

THEMATIC SECTION: FAUNA, FLORA, OTHER
LIVING BEINGS AND ENVIRONMENTS IN
SCIENCE AND BIOLOGY EDUCATION



Natural History and Environmental Education in Dialogue in Science Teaching

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ABSTRACT – Natural History and Environmental Education in Dialogue in Science Teaching. This paper analyzes pedagogical experiences of a Science teacher who taught in a Rio de Janeiro's public school between the 1960s and 1990s. Her experiences relate to a singular pedagogical action structured by building and maintaining a zoo where wild animals were protected and used in didactic activities under ecological-evolutionary perspectives and on behalf of the conservation of wild fauna. The paper discusses the changes in the teacher's practices that was originated by resignifications of naturalistic traditions, appropriated during her initial formation in Natural History in the face of the increasing influence of the field of Environmental Education over the years.

Keywords: History of Science Education. Life History. Curriculum.

RESUMO – História Natural e Educação Ambiental em Diálogo no Ensino de Ciências. O artigo analisa experiências pedagógicas de uma professora de Ciências que lecionou em uma escola pública municipal do Rio de Janeiro entre as décadas de 1960 e 1990. As vivências se relacionam a um singular trabalho pedagógico que se estruturou pela construção e manutenção de um zoológico escolar onde animais silvestres vivos eram mantidos e cuidados para serem usados em atividades didáticas sob perspectivas ecológico-evolutivas ou em ações em prol da conservação da fauna. Discute-se mudanças nas práticas de ensino da docente originadas por resignificações de tradições naturalísticas, apropriadas durante sua formação inicial em História Natural, diante da influência cada vez maior do campo da Educação Ambiental ao longo dos anos.

Palavras-chave: História da Educação em Ciências. História de Vida. Currículo.

Initial Considerations

This article is the result of research that sought to follow and analyze the trajectory of Nilza Vieira, a Science teacher who worked in the public system of the city of Rio de Janeiro between the 1960s and 1990s and taught for most of her career at the Camilo Castelo Branco School (ECCB), located in the neighborhood of the Botanical Garden (Borba, 2021)¹. In previous works (Borba; Selles, 2020a; 2020b), we presented detailed discussions about the life history of this teacher and the unfolding of her teaching practices for the Science and Biology curricula, as well as discussed, the implications of the biographical studies of subjects with certain profiles still not well explored by historiography for the construction of other versions and visions for the History of Science Education in Brazil.

In these productions, we were able to discuss the material and symbolical importance attributed to the teaching of Science at ECCB during the period of performance of Nilza Vieira and his colleague and friend Walter Veiga, also a Science teacher. However, suppose we dedicate ourselves to exploring different aspects of the daily knowledge and teaching practices built by both professionals. In that case, naturalistic traditions may have been the most significant mark of Nilza's teaching. These traditions do not invalidate the evident – and already previously discussed in other works – affinities of these with the experimentalist teaching traditions that until then were established in the school curricula through the appreciation of practical classes to reinforce the pedagogical exercise of the scientific method.

As we will develop in this article, the teacher's work was marked by using practical teaching methods to work with the diversity of living beings, which are one of the strongest curricular traditions within the Teaching of Science and Biology, a heritage of Natural History (Marandino; Selles; Ferreira, 2009), emphasizing her approach to didactic approaches that believed in a work with an ecological-evolutionary perspective to forge meanings and definitions to teaching that she considered good. Later, between the second half of the 1980s and the early 1990s, this perspective would be re-signified and unfolded into environmental educational activities that would strengthen Nilza Vieira's name as a public Picture linked to education and environmentalism.

Therefore, we aim to highlight and interpret changes in the pedagogical conceptions and curricular practices of the mentioned teacher regarding the approach to biodiversity in her classes, a subject that was dear to her for interacting with the training received in the course of Natural History in the University of Brazil at the end of the 1950s, marked by the naturalistic tradition². In order to facilitate the article reading, we use the term 'biodiversity' to refer, in general, to the variety of species found in a territory during some period due to the wide circulation and assimilation of this concept in the present time. We know, however, that the concept of biodiversity was constructed and legitimized by ecologists only in the late 1980s (Frank, 2013). Before that,

the concept needed to be established and actionable by Nilza Vieira in her classes. In the article, we will highlight questions and reflections about it from narratives and records about a mini zoo that worked at ECCB as a result of a singular personal and professional investment of Nilza Vieira. Thus, we will focus on some pedagogical practices seeking to indict them from historical sources and discuss the transformations in her professional trajectory in order to reflect on her journey from naturalistic traditions towards actions aimed at fostering environmental preservation through educational activities, more aligned with the growing field of environmental education in the country.

