at Dar Al Hekma College in Jeddah, Saudi Arabia. She received the Murphy & Cadogan Fine Arts Fellowship in 2003 and was the recipient of the Gary B. Fritz Imagemaker Award for Excellence from the Society of Photographic Education in 2012. Her work has been included in a number of exhibitions in the United States, Europe, and throughout Asia, such as the Singapore Art Museum; the Asian Civilization Museum, Singapore; the Royal Botanical Gardens, Edinburgh, Scotland; the Yokohama Museum of Art and the Contemporary Art Museum of Kumamoto, both in Japan.

DAN HANDEL is the curator of design and architecture at the Israel Museum, Jerusalem. He is an architect and a Ph.D. candidate at the Technion-Israel Institute of Technology, where his research focuses on the links between economic models and industrial architecture. He was the inaugural Young Curator at the Canadian Centre for Architecture

in Montreal, for which he developed the exhibition *First, the Forests* (2012). Additionally, he curated *Aircraft Carrier*, the exhibition at the Israeli Pavilion in the 13th Venice Architecture Biennale, also shown at the Storefront for Art and Architecture in New York and the Israel Museum (2012–14), and the exhibition *Wood: The Cyclical Nature of Materials, Sites and Ideas* at the Nieuwe Instituut, Rotterdam (2014). Before joining the Israel Museum, he worked on the exhibition *Yasky and Co.: Israeli Architecture according to Avraham Yasky* at the Tel Aviv Museum (2016). He has participated in symposia and lectured in various venues, including the Princeton School of Architecture; the International New Town Institute, Almere; the Society of Architectural Historians conference, Buffalo; the ETH Zurich; and the CCA, Montreal. He holds degrees from the Harvard Graduate School of Design and the Bezalel Academy of Art and Design. His writing has appeared in *Frame*, *Thresholds*, *San Rocco*, *Pin-Up*, *Bracket*, the *Journal of Landscape Architecture (JOLA)*, *Volume*, and *Cabinet*, among others. He is the editor of *Aircraft Carrier: American Ideas and Israeli Architectures after 1973* (Hatje Cantz, 2012) and the online publication *Manifest*: *A Journal of American Architecture and Urbanism.*

KATIE HOLTEN is a visual artist based in New York. She grew up in Ireland and studied at the National College of Art & Design in Dublin, the Hochschule der Künste in Berlin, Cornell University in New York, and the Santa Fe Institute. In 2003, Holten represented Ireland at the 50th Venice Biennale. She has had solo museum exhibitions at the New Orleans Museum of Art (2012); Dublin City Gallery The Hugh Lane, (2010); The Bronx Museum, New York (2009); Villa Merkel, Esslingen (2008); Nevada Museum of Art, Reno (2008) and the Contemporary Art Museum St. Louis (2007). Deeply committed to social causes—especially as they pertain to environmental issues—she makes drawings, sculptures, installations, books, public artworks, and ephemeral actions that function as poetic alterations to the everyday. Holten often works on site to explore the history, ecology, and other invisible aspects of an environment. At the root of her practice is a fascination with the contingency of life's systems—organic and human-made—and the inextricable relationships between the human and the natural world in the age of the Anthropocene. Recognizing a crisis of representation as our species adapts to life in the Anthropocene, her book *About Trees* (Broken Dimanche Press, 2015) considers our relationship with language, landscape, and perception. She created a *Tree Alphabet* and used it to translate a compendium of well-known, loved, lost, and new writing. The result is an astonishing fusion of storytelling and art, which celebrates trees and our understanding of them, their past and their future, their potential and their ubiquity.

