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Plant Alliances: companion species in teaching in the face of the Anthropocene

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ABSTRACT – Plant Alliances: companion species in teaching in the face of the Anthropocene. What can alliances with trees bring about when it comes to teaching experiences in the face of the Anthropocene? This text analyzes the encounters between biological sciences and the arts as seen throughout the “Art, science and technology” course. Having been provoked by Haraway’s (2021) concept of “companion species” and established a connection with works by artists and with authors of education and philosophy, its interest in thinking about what happens between material relations and the systems of signs involved in those exercises which have resulted in two book-objects produced within the course: *Floresta de luz* and *Floresta*². The trees call upon people to think of teaching as a laboratory-atelier of perceiving-creating forests and to pay attention to the fabulations between biological sciences and the arts.

Keywords: Trees. Teaching. Companion Species. Multispecies Studies. Art and Science.

RESUMO – Alianças Vegetais: espécies companheiras de ensino diante do Antropoceno. O que as alianças com as árvores podem ativar em experiências de ensino diante do Antropoceno? Partindo dessa pergunta, analisa-se encontros entre biológicas e artes nas práticas da disciplina “Arte, ciência e tecnologia”. Mobilizado pelo conceito de “espécies companheiras” de Haraway (2021) e em diálogos com obras de artistas, autores da educação e filosofia, este texto se interessa por pensar no que acontece entre as relações materiais e os regimes de signos envolvidos em exercícios que resultaram em dois livros-objeto criados na disciplina: *Floresta de Luz* e *Floresta*². As árvores convocam as pessoas a pensarem o ensino como um laboratório-ateliê de perceber-fazer floresta e a darem atenção às fabulações que brotam pelas frestas, entre biológicas e artes.

Palavras-chave: Árvores. Ensino. Espécies Companheiras. Estudos Multiespécies. Arte e Ciência.

Teaching as a Laboratory-Atelier between Biological Sciences and Arts

Figure 1 – Image from the book *Floresta de Luz: Laboratório de Botânica Especulativa*



Source: Dias and Wiedemann (2017).

Increased deforestation, fires, and invasions of indigenous lands, bodies, and stories. Increasingly intense investment in monocultures of plants, ideas, and affections. Rampant meat, wood, ores consumption, fake news, and ready-made meanings. The impoverishment of soils, thoughts, and times. We live in a “damaged world” (Tsing, 2019) in which narratives cannot be content with just “denunciations” (Latour, 2020a; Stengers, 2015; Haraway, 2021) of the dangerous exterminating forces at the play of ongoing climate change and many other catastrophic situations that mark the Anthropocene. Facing the Anthropocene, it is urgent to invest in images, words, and sounds capable of revitalizing plans devastated by capitalism, increasing confidence in the future without falling back into dystopian or salvationist narratives. It is necessary to invest in an “*other* curriculum,” capable of creating new forms of relationship with the *other*, capable of proposing and experimenting with alliances in favor of a more sustainable world, in which we can have fresh and affirming stories to tell (Fonseca; Amorim, 2021, p. 12; authors’ emphasis). It is indispensable to devote ourselves to new onto-epistemological approaches that investigate and engage in new, more transversal ways of being and thinking that favor “[...] inclusion, flexibility, mutability, and multiplicity, recognizing the tangled kinships between humans and a multitude of other nonhumans” (Carstens, 2022, s.p.).

The Anthropocene (Haraway, 2016; Tsing, 2019; Chakrabarty, 2009; Danowski; Viveiros de Castro, 2014; Davis; Todd, 2017; Carstens, 2022) is a concept that poses challenges for teaching practices because it calls for consistent questioning of our present time; a complex perception of the idea that humans have become a geological agent due to the destruction they promote; a critique of the centrality, exceptionality, and universality of the human; and the need for exercises that can rein-

vigorate future plans of existence based on practices of living together, between humans and nonhumans, between different ways of knowing and existing, which are affirmative and powerful. For Donna Haraway (2021; 2019), the generation of rare kinships between heterogeneous people can help to elicit robust responses to the devastating events that mark the Anthropocene. This is because to generate rare relatives is to connect effectively with the present; it is to realize that life occurs in interweaving and entanglement between places, times, materials, and unfinished meanings and in constant co-composition.

Making rare kinships in the face of the Anthropocene is what I have been looking for with the subject “Art, Science, and technology,” – which I offer in the Graduate Program in Communication of Science and Culture at the Laboratory of Advanced Studies in Journalism and Institute of Language Studies, from the State University of Campinas (LABJOR-IEL-UNICAMP) –, and which has been constituted as a laboratory-atelier for collective experimentation, between biological sciences and arts, of the notion of “companion species” by Donna Haraway (2021). I have been investigating this concept as an opening to a vegetal, animal, mineral sensibility... Paying attention to the vital coexistence with beings-things-forces-worlds of other species, always considering the profound difference, and not opposition, of these beings concerning humans. For this zoologist and philosopher, “companion species” is a notion that always puts love in motion as a fundamental theoretical-methodological aspect, the love that crosses the relationships between species and that defines joint lives lived based on respect and responsibility.

To think with “companion species” is to engage with the material and virtual dimensions of the world and to live under the sign of “significant otherness” (Haraway, 2021). Such a concept requires an interest in listening to nonhumans, a disposition to gain effective intimacy with them, and a desire and commitment to developing procedures, tools, and materials to make these listenings possible, real, and multiple. So that the nonhuman voices that echo in works and creations are not, once again, representations invented according to reprehensible Western and modern interests, and that, Haraway points out, depends on a “[...] recognition that one cannot *know* the other or the self, but must ask in respect for all of time who and what are emerging in relationship” (2021, p. 60, author’s emphasis).

I consider that “companion species” is a concept with political, ethical, and aesthetic dimensions that is fundamental for thinking about teaching between biology and the arts in the face of the Anthropocene. I have tried to experiment with this perspective in teaching processes in the latest editions of the course, taught by me between 2018 and 2021, in which I proposed that we think with more than human beings (trees, rivers, stones, stars, and animals...) what communication can in the face of the Anthropocene. In this article, I will specifically focus on the alliances we seek to establish with trees and on thinking about how these alliances influenced the “ways of existing” (Souriau, 2017; Lapoujade, 2017) of the relationship between biology and arts in teaching.