The article is organized into five parts. In addition to this first, in which a quick introduction is made, the manuscript also has a section for some theoretical-methodological clarifications and two sections intended to Nilza Vieira's knowledge and practices reflections, having as background glimpses of her experience during the creation, operation and closure of the mini zoo that existed at ECCB under her coordination. Finally, we close the article with some considerations to conclude.

Theoretical-Methodological Dimensions of the Research

In the search for records and historical evidence of the educational processes conducted by Nilza Vieira regarding the teaching of contents related to the diversity of living beings, we used, as sources, transcribed interviews and photographs. The interviews and their transcriptions were produced following the procedures inherent to the oral history methodology (Delgado, 2011; Portelli, 2010), while the work with the photographs was operated based on the reflections constructed by Mauad (1996) and Vidal and Abdala (2005). The interviews brought were conducted with Nilza Vieira herself in an autobiographical perspective, but also with Verônica Vieira (former student, former intern and her daughter), Irma Rizzini (Nilza's former student at ECCB) and José Antônio dos Anjos (former student at ECCB and former co-worker of the teacher) for the development of the research (Borba, 2021). The photographs were obtained from Nilza's collection and provided by her.

It is worth mentioning that the interview with the teacher Nilza Vieira was conducted from a narrative perspective, with few interventions from the interviewer and more freedom for the interviewee to report her experiences and reflect on her own life history. However, in some moments, questions were asked to trigger her memories or provoke reflections related to her social status, the teaching formation processes she lived, or the issues concerning teaching in a school routine that guided her pedagogical practices, for example. On the other hand, the interviews with Verônica Vieira, Irma Rizzini and José Antônio dos Anjos were more scripted, conducted in a semi-structured way and mediated in a more directive way by the interviewer. This methodological option was used to prevent the interviewees from moving away from the intention of the interview, which was the understanding of how the contact/coexistence with Nilza Vieira and with her unique pedagogical

ideology crossed the social trajectories of these interviewees and influenced their views on scientific knowledge, educational processes and science teaching.

We chose to methodologically treat each source in dialogue with specific authors throughout the article as a theoretical-methodological precaution: using different research methods and sources comes from the understanding that historical investigations require the triangulation of several sources. In addition, we understand that the information produced by the historian from the questions asked to each source must be problematized and tensioned during the construction of the historical narrative, avoiding naïve interpretations and exploring controversies and contradictions inherent to past educational processes. Supported by Nunes and Carvalho (2005), we understand that historical sources do not speak for themselves, nor are they neutral, once the fact that they have been preserved or already produced indicates that they are not stripped of any intentions. Therefore, in the following sections, a movement for integration of the theoretical-methodological analyses to the empiricism and its development during the text will be tangible.

Naturalistic and Environmentalist Elements in Nilza Vieira's Teaching

During the broader research on Nilza Vieira's life history, it became evident that the teacher valued field classes as pedagogical opportunities to teach her students content related to biodiversity, especially those permeated by morphological, ecological and evolutionary knowledge of animals and plants. However, over the years, the physical and conceptual proximity of the students with the animal diversity mediated by the teacher began to be unrestricted only to the opportunities produced by the field classes. The ECCB itself sheltered wild animals for years, which were used in Science classes or in environmental actions in other spaces.

Thus, in addition to being reserved for practical classes, the teacher's laboratory, for a Non-specific period, was also home to some animals kept in terrariums or aquariums. In some cases, even the teacher's house itself hosted live specimens used for Zoology classes or environmental education activities³. According to Magalhães, Massarani and Norberto Rocha (2021), live animals' use in classes was well accepted and encouraged in the 1960s. This scenario began to change in the following decade until the establishment of legislation that prohibited such practices, as will be discussed later.

We raised animals at school, but some came to my house because there was no place there. For example, this beautiful little monkey here [the interviewee pointed to a photograph]: he could not stand living alone in school. Then it came to my house because Veronica [her daughter] also liked animals, so she was raised with them. Veronica raised a female teal from a young age and thought it was

a male; she had a male name. One day it laid an egg, and she told me very disappointed on the phone: 'Mother, so-and-so, Nicolino, I don't know, I forgot the name, it laid an egg'. I laughed and said, 'your male teal is not a male teal; it's a female teal. So, what's the name, Veronica?' and she said 'Matilda!' (Nilza Vieira, 2019 apud Borba, 2021, p. 154, emphasis added).