ELISE HUNCHUCK is a philosopher and landscape architect whose work engages practices of knowledge production and infrastructures of risk. Her current research explores complex and unpredictable events; her research methods relying heavily on field work, site-based methods, archival and historical investigations. She is the Research Coordinator at anexact office, as well as the Curatorial Assistant for the forthcoming exhibition cycle *Disappearing Legacies: The World as Forest* (Germany, 2017–18). She is a University Olmsted Scholar and an Assistant Research Fellow with the Landscape Architecture Foundation, where she has worked to develop methods to quantify environmental, economic, and social benefits in an effort to understand how well-intentioned proposals are affecting urban environments—for better or worse. She was awarded the Peter Prangnell Travel Grant at the Daniels Faculty of Architecture, Landscape, and Design, which allowed her to develop cartographic, photographic, and text-based practices to explore and communicate the agency of tsunamis and earthquakes in Japan through the continual configuring and refiguring of infrastructures of risk, including memorials, monuments, and coastal defense structures. She has taught representational history and methods at the Daniels Faculty of Architecture, Landscape, and Design, University of Toronto.

EDUARDO KOHN is interested in the exploration and capacitation of sylvan thinking in all its valences. He is the author of *How Forests Think: Toward an Anthropology Beyond the Human* (University of California Press, 2013), which won the 2014 Gregory Bateson Book Prize. He teaches anthropology at McGill University, Montreal.

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PEDRO NEVES MARQUES is a writer and visual artist. He is the editor of the anthology *The Forest and the School/ Where to Sit at the Dinner Table?* (Archive Books, 2014), an anthropological reading of Brazilian Antropofagia, and the author of the fiction books *The Integration Process* (2012) and *Dying in America* (forthcoming). In 2015, he was a guest editor for *e-flux Journal*'s

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ABEL RODRÍGUEZ, also known as Mogaje Guihu, was born in the Cahuinarí River in the region of Araracuara, which is located in the Caquetá River basin in the Colombian Amazon. He is an elder from the Nonuya people, an ethnic group that is part of the ethnic family of the People of the Center. He became known because he is an expert in the weaving of traditional artifacts, such as basketry and fish traps, but mainly because of his botanical knowledge. For almost twenty years, Abel has been part of Tropenbos International Colombia's local research program. He has been working in the illustration and compilation of his botanical knowledge of the tropical forest, the names of trees and plants, and their traditional classification. Among his works on paper, you may find illustrations of hundreds of trees, lianas, palms, cultivated plants, forest landscapes, studies of seasonality, studies of food and nutrition, and studies of the ecological relationships among fauna and flora. One of his most outstanding drawings is the *Tree of Life and Abundance*. In 2014 he was awarded the Prins Claus Award in recognition of his contribution to the strengthening of Indigenous communities and traditional knowledge of the tropical rainforest. He has exhibited his works in *Historia Natural y Política*, Museo Banco de la República, Bogotá (2008); Smithsonian Folklife Festival, Washington (2011); *Sakahàn, International Indigenous Art*, Montreal (2013); Mira Artes Visuais Contemporâneas dos Povos Indígenas, Brasília (2013–14); *Waterweavers*, Bard Graduate Center and other international venues (2013–15); Salón Nacional de Artistas, Medellín (2014); *Selva Cosmopolítica*, Bogotá (2014); *El nombrador de plantas*, Amsterdam Prins Claus Fund Gallery (2014); *Right of Nature*, Nottingham Gallery, Nottingham (2015); *Ruido Sur*, Neiva/Pasto/Popayán (2015); *Imitya*, FLORA ars+natura, Bogotá, (2016); and Santa Fe Biennale, Santa Fe (2016). His illustrations can also be found in many pedagogical materials for Indigenous communities in the Colombian Amazon.

CARLOS A. RODRÍGUEZ holds a Ph.D. in Natural Sciences from Amsterdam University and is a specialist in Regional and Urban Development Planning. Since 1998, Rodríguez has been the Program Director of Tropenbos International Colombia, an organization working on participative methodologies for the generation of knowledge about the tropical forest in the Colombian Amazon to strengthen traditional governance and decision-making in this ecosystem. He has published numerous books and articles about the management of natural resources and the relevance of the symbolic approaches of Indigenous and local knowledge for the sustainable use of different ecosystems. He has been delegate in many international initiatives such as IPBES, the National Science Organization (NWO), and GSI, as well as guest lecturer on the Colombian Amazon at many national and international universities. Rodríguez is a member of the editorial committees of the magazine *Colombia Amazónica* and the *Journal of Nature Conservation*, and a professor at the Universidad Nacional de Colombia (Sede Amazonia). Together with researcher Maria Clara van de Hammen, he has worked closely with Abel Rodríguez in the compilation of his botanical knowledge for more than a decade, publishing numerous texts about his work.