In the three editions of the course, I proposed a partnership with biologist and friend Alessandra Penha from the Federal University of São Carlos (UFSCar), Araras campus. The aim was to provide participants in the course with contact with a researcher passionate about trees and experience practical botany classes as offered to undergraduate biology students and contact with a relevant and up-to-date bibliography. I also proposed partnerships with several artists, such as Marli Wunder, Fernanda Pestana, Sebastian Wiedemann, Marcelo Moscheta, Sara Melo, Tatiana Oliveira, Rodrigo Rodrigues, Mauro Tanaka, Silvia Figueroa, and Paulo Teles, intending to get to know and experience different artistic practices and techniques performed with plants.

These people, both scientists and artists, are interesting because, in different ways, they seek to consider the complexities and particularities of plants as requirements for establishing consequent relational practices. In the meetings with them, the students were invited to adopt a posture of collecting materials for later experiments, which involved them (whether the guest planned this or not) in the creation of writings, photographs, drawings, collages, etc., which would be raw materials for new designs.

It is worth mentioning that the course has always welcomed a very diverse audience of students with backgrounds (undergraduate and postgraduate) ranging from journalism, education, arts, literature, philosophy, and anthropology to biology and geology. It was important that participants had access to the maximum conceptual and procedural complexity of biology and arts, i.e., that perspective escaped the simplifications, standardizations, infantilizations, and ideas of public deficit often present in formal and non-formal education actions when dealing with diverse audiences.

After the meetings with the guests, we began movements of theoretical-methodological consolidation in the course, with studies of works and processes by other artists and by authors dedicated to multispecies studies, Donna Haraway and Anna Tsing; to the philosophy of difference, Gilles Deleuze and Félix Guattari; to the philosophy of science, Isabelle Stengers and Bruno Latour; and to the philosophy of art, Étienne Souriau and David Lapoujade. We paid attention to the materials collected at the meetings and dedicated ourselves to giving new life to these materials through various exercises. Finally, the new materials were gathered and recreated in book-objects I made in partnership with students and/or with scientists and/or artists invited for the course.

The idea of making a book-object was present from the beginning of the proposal. Every time the trees called us to try the question: what can a book do in the face of the Anthropocene, in a time of catastrophes? The choice of the book as an object to be created and thought about relates to an understanding proposed in the course that a book, without exception, requires a movement of “perceiving-making a forest” (Dias, 2020). A book is an exercise in putting different species, materials, ideas, concepts, and procedures together and making them live together, co-exist, affect each other, hybridize, and co-create each other. Books are

made from trees, not by chance, and even books in digital formats raise problems that connect us to the plant kingdom. Our relationship with trees and books involves, for example, facing issues related to monocultural systems.

The proposal to make book-objects was also thought of in the relationship with trees, as it related to a need for experimentation with the material and virtual powers of paper (photographic paper, newspaper, magazine paper, etc.). And, at the same time, with a need to show this experimentation to make it remarkable for the readers, causing the problems related to images, words, and papers to be, simultaneously, of trees and humans, of sap, flesh, and sign, thus concerning “natures and cultures” (Haraway, 2021).

The production of book-objects was assumed to be the invention of encounters between heterogeneous groups and the output of unprogrammed symbiosis between biology and the arts. These encounters becoming possible required interrogating and abandoning the grand narrative of the scientific revolution that we inherited (Latour, 2016) and finding infinitely more complicated and multiple biologies. It also required moving beyond the idea of the arts as a mere resource to make teaching more enjoyable, palatable, and lively. This meant taking responsibility for a speculative and fictional perspective (Haraway, 2021; 2020), accepting that teaching does not work with biological sciences and arts that are there, ready, and finished, but that it invents new relationships *between biological sciences and arts and...*, demanding to think between biological sciences and arts to come and engage in the multiplication of worlds, just as plants do in a forest.

Teaching thought in this way is experienced as a laboratory-atelier that is not restricted to repeating experiments and practices that have already been carried out and which have worked, rediscovering the power of the laboratory and the atelier to go beyond what was already given and guaranteed, embracing the risk of generating new encounters between materials, testing procedure innovations, producing alterations in the usual perceptual fields, and establishing new critical and problematic zones. Bruno Latour (2016) tells how Galileo’s drawing of the lunar craters from a rudimentary telescope left art and science historians enchanted at the same time. This is because he could only realize that the shadows he saw on the Moon were mountains, as he was an accomplished draftsman accustomed to following the newly discovered laws of perspective (Latour, 2016).

Teaching as a laboratory-atelier is a call to be interested in scientific and artistic practices beyond the judgments and opinions already formulated about them, beyond what scientific and artistic practices can do in isolation, and to seek to experience what the establishment of a typical soil can. A forest floor, where scientific and artistic practices are released from previously given forms, reaches an elemental power and begins to compose new ways of living together. This common ground is not a ready-made plan in advance. Still, it is established each time, with materials, events, and issues that are at stake, which is why

it concerns a “cosmopolitical” bet, as opposed to “cosmopolitan” bets, “[...] that fail to register the politics of the nonhuman, through which a common world might be composed” (Dibley, 2015, s.p.).

Teaching as a laboratory-atelier is an invitation to remember how laboratories and ateliers amalgamate many different traditions, certainly those of scientists and artisans, but not only that. “There is no doubt that the crowded tables of a contemporary laboratory preserve something from the artisan’s atelier, not to mention the cook’s oven”, as Latour (2016, p. 120) recalls. The laboratory-atelier gathers cooks, samauma trees, weavers, mulberry trees, sewists, fig trees, writers, mastic trees, *yvalorixás*, almond trees, shamans... All those involved in specialized practices of blending and transmuting the materials of the world with their hands, leaves, and roots. And if, unlike Latour, I prefer to speak here with women and trees, it is only to emphasize that this practical dimension involves female becomings, secrets, and mysterious places, which call for attention to what happens in passages when bodies and worlds change of quality and nature, when new possibilities become pregnant. It is not without reason that agronomist Carlos Nobre defines, in a conversation with indigenous leader Ailton Krenak, a *forest as a womb* (Nobre; Krenak, 2021).

Teaching as a laboratory-atelier instigates finding the openings *in* and *between* biological sciences and arts that allow generating double captures, nuptials, and transmutations; it impels finding the means and propitious procedures for contagions and alliances. Such encounter is evaluating and creating, creating and evaluating simultaneously and permanently.