About this daily coexistence with the animals at school and, sometimes, inside her own home, Veronica recalled the amount and diversity of species that circulated the apartment and the work spent to keep them well, even when predators were close to their prey:

The tidying-up of the school spaces was at night, and there were already live animals there. During vacation, they went to our home. I grew up with lizards, vine snakes, opossums, Boa constrictors, sucuris, coatis, armadillos, quail, parakeets, parrots, guinea pigs, rabbits, and monkeys. They stayed at school on the weekend because there was no problem, but on vacation, they went home. Moreover, I lived with these animals since I was little [...], and they were all at large, none in cages. The snakes were from the lab; they only went home during the vacation and were housed in the small bathroom. We had no maids, just cleaners. They went berserk, getting to my house and finding a snake in the bathroom (Veronica Vieira, 2019 apud Borba, 2021, p. 155, emphasis added).

When asked about the practice of assigning human names to animals, Nilza replied that this was something familiar and that all of them had a name, emphasizing that it was an affectionate way of relating to them, although revealing an anthropocentric reference in these relationships. From the tamarin named Chico, she recalled the success it made with the children⁴:

Chico lived here; it had a little chain. [...] I used to pass food on the table, and it'd keep asking. However, it wouldn't accept anything. It screamed. When I passed French fries, steak, rice and beans, I would take a fry and give it. It wasn't what it wanted. Chico would take the fry and throw it on the floor. It screamed because it wasn't what it wanted and threw it on the floor. We offered the rice, and it wasn't the rice. We would offer the steak, and then it would take the steak. Then it would scream, and we offered the potato; now it was the potato. He ate in the order he wanted. Chico was trapped in the curtain with a large strap. Veronica walked by, and it jumped on her head, grabbed her hair and pinned her down. She couldn't walk and screamed, 'Mom, take that monkey out! This monkey won't let me pass!'. I adored him, and it was grabbed cute. (Nilza Vieira, 2019 apud Borba, 2021, p. 155).

In addition, a specific disciplinarian use in the management of classes can also be noticed in the presence of the tamarin in classes, since the children fixed their attention on the animal and on the expla-

nation given by the teacher when introducing it, as she observed when pointing to Figure 1: “The children were delighted” (Nilza Vieira, 2019 apud Borba, 2021, p. 155):

Figure 1 – Two students of Nilza with the monkey Chico in class at the Botanical Garden



Source: Nilza Vieira's collection.

The image shows that, when dealing with the little primate, the students experienced a mixture of sensations: one seemed relaxed and comfortable with it in his hand while passing the animal to his colleague, but she had a more insecure posture and worried facial expression. Such photography contributes to relativizing the shade of naturalism incorporated into some narratives that revisit Nilza's habit of working with living creatures. When we come into contact with those narratives, we have the impression that they were so common that students and family members were used to them and did not cause any oddness.

In the socio-historical context in which Nilza Vieira developed her educational practices with animals, the considerations and problematizations that currently circulate about legal conditions, structural requirements, and environmental and veterinary issues related to the maintenance of wild specimens in captivity, whether in domestic spaces or institutions for research and scientific dissemination purposes, such as zoos. Although we are aware that the scientific knowledge and bioethical debates in vogue at present contrast with the actions of the teacher in the past and would make it difficult, for example, for a tamarin to be kept today under the same conditions in which Chico was raised, we do not intend to present a value judgment at the risk of erecting anachronistic considerations. With this, we try to avoid the historical narrative of the work becoming a judgment about the teacher Nilza's teaching.