SUZANNE SIMARD is a Professor at the University of British Columbia, Canada, whose research and teaching focus on forest ecology and complexity science. Her research is motivated by our fundamental right to a clean and healthy environment. She contributes to this goal by researching the synergies and complexities of our natural world and the development of sustainable land stewardship practices. Her research centers on understanding the vital relationships between plants, microbes, soils, carbon, nutrients, and water that underlie the adaptability and resilience of ecosystems. She is known for her work on belowground fungal networks that connect trees and facilitate communication in the forest, and how these are fundamental to the complex adaptive nature of ecosystems. Dr. Simard is dedicated to empowering people with science-based knowledge to manage and heal the land from human impacts, including deforestation and climate change.

ANNA-SOPHIE SPRINGER is an independent curator, writer, and the Co-Director of K. Verlag in Berlin. Her research-based practice merges curatorial, editorial, and artistic commitments by stimulating fluid relations among images, artifacts, and texts in order to produce new geographical, physical, and cognitive proximities, often in relation to historical archives and the book-as-exhibition. Her previous curatorial projects include the series *EX LIBRIS* (2013) on how to make exhibitions out of books and libraries at Hochschule für Grafik und Buchkunst Leipzig (HGB); Galerie Wien Lukatsch, Berlin, and Arg.org. With Etienne Turpin, Springer is a Co-Principal Investigator of *Reassembling the Natural,* an exhibition-led inquiry into the meaning of natural history collections in the Anthropocene. In 2015, they co-curated *125,660 Specimens of Natural History* at Komunitas Salihara in Jakarta, Indonesia, in partnership with the Indonesian Institute of Science; the new exhibition cycle for 2017–18, *Disappearing Legacies: The World as Forest*, is funded by the German Federal Cultural Foundation and the Schering Stiftung. In addition to co-editing the *intercalations: paginated exhibition* series, she is also the co-editor of *Fantasies of the Library* (MIT Press, 2016), as well as the editor of numerous K. publications (many in collaboration with Charles Stankievech), and the translator of books by Mark von Schlegell and Nina Power (Merve, 2009/11). She received her M.A. in Contemporary Art Theory from Goldsmiths College, University of London, and her M.A. in Curatorial Studies from HGB, Leipzig. In 2014, she was the Craig-Kade Visiting Scholar-in-Residence at Rutgers University. She is currently a Visiting Lecturer at Institut Kunst, Basel, and a Ph.D. student at the Centre for Research Architecture, Goldsmiths, where her research examines the financialization of nature and the role of natural history collections in a time of ecological collapse and mass extinction.

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CATALINA VARGAS TOVAR is a philosopher and editor working in the fields of independent publishing, education, cultural agency, and translation. She has worked and collaborated with Tropenbos International Colombia since 2009, in charge of publications based on local knowledge mainly from Indigenous communities in the Colombian Amazon. She has been editor and copy-editor for organizations such as International Art Fair of Bogotá, FLORA ars+natura, Fundación Gilberto Alzate Avendaño, Secretaría de Cultura, Recreación y Deporte, and Ministry of Culture of Colombia, among others. In 2016, she obtained grants—AÚN 44 Salón Nacional de Artistas and Grant for Independent and Emerging Publishing Projects in Literature, IDARTES—for her independent publishing project *Cajón de sastre.* She has worked closely with Abel Rodríguez for many years organizing his exhibitions and publishing the following texts about his work: “El agua corre, las palabra curan: Colección de preguntas para Abel Rodríguez” (2015) and “Mirar con las palabras, mirar con las historias: Una conversación con Abel Rodríguez” (2014).

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