From the Fabulations that sprout through the Cracks

Figure 2 – Image from the book *Floresta de Luz: Laboratório de Botânica Especulativa*



Source: Dias and Wiedemann (2017).

I realize that in each book-objects we create with the trees, we deal with procedures, materials, and signs collected from biological practices, such as these eager ends for alliances, connections, and interweav-

ings. This is an essential question because it was not just the contents of biology that interested us. There is in this bet an understanding that it requires facing in teaching the problems of the opposition between form and content that mark many choices. They even assign to the arts the function, almost exclusively, of shaping the contents from the sciences.

With Deleuze and Guattari (1995), we can think differently in terms of “form of content” and “form of expression”, assuming another distinction, which no longer operates by the opposition, in which form is always on stage, being the form of content linked to the set of material relations and the form of expression associated with the regimes of signs. With this possibility, the call is no longer to attribute one of the two forms to the sciences and the other to the arts but to pay attention to the assemblages *between* them. I will try this by presenting some exercises in the courses and two book-objects we produced regarding the biological sciences’ procedures, materials, and signs that mobilized creative intersections with the arts.

Figure 3 – Image from the book *Floresta de Luz: Laboratório de Botânica Especulativa*



Source: Dias and Wiedemann (2017).

Among the various exercises we did for the book *Floresta de Luz: Laboratório de Botânica Especulativa* (Dias; Wiedemann, 2017), for example, are the aberrant *exsicatas* with the plants that we collected and classified in the class given by guest Alessandra Penha. *Exsicatas* are samples of plants (branches, leaves, and, when possible, flowers) kept in herbariums, species of plant libraries, for many years for botany studies. The collected plants are pressed between sheets of newspaper and cardboard and dried in a greenhouse. Subsequently, the plants are removed from the press, made of wood and screws, the newspapers and cardboard are eliminated, and the plants are fixed with adhesive tape or sewn onto an A3-sized sheet and, finally, wrapped in a paper envelope. On that sheet, a label is placed containing information about the plant,

date of collection and location, the collector, the identification of genus and species, the name of the researcher who identified the plant, and the institution that validates this information, a university, for example.

In our creation, we have introduced a change to this process. When we were creating the *exsicatas*, I invited the students to observe the relationship between the collected plants and the newspapers, something I did in my biology course and a gesture that is related to my commitment, since my doctorate, to pay attention to the materials associated with the field of communication, especially paper (newsprint, magazine paper, photographic paper, painting canvas paper, tv screen paper, multimedia paper, etc.) (Dias, 2008). I suggested that we not completely discard the newspapers and bring them to the *exsicatas*, transforming them into collages that would experience the coexistence of these materials: dry plants, paper, words, and images. All *exsicatas* promoted coexistence between heterogeneous materials, experimenting with coexistence and co-creation between lines of nature and culture. Plants were no longer presented as part of the untouched and isolated nature of worlds, under the signs of neutrality, objectivity, and reality-truth, but intimately sewn to the worlds of cultures, mobilizing real perspectives but promiscuous and fictional.

Figure 4 – Images from the book *Floresta de Luz: Laboratório de Botânica Especulativa*



Source: Dias and Wiedemann (2017).

The joining of materials occurred uniquely in each *exsicata*. Like the leaves and branches of the plants, no interactions sprout the same as the others. One of the students from the arts area took (uncommon) drawings of plant leaves and insects from the newspapers and recreated with her drawing skill parts of the plant lost in the process, such as the leaves and leaves of other plants. The result is an *exsicata* that not only simulates the plant collected amid its supposed natural ecosystem but that invents an ecosystem in which plants, animals, papers, drawings, lines, and shadows interact differently, mobilizing a delicate and incessant game between reality and fiction. The pictures in the newspaper

connect us to the illustrations of naturalists, as opposed to the traits of the student who do not have a representational and realistic will but a desire to intensify “virtual existences,” which evoke or demand art (Souriau, 2017; Lapoujade, 2017). They are existences that lack solidity and consistency, appear only suggested and outlined, wait for art to reach a greater and different existence, and have the strength to open up a range of new possibilities in materials and gestures.

Figure 5 – Images from the book *Floresta de Luz: Laboratório de Botânica Especulativa*



Source: Dias and Wiedemann (2017).

Figure 6 – Images from the book *Floresta de Luz: Laboratório de Botânica Especulativa*



Source: Dias and Wiedemann (2017).

In other *exsicatas*, the plants coexist with the pages of the newspaper, and we do a reading *between the pages* of different natures. Plant ways of existing dialogue with newspaper ways of existing: leaflets, limbs, petioles, stipules, sheaths, burls, and stems establish strange conversations with headlines, sections, titles, subtitles, delayed leads, leads, supplementary titles, highlighted texts, highlights, comics, diagrams, drawings, photographs... Sometimes, we feel that the texts are

whispers of the plants themselves. In others, loose words from different headlines form a text that seems to question the validity of the *exsicata* itself. In still others, newsprint is used as a texture that plays with the colors and lines of dried plants. The lines that would only serve to sew the plants on A3 paper became elements of experimentation by the students, enhancing a particular work of embroidery and sewing involved, simultaneously, in the making of the plants and the making of the scientists with the *exsicatas*, also invited to perceive the impure crossings between vegetable and animal threads, between artistic and scientific signs.

With Donna Haraway (2021), I think the fabled *exsicatas* cover facts and fiction differently. Making things done, finished, fixed, performed, and accomplished (facts) co-evolve with inventions, falsifications, stumbles, inversions, and deviations (fiction). This makes them open to an experience of time that simultaneously brings together past, present, and future, like the body of a plant, which presents these temporalities together in a single specimen.

The herbarium created by us fables places that we visit and, at the same time, that we do not know. It proposes experiments that generate some movements of reciprocal capture: the newspaper becomes almost a plant, opens itself to a plant-becoming, and the plants, in turn, open themselves to animal-becomings; the collectors and recreators of the *exsicatas* are taken by child becomings, feminine, artistic becomings... These becomings trigger others, and we feel that becoming is never alone. What makes us think that the proposals between biological sciences and arts make us access a teaching experience as the activation of an “ecology of becomings” (Dias, 2019) between biological sciences and arts and... As Deleuze (1997, p. 11) says in *Crítica e clínica*, “[...] becomings are linked to each other according to a particular lineage, as in Le Clézio’s novel, or they coexist at all levels, according to doors, thresholds and zones that make up the entire universe, as in Lovecraft’s powerful work”.