In addition to the teal Matilda and the monkey Chico, another animal nominally remembered by Nilza was the hedgehog Loli (Figure 2). When talking about it, the teacher explained how a set of wild animals was being incorporated into her pedagogical routine:

The hedgehog was Loli. Loli lived in my house too, but then we built the space at school, and they could go there. I don't even know if it was good or bad for them, but it was more comfortable because the nurseries were the size of my living room. They were as big as quite large brick houses, with doors and windows. The kids loved it. And Loli was going to be killed; a girl saved him. They were going to beat him to death because there is this idea that they throw their thorns. Loli showed up in the Botanical Garden; then she surrounded it saying, 'No, don't kill it! My teacher will take care of it; she will raise it, let it go!'. So much she said that they left, it came and stayed living here. And since it is nocturnal, it spent the day sleeping inside my wardrobe on top of a jacket and chewed the entire collar of his jacket. For Loli, it was not good to go there [to school] because it stayed in the nursery along with the coati, and the coati is a daytime animal and very frantic; it kept messing with the Loli during the day. It wanted to sleep, and she wouldn't let it. Then it fled, and people beat him to death in the Botanical Garden. Some girls later told me. They looked everywhere and got to know that they did it (Nilza Vieira, 2019 apud Borba, 2021, p. 157).

Figure 2 – Verônica Vieira showing the hedgehog Loli to her mother's students



Source: Nilza Vieira's collection.

Figure 2 is the photograph that best expresses the fascination of the students before the wild animals used by the teacher in her didactic activities. The curious looks turned to the animal, and the amazed expression of the student closest to him, characterized a particular enchantment by the morphological characteristics of the mammal added to the explanation of Nilza's daughter. While she holds him by the tail, Veronica stares into the eyes of a more distant student, apparently explaining something that piqued the interest of her interlocutors.

The space built by Nilza with the help of students, which she named an "ecological park", and which some interviewees also called a "mini zoo", shows how insufficient the other spaces occupied by the school's Science team have become in the face of her desire to build a bolder enterprise related to the logic of "knowing to preserve":

We made an ecological park. Beautiful fences surrounded the school's backyard, and we made houses for the animals. Two messy boys are here quietly with the little monkey. We started going on field trips. [...] So we really put up a fight and were challenged. Science teaching is the challenge. But the main thing is the children's eyes, the attention, the attempt to understand, to get there and see (Nilza Vieira, 2019 apud Borba, 2021, p. 158).

Figure 3 – Students with the monkey Chico inside a nursery built at the school



Source: Nilza Vieira's collection.

The narrative elaborated by Nilza while examining the photograph that depicted her students interacting with Chico in a nursery of the mini zoo built at ECCB (Figure 3) once again shows that the pedagogical use of the living fauna also contributed to motivating her students and undertaking her class dynamics with more tranquillity, as much as some agitation was expected in front of the animals.

From a critical perspective of using photography as a historical source, inspired by Mauad (1996) and Vidal and Abdala (2005), pictorial records can be produced and preserved to build or demolish consensus on certain practices. Thus, the photographic arsenal composes resources that take part in the battles of memories (Pollak, 1989), a concept in which Pollak emphasizes the tensions that mark the possible meanings of these records. Therefore, we are warned that the photographs we used to tell Nilza Vieira's life story mainly come from her collection and probably were produced and preserved intentionally because they contemplate a particular facet of her teaching work to be remembered, known and disseminated.

Compositions such as the one shown below (Figure 4) are surprising for the framing that accurately captures the facial expressions of the teacher and her students while displaying the specimens. In this case, Nilza was photographed explaining a behaviour developed by tree frogs to reduce the damage caused by insect bites. Thus, we can see that the photographs from the teacher's private collection contribute to reinforcing the idea of a safe professional when teaching about biodiversity and about curious students fascinated by the animals shown, as she pointed out in the statement below:

So, the students were amazed seeing this: the tree frog that enters the tube by itself in the bamboo. It walks in on its own and puts its butt up. It is protected because it has almost no meat in the butt, and when the mosquitoes bite, it almost feels like nothing. This mastery [knowledge of the species] of gardens... The strangling plant that starts from above, the baobab from Paris Square... That beauty of baobab, I didn't know either. Carauta, the botanist of the Botanical Garden, a famous botanist, told me... (Nilza Vieira, 2019 apud Borba, 2021, p. 160).

Figure 4 – Students with Nilza observing a tree frog inside a bamboo



Source: Nilza Vieira's collection.

To analyze this type of experience, we recall the considerations of Carvalho (2005) on the intermingling of environmental themes raised between the teaching of ecology and environmental education in school history. In the period in which Nilza consolidated the execution of field activities with her classes (Borba; Selles, 2020b) and teaching actions involving the handling of fauna as significant parts of her pedagogical repertoire, the didactical approaches based on the exploration of ecological-evolutionary phenomena have come to be understood as alternatives to traditional Science teaching, based on the memorization of contents and biological concepts. That is, it was a way of substituting the traditions of Natural History, replacing the observation and description present in textbooks, which required the passive intellectual mobilization of the characteristics of the fauna and flora by actively handling living specimens.