Many of the inspirations for what we have created come from the experiments and works of the artist Walmor Corrêa (Ramos, 2015). This artist is particularly interested in biological processes and materials in his works. He is an artist well known for creating monstrous beings, mutants, hybrids of human and nonhuman, and organic and inorganic, which are presented under an aesthetic of biological sciences, but which welcome from within many disturbances and misunderstandings caused by arts and cultures.

By studying his different works, we can see that his procedures do not follow a single pattern; they are constantly repeated with differences. There is attentive and meticulous work with the materials and regimes of signs to understand both what they can and what they ask for. He is interested in properties, states of affairs, and the “virtual clouds” that constitute the materials of worlds and are openings for them to become something else, to enter unprecedented becomings (Souriau, 2017; Lapoujade, 2017).

Particularly with plants, there is a work by Walmor that I really like, which is called *Sementeira*, a kind of showcase or gondola, like those found in agricultural products stores, with 100 bags of 10 species of trees. The bags have, on one side, illustrative drawings of the plants, scientific names, and information about the weight of the package, and, on the other, information about the origin and biological characterization of the plants and, also, tips on cultivation methods and maps with the species location and recommendation of best planting times. It is in reading the guidelines that the first contact with something that disturbs the functioning of the sciences appears: among the texts, absurd, illogical, and ridiculous instructions are offered, accompanied by equally senseless arguments. When picking up the bags, it is also noticed that the seeds do not correspond to those cataloged. The nuts are not perceived by touch inside the bag in the cashew package. *Sementeira* is a playful way for the artist to make us access the relevance of plant classification and biological cataloging for effective planting and harvesting. At the same time, it makes us remember and imagine a set of instructions for planting and caring for plants, apparently absurd but equally effective, that people develop in the cultivation of plants and that is neglected in scientific instructions such as, for example, talk to them to make them grow more. It also brings a dimension of tactile perception invoked so intensely in the plant kingdom.

On Teaching as Proliferation of Forests

Figure 7 – Image from the book *Floresta*²



Source: Dias and Penha (2019).

In the second book I would like to present, *Floresta*² (Dias; Penha, 2019), the artist who inspired us was the filmmaker Agnès Varda. The course aimed to experiment with the idea that communicating is “perceiving-making a forest” (Dias, 2020). The alliance with the forests, to think about communicating systems, called me to pay attention and take care of the idea of an “ecology of becomings” to be established in teaching practices. Therefore, I proposed the course around blocks of becomings: becoming-child-animal-elemental-traitor, becoming-plant-house-cos-

mos, becoming-line-air-light, becoming-machine-number-living-matter, becoming-black-music-healing-party, becoming-river-woman-sea, becoming-indigenous-intense-molecular, becoming-poetry-multiSO-anonymous, becoming-forest-paper. This is because one of the exciting issues that a forest raises to think about is the fact that it brings together an abundance of beings-things-forces-worlds and provides conditions for assemblages between heterogeneous ones, and gathering always involves becomings.

In each block, we would enter into a relationship with the practices of people (scientists and artists) who are allied to various other beings, materials, spaces, and practices, people who “make forests” in different regions of Campinas, São Paulo. The perceiving-making forest made trees partners in the entire course, not just in a block, as in the previous year. Thinking with trees made us pay particular attention to the inter-scalar and multidimensional dimensions of territories because trees are beings that know what it is like to be intimately connected to the land/Earth. The course was conceived as an artistic residency. Residences are extremely relevant space-times for thinking about and experimenting with alliances between arts and sciences (Fonseca; Amorim, 2021). It is where we can see how “[...] connections, entrances, and exits are created and, between them, lines pass that intertwine and burst, becomes a rhizome” (Fonseca; Amorim, 2021, p.15), where we distance ourselves from utilitarian perspectives and parameters and launch ourselves into the creation of new relationships. As artistic residencies always involve experimentation related to displacement and the privileged space, it puts into play “[...] the experiences, coexistence, exchanges, the ‘in transit’ condition, life in common, participation, collaborations, and the articulation and negotiation processes” (Moraes, 2014, p. 42).

The choice for the artistic residency, as part of the work methodology, also enhances an essential assumption of the notion of companion species and multispecies studies: the non-opposition between organisms and environments (van Dooren; Kirksey; Münster, 2016). Visiting Mata Santa Genebra, the Casa de Cultura Fazenda Roseira, the EMBRAPA laboratory at UNICAMP, participating in activities at Praça da Paz and even in the classroom at LABJOR-UNICAMP became ways of experiencing, radically, a connection with the environments. At Fazenda Roseira, the Jongo Dito Ribeiro Community presented us with a living space, from tiny flowers to secular trees, from food to drums, thanks to sensitive practices linked to the African matrix, to the *orixás*, to the ancestors, which reveal the power of a place where all dimensions are interconnected, whether spiritual, cultural, environmental, architectural, historical, or political.

At Praça da Paz, we collected leaves, branches, and seeds, worked with the guests creating new tacks, embroidery, sewing, lashings, and webs among these collected materials; we made poetic herbariums and experiments with phytotyping; through eco-performance, we made bodies with the elements – air, water, mud, and fire; we learn to listen to the sounds of stones, trees, leaves, awakening emotions never before felt before the different sounds that each being has, each part of its

body, reaching a kind of childhood, at the same time, of materials and our bodies. We also learned the history of some trees in the square, from how they arrived at UNICAMP to the families and biological species to which they belong. We were invited to feel how their stories are intertwined with ours, even without knowing it.

At EMBRAPA, we access how scientists have sought to relate to complex climate phenomena and agricultural production through supercomputers, software, graphics, and maps. A whole universe that challenged us to get out of our usual perceptions and feel the life that pulsates from machines and numbers. In Mata Santa Genebra, the largest urban forest in the region, we took a walk and field class with biologists. We learned about the tools, materials, and practices that involve the “quadrat method” used by ecologists to sample leaf litter. We ended the visit with paintings with collected leaves and readings by poets and philosophers such as Manoel de Barros and Emanuele Coccia. In the classroom, we get to know works by artists and researchers who invent connections between plants, stones, and bodies, which put lights, lines, agroforests, clouds, and photographs in relation, among other approaches.