By contextualizing the natural environment to analyze different interactions between living beings and biological transformations over time combined with changes in the environment as factors to explain the diversity of species, Nilza had a whole apparatus of knowledge that served as a substrate for later propositions and actions of environmentalist nature, as Selles and Abreu (2002) help us reflect when considering how the environmental theme was being inserted, appropriated and re-signified in the curricula of science and biology.

Thus, the teacher operated tensions between evolutionary and naturalistic perspectives while reframing them: either she used them to strengthen science by establishing dialogues with ecological scientists

and environmentalists, or it triggered them to adapt specific practices for didactical purposes, carrying out dialogues with the disciplinary community formed both by Science teachers and university professors, who aimed curricular innovations in the basis of active teaching that had already been propagated since the beginning of the twentieth century (Azevedo, 2020). Without totally breaking with didactical approaches that could be considered traditional, Nilza hybridized these two perspectives by responding in a coherent way to the new purposes of schooling that emerged.

It can be deduced from the memories of José Antônio dos Anjos, the space, as mentioned earlier, for animal breeding in the school was built in the 1980s and became a *place of memory*⁵ (Nora, 1993) about Nilza's teaching. The interviewee witnessed the establishment of the space and its peak:

For a long time, Nilza was responsible for our mini zoo at the school. She had the help of two former students who used to be her students. It was built when I was in school, but I don't remember the process. (...) Where the animals got, where she finds them ... I just know that she was very committed to this mini zoo. She was the one who got the food. If she had any sponsorship, I don't know, but Surely, every food that came into the animals came from her. If she didn't go to the market to fetch it, the animals wouldn't eat. They took the market remains from Feira da Cobal do Humaitá ... I only know that the car was packed with much food and the animals had fun. Her car, oh, my Lord! I remember it was a blue Caravan. It smelled of foliage. It stank. There was no other term. Nilza was always inside of it, bringing material to keep things in order and making it possible for the children to see the animals there, and how they lived. I remember there were toucans, ducks, raccoons... There were several animals inside that zoo (José Antônio dos Anjos, 2019 apud Borba, 2021, p. 161, emphasis added).

About the need of this space for keeping animals in captivity, Verônica offered more details of how the interior of the building became small to properly house the set of living beings that were used in classes and activities:

The students took what they found dead, but they had a lot of alive animals. They had many terrestrial terrariums, and insects lived in these terrariums because they were taught with them. They took them in their hands ... They were huge water tanks. I don't know how they managed that, but they cut the water tank on the side and placed some glass. And there were some that were marine tanks. They returned Urca's animals because she taught on the beach and gave them back; she didn't kill any of them. Some they took to their aquarium. [...] The animals were trapped in the lab. She and my godfather [Walter] dominated the top floor of Camilo [Camilo Castelo Branco

School], so they had many rooms, several bathrooms and their laboratories. The animals stayed there, in the tanks. Then she started to get many animals because the staff sent the injured animals to her (Verônica Vieira, 2019 apud Borba, 2021, p. 162, emphasis added).

In this bulge, Verônica talked about the resources involved in the construction and assembly of the animals' nurseries and, coinciding with what José Antônio dos Anjos informed, stressed the importance of donations and the support provided by Nilza's former students to enable the teacher's actions since this seemed to be a personal project funded by her:

When she got a loan, she made a mini park. Before having the mini park, they stayed at home on vacation. There were many animals back home, but when she started building the mini ecological park, they stayed there all the time. And she had a former student who used to go there on weekends and vacations to care for the animals. And we always went, got many donations at Cobal, because we spent a lot of money, there were many animals. She took the money out of her pocket because her funding was to build the structure, not maintain it. We would go to Cobal and get donations of vegetables and fruit (Verônica Vieira, 2019 apud Borba, 2021, p. 162, emphasis added).

As Carvalho (2005) points out, the perception of environmental problems that emerged during the 1960s and strengthened in the 1970s made biologists start to worry about the maintenance of life on Earth, especially with issues related to pollution that affected urban centres, the extinction of species and the damage suffered by natural environments that had been impacted by industrial activity. The accelerated and undeniable extinction of fauna and flora, both in Brazil and the world, gradually came into the picture as a point of attention and as a factor that contributed to the construction of different environmental movements and discourses in favour of the natural defence and conservation of species.