With these movements, we feel that places are no longer a mere inert backdrop where classes take place, where beings live, to become all living space-times, full of multiple connections between organic and inorganic, human and nonhuman worlds, and between natures and cultures. Visits to these spaces brought us the challenge of becoming sensitive to these means of extreme richness and abundance of lives concerning both visible and invisible lives. We were presented with the problem of writing, photographing, drawing, performing, and painting as someone who seeks to honor the forest.

Figure 8 – Image from the book *Floresta*²



Note: Figure translation: In the territory there is always a place where all forces come together, tree or grove, in a melee of energies. The earth is this melee"; FIG. 01 MATA SANTA GENEBRA MONTAGE | SUSANA DIAS. TEXTO | GILLES DELEUZE E FÉLIX GUATARI, MIL PLATÔS: CAPITALISMO E ESQUIZOFRENIA, 1997.

Source: Dias and Penha (2019).

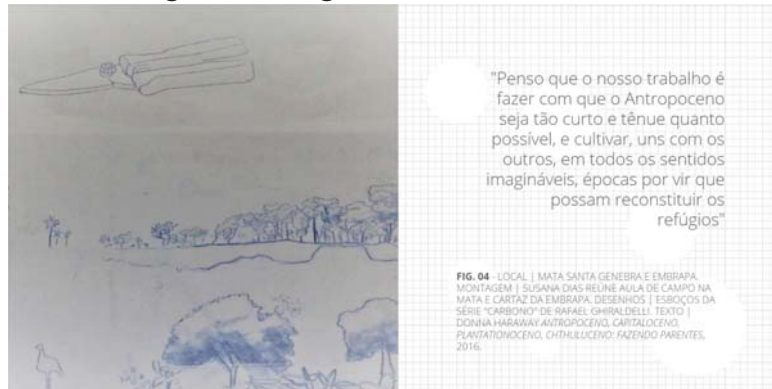
The film *Les glaneurs et la glaneuse* (2000) by Varda, shown in the first class for the students, was a kind of guide for our experiments. Departing from pickers who collect potatoes left over after the harvesting

machines have passed, in plantations in France, Varda puts the gesture of collecting, collectors and collected, in incessant variation. She makes us think about plants, leftovers, abandonment, waste, scavengers, poverty, exclusion, reuse... We feel how scavengers are closer to what Donna Haraway (2016) defined as “humans-as-humus,” those who are not ashamed to get their hands dirty – “wash themselves,” as the truck driver in the film says – instead of the current erect and arrogant posture, which has drained, depleted, poisoned, and exterminated the Earth’s reserves.

Varda turns our gaze to the hands that sniff, dig, find, collect, store, distribute, transform... She makes us follow with an unusual concentration the life of different harvesting machines: bags, boxes, buckets, aprons, scissors, knives, pots, baskets, cars, trucks, cameras, books, paintings, brains... She makes us question the countless aspects involved in the gestures of harvesting: the complexity of relationships between humans, potatoes, and other vegetables, power struggles, the incomparable enthusiasm for the existence of plants, property rights, transportation problems, different ways of telling stories, the power of the arts in the face of the ruins of capitalism...

The countless collectors that Varda puts on the scene, including herself, know that “There is no way of escaping our earth-bound existence,” as Bruno Latour (2020b, p. 12) provokes when thinking about the Anthropocene. Against those who argue that the way out would be elsewhere, on another planet, in another life, Latour insists that the only escape route is back to Earth, to this Earth.

Figure 9 – Image from the book *Floresta*²



Note: Figure translation: “I think our job is to make the Anthropocene as short and tenuous as possible, and to cultivate, with each other, in every conceivable way, epochs to come that can reconstitute the havens”. FIG. 04 - MATA SANTA GENEVRA AND EMBRAPA. ASSEMBLY | SUSANA DIAS GATHERS FIELD CLASS IN THE FOREST AND EMBRAPA POSTER. DRAWINGS | DRAWINGS FROM THE “CARBON” SERIES BY RAFAEL GHIRALDELLI. ANTHROPOGENOUS DONNA HARAWAY TEXT. CAPITALCENO PLANTATIONOCENO, CHTHULUCENO. FAZENDO PARENTES. 2016.

Source: Dias and Penha (2019).

Deeply touched by the ways of existing in plants, returning to this land/Earth is the movement that Varda summons in the film. It is a return that has nothing to do with nostalgia for ancient times; it is not a

defense of abandoning the cities and returning to the countryside, nor a technophobic narrative denouncing domination by machines and algorithms. Instead, it is a call to an active melee with a whole living world, in which all available materials need to be honored in their becomings, in their creative powers of becoming something else altogether.

We feel that Varda does not seek to make the idea of the human as a creator among “his” creatures work, objectified, and considered inert. Instead, she makes a terrestrial image work, in which humans, aware of their smallness, place themselves among others more than humans in a constant movement of decomposition and transmutation to be closer to the Earth. The human emerges as a material among materials, which, in turn, metamorphose from hand to hand.

The film is full of terrestrial images. I bring this term – “terrestrial” – by Bruno Latour (2020b) to think that terrestrial images are those that do not separate arts and sciences from politics, that seek to inhabit the Anthropocene and question themselves about the time and space we are living in, that they think with the power wars and catastrophes that mark our era, and that seek to trace paths that go beyond the mere denunciation of the violent appropriation of land/Earth. Thus, effectively embracing the problem and practices of those who do not have land, those who do not want to have land, those who fight for land demarcation, or those who realize that there is no more land/Earth for everyone, whether they are humans or potatoes.

Inspired by Varda, I gave each student a fabric bag on the first day of class (the kind I used to collect at conferences). I proposed that throughout the semester, we collect materials in that bag and notebooks, cell phones, cameras, camcorders, etc., and that, in each meeting, we would make the gestures of scavenging and the materials a problem to be experimented with. I also proposed that at the end of the course, individually or in pairs, we would have to produce communicating materials (photographic essays, drawings, performances, podcasts, book...) that would create intersections between the materials collected in the meetings with the guests and that would make it clear the forests we access and, at the same time, that they make forests in their experiments.

Experiencing grooming not as extraction or exploitation but as a donation, as immeasurable availability to make mutual co-learning exists, to gain intimacy with encounters, the living matter of the course. Each meeting demanded attention to the gestures, materials, and affections involved that mobilized a joyful lucidity that did not relegate us to impotence, affirming a vitality of a forest in these times when we are challenged to think about separations and divisions and what a being together can. With the forest, we learn that communicating is a problem of being together; it is to invent brilliant ways of composing, gathering, and connecting that affirmatively affect the entire cosmos. Living together is a problem formulated by the forest, which comes into existence in its collective and aberrant body, in which being together is not war nor homogeneity, but rather the invention of unusual and highly complex modes of pluridimensional multi-collaboration.

Figure 10 – Image from the book *Floresta*²

Note: Figure translation: "Mata Santa Genebra is considered a living laboratory and its conservation is essential for the development of research with the aim of expanding knowledge and understanding of the local ecosystem and its biodiversity". FIG. 06 MATA SANTA GENEBRA PHOTO AND FIELD CLASS | ALESSANDRA PENHA. TEXTO | PATRICIA LIA SANTAROSA - PLANO DE MANEJO MATA SANTA GENEBRA, 2010.
Source: Dias and Penha (2019).

Among the various meetings we had in the course, I am interested in detail here the field class with biologist Alessandra Penha in Mata Santa Genebra. I proposed that she teach the students the quadrat or plot method, which ecologists use to study the forest by collecting samples from the forest floor and the leaf litter. The name – quadrat method – is due to the use of a square wooden frame thrown by the researchers on the forest floor, randomly or systematically, in different places to define the areas where the samples will be collected. The size of the squares and the number of squares thrown must be consistent with the studied community and represent local diversity (Freitas; Magalhães, 2012). All the leaves, branches, and seeds inside the square are deposited in bags and taken to the laboratory. The existence of tiny plants and animals in this quadrant is also recorded.

In the laboratory, collected leaves, branches, and seeds are used to count and identify the existing species in the place, and statistical methods are applied to calculate the density and frequency of the species and the coverage area. The biologist invited the group to complete the entire collection process with the squares. When we finished the field class in Mata Santa Genebra, I proposed that we create, this time, a "square book," a book that would experiment with the subject's proposal of perceiving-making forest based on the quadrat method. The book, which I still didn't know then, would bring together the different creations of the students (individuals and in pairs).

Figure 11 – Image from the book *Floresta*²



Note: Figure translation: "Plants, their history, their evolution, prove that living beings produce the environment in which they live, instead of simply being forced to adapt to it". FIG.18 - MATA SANTA GENEVRA. DRAWING 1 SERIES "CARBON" BY RAFAEL GHIRALDELLI GATHERS MARÍLIA COSTA, ALESSANDRA PENHA AND PLANTAS DA MATA TEXT | EMANUELE COCCA, A VIDA DAS PLANTAS, 2018.

Source: Dias and Penha (2019).

From the combinations, mixes, and compositions of the collected materials were born: the photographic series *Ao mesmo Tempo*, in which Gláucia Pérez removes the opacity of the photographs and investigates delicate overlaps between plants, people, and places, between times and spaces, opening the perception to colors and textures that come to life in the coexistence of bodies and practices, populating the sensory experience with visions of a cosmic being together; the drawing series *Carbono*, in which Rafael Guiraldelli extracts with carbon paper lines from different photographs taken in the various spaces visited, and activities carried out and brings them together in an alchemy of lines made on the fabric bags we use for collections. His drawings intensify encounters between *Mães de Santo* and trees, between plants and women, between laboratories and ateliers, in speculative scenarios and fictional space-times that he creates with his lived experiences; the series of nine photos by ambulant photographer, *SintropizAR o Olhar*, in which Marília Costa gives imagery power to words in the relationship with syntropic agriculture, invading urban art, and communication with fractal power and with a kind of vegetal enthusiasm, which filmmaker Agnès Varda (2000) perceived in the plants, and that collapses the recurrent bets of denunciation and information and gives ancestral knowledge a force of the future and high technology.

The experimental music, *Os Sons à Margem: como ouvir?*, in which Maria Cortez gathers sound fragments and gives life to an acoustic archipelago made of winks, fireflies in the middle of the forest, a desire for pulsating dissemination, which prefers not the linearity, the metrics, and regularity of the narratives of communication that dwells too much, if not just, on arguments and persuasions. The podcast *A Diversidade na Narrativa do Devir Floresta*, in which Luciana Martins reports her experience with the course and proposes that listening takes place

amid the manipulation of water and clay as if asking creation to continue with this thinking with the hands, in that attentive inattention that involves doing something while listening.

Figure 12 – Image from the book *Floresta*²



Source: Dias and Penha (2019).

The series *Quadrados*, in which Alessandra Penha and I used the wooden frame used by ecologists, as well as pruning shears, plastic bags, labels, newspapers, scales, beakers, and a sieve, in the relationship with the materials generated in the course: leaves, branches, photographs, words, drawings, writings, books, etc. Redoubling the idea that we made a forest in the course, transforming these materials into leaf litter, and enhancing the feeling that communication passes through the release of the elemental power of images, words, and sounds through the (de) composition of the meanings already given.

Figure 13 – Image from the book *Floresta*²



Note: Figure translation: "What if we open ourselves to the idea that communicating is a call to the task of perceiving-making a forest through other modes of existence: photographic, filmic, performative, writing, drawing...?"

FIG. 24- MATA SANTA GENEVRA. FOTO AND MONTAGE | RAFAEL GHIRALDELLI BRINGS TOGETHER MARÍLIA COSTA, MATA LITTER AND SQUARE USED IN FIELD CLASS. TEXT | SUSANA DIAS, PRODUCED FOR THIS BOOK, 2019.

Source: Dias and Penha (2019).

Figure 14 – Image from the book *Floresta*²

Note: Figure translation: “A forest is being together taken seriously”. FIG.30- CASA DE CULTURA FAZENDA ROSEIRA PHOTO | FACEBOOK OF ROSEIRA. PRESENTES | VANESSA DIAS, ALESSANDRA RIBEIRO, MARIA ALICE RIBEIRO, VERA ZUIM, VANDIR GOMES AND BIANCA LÚCIA RIBEIRO. TEXT | SUSANA DIAS, PRODUCED FOR THIS BOOK, 2019.

Source: Dias and Penha (2019).