Thus, the second half of the twentieth century would be marked by interlocutions between scientific knowledge and ethical and political issues. Nilza seems to have driven attention to some dimensions of environmental problems, gradually changing the focus of her pedagogical work to integrate environmentalist discourses into the educational practices she proposed, incorporating the ideology of nature conservation into the processes of teaching and learning science as a reason to give meaning to them. With this, she transformed her animal affection pedagogy, adding ecological concerns. For example, in her nursery at school, in addition to not bothering the teacher's neighbors, Matilde could count on more space and student's care and affection (Figure 5). On the other hand, the mini zoo also contributed to solving problems brought about by non-domesticated animals in the teacher's apartment, which emitted sounds quite different from the conventional barking and meowing.

Matilda was teal. The one which was a male, and then we found out it was a female. It lived here for a long time; then the neighbours were interphoning Saturday and Sunday, asking to put duct tape at the tip of the paw because no one could sleep. During the week, we would wake up early and go out with it. But Saturday and Sunday, we wouldn't. Then I had to take it to school (Nilza Vieira, 2019 apud Borba, 2021, p. 163).

Figure 5 – Student and Nilza caressing the teal Matilde in a nursery built at the school



Source: Nilza Vieira's collection.

In addition, from Goodson (1997), we can inquire whether the day-to-day management of wild animals was also configured as a practice, which served to favour the teacher to move through different disciplinary communities and, at the same time to ensure status, resources and territories for the school discipline Science at ECCB. We know that this type of action culminated in a certain notoriety of the teacher within the environmentalist niche, taking into consideration that Nilza and the fauna under her custody began to be integrated into other social spaces and more socially prestigious characters:

This one is Perfeito Fortuna, from the Circo Voador, with a boy's smile. If he let His smile out with the monkey, imagine the children. In this picture, there was an excursion, so Perfeito Fortuna came. He met us at an Art and Education meeting in Friburgo, and we were there with all the animals. Afterwards, he went there and intended to present with Caetano Veloso. With Caetano Veloso's style and my way with the animals, but it did not work out ... (Nilza Vieira, 2019 apud Borba, 2021, p. 165).

In Figure 6, we can see the meeting of Nilza Vieira, Perfeito Fortuna and Chico, the teacher's pet primate. The cultural promoter seemed happy and at ease with the little monkey on his shoulder, while a collar and a leash held it, as seen in other photos.

Figure 6 – Perfeito Fortuna, Nilza Vieira and Chico, the monkey



Source: Nilza Vieira's personal collection.

By mentioning the students' engagement in the activities with the animals, Nilza reinforced the discourse that the specimens acted as "differentials" that also contributed to academic performance improvement. The living beings would function as a kind of learning catalyst by holding the students' attention and arousing the curiosity in the face of evolutionary adaptations and ecological characteristics of fauna, as she exemplified by pointing to a photograph that shows her teaching with the coati called Bimba, and two interns Denise Lopes Machado and Márcia Dias Silva who were recognized by one of our interviewees, Tânia Goldbach (Figure 7):

Look at their attention. Look at this boy. They are 'bought'. They're trapped to the animal, to what I'm saying. There's no need for discipline; they're at ease. Each one sat wherever they wanted, as they pleased, even on the tree trunk. The coati is dominating. They're stuck at what I say. You don't need a disciplinarian to care for them; you don't need grades to demand their attention. Nothing. And how delightful! These are interns; they are also hooked up. Look at that smile! And look at this boy over there! He was a naughty boy The girl, such a dear! All of them are connected! The links made... (Nilza Vieira, 2019 apud Borba, 2021, p. 166, emphasis added).

Figure 7 – Nilza in class with Bimba, the coati



Source: Nilza Vieira's collection.

Over the years, the teaching practices that triggered the use of animals as didactical resources became more accepted by the ECCB school community. For example, the fact that the teacher had a pet monkey and walked around with him through the school ended up being incorporated as a trait that distinguished Nilza from other people:

Her appearance at the time was what was used [in fashion]: Gal Costa with that vast hair. Moreover, for a change, she used to stick a monkey in her hair. It was a little monkey she had. She was walking and, out of nowhere, the animal appeared. It was hilarious! It was normal. It was very typical. No one said anything, and everyone thought it was expected, natural. What do we have to say if the person... Everyone knew she was a Biology teacher, so that is it, end of the conversation, bye. However, that snake playing, children coming up and down with snake ... [the interviewee deponent ended reluctantly, but implied that it caused some awkwardness] (José Antônio dos Anjos, 2019 apud Borba, 2021, p. 167, emphasis added).