Finally, the performance *DevirAÇÕES Floresta*, in which Mariana Vilela and Alice Copetti give life to a body-entity-mantle-river-forest that moves slowly across the UNICAMP lawn, taking with it the square wooden frame, the bags, the drawings, the dreams, the embroideries, the paintings, the notebooks, the questions, the forgetfulness, the plants, the people, the children, the animals, the *orixás*... A body that goes on scavenging, looking for some life, guided by intuition. A being that finds as much life in the tree as in the electricity pole emptying perception wherever it goes, making a desert that is not opposed to the forest but affirms its proliferation everywhere. The desert is a forest of sands, colors, winds, nomadic vegetation, and smaller animals, very different from the too much human desertification that has resulted from the destruction of forests. The character uses squares, measuring tapes, and magnifying glasses to detect life wherever he goes. Ecologists, photographers, sewists, and physicians also use such tools, making us think of the (im)potencies of measuring gestures...

Furthermore, with the proposal to bring together all these experiences, the book-object *Floresta*² was born. The book seeks to experience the power of the “square” – the “quadrat method” – between biological sciences and the arts. Thus, it proposes to inhabit the “square” form as “a trope” (Haraway, 2021), i.e., to deviate and twist the meanings already fixed in culture, to unfold the signs emitted by the square on the surface of an event: the forest. When we say someone is square, we associate him with something old-fashioned, traditional, dull, and without new ideas. Something square can also be considered too white and Western. The circle and the wheel are forms considered very powerful for thinking and living effective integrations and cooperation, while the square is commonly associated with limitation, exclusion, and imprisonment.

When we say that the sciences scrutinize the world, we bring their power to study events thoroughly, in detail, and exhaustively. Still, we also criticize, with this term, their overly modern and scientific approach.

Figure 15 – Image from the book *Floresta*²



Note: Figure translation: "Entering here is knowing that we have resistance, we have our 189-year-old Flamboyant tree totally embraced by the Swiss cheese plant".

FIG. 37 – CASA DE CULTURA FAZENDA ROSEIRA. PHOTO | GLAUCIA PÉREZ. PHOTOGRAPHS FLÁVIA TAMIRIS, CRIS MONTEIRO, PAULA BATISTA, CAROLINA AVILEZ, CAROLINA SCARTEZINI AND MARIA CORTEZ. TEXT AND FLAVIA TAMIRIS, FRAGMENT COLLECTED DURING GUIDED TOUR, ROSEIRA, 2019.

Source: Dias and Penha (2019).

Figure 16 – Image from the book *Floresta*²



Note: Figure translation: "A few million years ago the earth reached a two degree rise in temperature. That's millions of years ago. We're achieving the feat of getting close to that in just 100 years". FIG. 52 - PRAÇA DA PAZ. UNICAMP. PHOTO | CAROLINA AVILEZ. WORKSHOP | 'PHYTOTYPE AND HERBARIA POE PEAKS' SARA MELO. TEXT | EDUARDO ASSAD. FRAGMENT COLLECTED BY LUCIANA MARTINS IN A LECTURE GIVEN AT EMBRAPA 2019.

MARTINS IN A LECTURE GIVEN AT EMBRAPA 2019.

Source: Dias and Penha (2019).

The idea of the book was to materially explore these signs of culture emitted by the square and place them in connection with other sign regimes, biological sciences, and arts. In the "quadrat method," squares

appear as effective ways for biological sciences to communicate with living forests, in constant formation and active, without restoring a separation and hierarchy between scientists and nature. Although the method is called the “quadrat method,” the plots can be rectangular and circular. The choice of one or the other depends on assessing what is most operative in each situation. Whether squares, circles, or rectangles, these shapes generate sampling possibilities and produce estimative calculations. Squares are, therefore, a way of measuring the world, but when efficient in the sciences, this measuring is closer to becoming than determining (Stengers, 2012). Thinking in this way, measuring with squares is not a fixation but an invention of relationships whose effectiveness cannot be ignored. And measuring, emphasizes Stengers (2012, p. 197), is not an exclusive human practice. We can say “[...] that the sun is ‘measured’ by plants”, something “confirmed when we measure the well-defined wavelengths of sunlight absorbed by plants, or when we characterize the relationship between germination and daytime”.

Figure 17 – Image from the book *Floresta*²



Note: Figure translation: “What is called objectivity by experimental scientists therefore depends on a very particular and very selective creative art, as it means that what they are dealing with must be admitted as a ‘partner,’ within a very unusual and entangled relationship”. FIG. 55- LABJOR, UNICAMP. PHOTO AND MONTAGE | SERIES ‘TECHNIQUE OF THE PLOTS’ BY ALESSANDRA PENHA AND SUSANA DIAS TEXT | ISABELLE STENGERS. NO TEMPO DAS CATÁSTROFES, 2015.

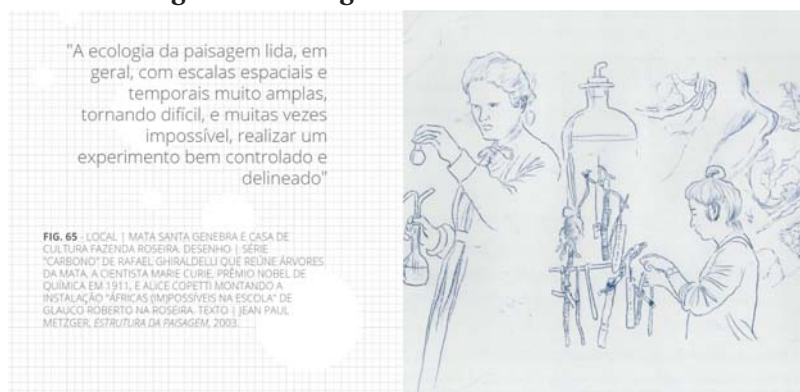
Source: Dias and Penha (2019).

Like circles, rectangles, and other shapes, the square is also a way of cutting out worlds. This gesture of cutting out worlds is strongly associated with photography, which had the rectangle as its most traditional form. We recently had a revolution in this issue of photographic form with Instagram, which, in its initial phase, imposed a square format on a social network that promotes the circulation of photographic images. The photographic framing brings into play the problem of the fragment, triggering critical reflections on the relationship between the fragment and the whole (closed and open) and the political possibilities of photography to escape anthropocentric perspectives. These relationships

– the reality cut and power of the fragment – are also present in the work of ecologists, who experience the fragment as a possibility of interscale understanding.

In the book, we seek to invite readers to perceive-make a forest from within the squares, creating connections between different materials and regimes of signs of arts, biology, and cultures and... The book presents 100 cards with images on one side and texts on the other. The pictures are samples of the relationships between the lives that sparkled in the encounters with an urban forest, an African culture house, a laboratory, a square, and a classroom, and that sparkled from the combinations between these encounters. The texts were extracted from the studied authors, from the meetings, and created from the investigations carried out in their production and are placed on graph paper and dialogue with white circles. The use of graph paper on the back, with 0.5 cm squares, intensified the relationship of all the pages with the squares and served as a guide for the layout of texts, which happens when this paper is used for drawing. Unlike other books in which the authorship of images and texts was not attributed to each production (closer to art books), in this book, each author and place involved in photographs, writings, drawings, speeches, paintings, digital collages, etc., are broken down in image captions, which gives each card a relationship with the sciences.

Figure 18 – Image from the book *Floresta*²



Note: Figure translation: "Landscape ecology deals, in general, with very large spatial and temporal scales, making it difficult, and often impossible, to carry out a well-controlled and designed experiment". FIG. 65 - MATA SANTA GENEVRA AND CASA DE CULTURA FAZENDA ROSEIRA. DRAWING SERIES "CARBON" BY RAFAEL GHIRALDELLI THAT BRINGS TOGETHER TREES FROM THE FOREST, THE SCIENTIST MARIE CURIE, NOBEL PRIZE IN CHEMISTRY IN 1911, AND ALICE CORETTI ASSEMBLING THE INSTALLATION "(IM)POSSIBLE AFRICAS IN THE SCHOOL" BY GLAUCO ROBERTO IN ROSEIRA. TEXT | JEAN PAUL METZGER, ESTRUTURA DA PAISAGEM, 2003.

Source: Dias and Penha (2019).

In the book, photographing, writing, drawing, painting, thinking, etc., become gestures of throwing squares in a forest that is not given, a forest that is born at the same time it is traversed. To enter the forest is to

invent the forest along with it. Throwing squares is dealing with limits, opening new windows on things, and creating infinite connections in the finite. The title, *Floresta*², goes beyond the square shape and speaks of a desire to redouble the forces of the book and the forest. The book recalls that every forest squared becomes positive. It also provokes one to think about what the number two poses when it functions as simultaneity, folding, and coexistence, not opposition. It is like the book mobilized the two – square and circle, image and word, front and back, real and fiction, regular and irregular, human and nonhuman, biological sciences and arts – to experience multiplying it. Two together become at least three: image, word, and image-word, real, fiction, and real-fiction...

Still following this experimentation with “two”, the book has PDF and physical versions. It is a book on paper and canvas. The paper version is the same book, but it is also a different book. It comprises a square wooden box measuring 20 x 20 x 20 cm, a rug-mantle made of dyed fabric with vegetable printing and embroidery, ten fabric strips with questions, and 100 square cards with images and text on each side, a notebook with texts from the organizers, and a miniature wooden square.

Figure 19 – Image from the book *Floresta*²



Note: Figure translation: “We need experience of mutual co-learning, in order to create multiple and mobile common causes, solidarities of struggle against the feeling of impotence that the installed divisions manufacture”. FIG. 70 - PRAÇA DA PAZ, UNICAMP, LAMBE | SERIES “SINTROPIZ-AR O OLHAR” OF MARÍLIA COSTA. TEXT | ISABELLE STENGERS, IN INTERVIEW 2015.

Source: Dias and Penha (2019).

With the box, reading *Floresta*² becomes a ritual. Open the box, lay out and linger on the mantle, spread out and contemplate the cards, throw the squares over images and texts, deal with combinations and intersections... It's a book but also a game, a flying carpet, a forest floor, an offering to the forest. It seems to contain much of what we wanted to do in the course and couldn't. The loose pages make one feel the intense movement of reading that a forest summons: attention to the abundance of kinds of possible relationships. Not just connections that the book makes, but relationships that it asks us to keep making, forests to come...

Teaching and companies more than Human

The statute of teaching companion plants emphasizes the importance of plants in teaching and learning processes beyond utilitarian perspectives that would make them vulnerable to human whims. In this perspective, plants are not mere teaching content nor mere didactic resources; they are co-conspirators in thought and creation processes that make material relations and sign regimes between biological sciences and arts in constant becomings flourish in unusual ways. Plants mobilize us and involve us in new “onto-epistemological sets”, to use an expression by Carstens (2022), causing university education to be called upon to cover different modes of perception and action to cultivate endless possibilities of cross-pollination between biological sciences and... and... and... Plant alliances invite us to think of teaching as a laboratory-atelier for perceiving-making forest and to pay attention to the fabulations that sprout through the cracks, between biological sciences and arts.

Fabulations that seek to give way to ways of existing that have never been seen before, real but anomalous and speculative, also demand from teaching a movement of learning to see the powers of fluid entanglements between biological sciences, arts, and cultures. The philosopher Étienne Souriau asks himself: “How to see?” (Lapoujade, 2017), making us think that there are arts and sciences linked to the perception of openings to creation designed by the virtual in materials. The plants called us to learn to see, beings that see with their whole bodies and whose way of seeing is populated by the constant generation of rare kinships with the Sun, the land, the waters, the animals, the other plants, and the humans. Learning to see is also possible to combat the communicative xenophobia that prevents modes of existence between biological sciences, arts and cultures, foreigners, and aberrants from coming to life and having the right to existence and experimentation in the classrooms. Questioning, therefore, the attribution of “scientific” that is sometimes exclusively attributed to laboratories, science academies, and universities, assuming a perspective of biological sciences that are invented in an interweaving and intermingling with cultures (Guimarães; Silva, 2010).

To think about teaching taking plants as companions is to reinscribe the problems of the Anthropocene in terms of attention, listening, and respect for becomings; it is to conjure up other possible pasts-presents-futures, in which we escape biological reductionisms, oppositions between arts and sciences, and perspectives that think of teaching as mere repetition and reproduction. With plants, we are invited to realize that teaching is related to taking care of the political event “forest”, where we assume that we do not think alone but through bridges, connections, and synapses. We do not think about plants, but with them, in relationships with their imposing, affirmative, and enigmatic realities and ways of existing.

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