If the tamarin was better accepted, the snakes could have been better-liked. However, this statement connotes that there were different levels of tolerance towards the animals kept at school and handled in classes by the teacher and her students. That is, Nilza's actions were not uniformly understood as something welcomed by the entire school community but were crossed by tensions and contradictions in the daily curricula of the institution's Science discipline. The naturalization to which José Antônio dos Anjos refers cannot be understood as acceptance of her practices, as will be discussed in the following section.

Curricular Disputes and Destabilization Nilza's teaching in question

Despite its complexity and robustness, Nilza Vieira's pedagogical work supported by the collection and handling of animals was met with

resistance from colleagues and student's family members, in spite of the success it seemed to achieve with the students, at least to a part of them:

It was funny that the girls under 10, the ones who went to 5th grade, went to school all tidy. And then they would give it all, catching frogs, catching snakes, spiders, this, catching that. I would walk into the room, and they wanted to get everything. Who was going to keep the frog? Who was going to keep the monkey? All of them are alive! Then they would switch with each other because they could not just stay with one girl, but it was that vibe of catching. *A week would pass, two or three, and then this cute little girl would come and say, 'Teacher, my mother said you're sloppy.' I'd say, 'Sloppy. Why did she say that?' she answered, 'Because you catch all these dirty critters. Catch snake, catch a frog, keep catching these dirty creatures.'* And I'd say, 'But didn't you tell your mom that I always wash my hands? That I spent my time washing my hands? I always tell you this, and you didn't explain it to your mother?'. There were two sinks in the lab. It's something that I bring from my house like I deal with bunches of animals... Then I swept from one to the other and washed my hands (Nilza Vieira, 2019 apud Borba, 2021, p. 168, emphasis added).

Therefore, Nilza had to deal with negative pressures within ECCB. Along with her notoriety, there were difficulties, limits, and obstacles that could not always be easily circumvented. It can be thought that such conflicts and questions would even be expected, considering that the pedagogical practices of the teacher, although many of them approached the curricular innovations forged in the scope of the Movement for the Renewal of Science Teaching and were approaching the growing environmentalist ideology, also withdrew themselves from the norms and values of the more rigid school culture that there was at the time, and from the family habits that attributed disgust or fear of wild animals. In addition, the teacher's productions can be understood as attempts of changes that competed for acknowledgement with stabilized curriculum conceptions from that time, and at the same time, she intended to modify, at school and outside of it, the wild animal rejection culture.

A certain lack of support within the school itself was also mentioned when the teacher remembered the challenges of feeding the animals apart from school days:

Saturday and Sunday, we had to jump the wall to feed the animals when I managed to build the nurseries, and they went to live there. The watchman and the watchwoman would not open the gate for me. I kept knocking and knocking, then I would go around the school from side to side, and they wouldn't open it. She had to ask the neighbours for ladders, put them on the wall and jump. It was a high wall. She jumped through the Yard side, so she could feed the animals (Nilza Vieira, 2019 apud Borba, 2021, p. 169, emphasis added).

José Antônio also remembered incidents in which the teacher had problems getting help to perform tasks related to the maintenance of the nurseries, considering that some students avoided her when they realized that some requests would be made:

She would come out of the lab and say: 'come here, help me', 'help me get a chair out of place', 'help get a bag of whatever out of the car'. It was more of a manual kind of help that she wanted. *So much so that some students barely felt the smell of her car; they would run to the hills, so they would not have to help her.* (José Antônio dos Anjos, 2019 apud Borba, 2021, p. 170, emphasis added).

Regarding the use of animals for didactical purposes, the teacher mentioned she worked with living specimens to handle and present external structures and evolutionary adaptations. However, teacher Walter performed dissections or vivisections⁶:

Walter did it [the dissection], and it broke my heart. He took it and did it, but he thought it was necessary. So, when he opened it, I took it to show it too. But I was broken. He opened frogs, snakes, These kinds of animals... Rats. Sometimes he dared to open rats too. Once, he took a pregnant female home and 20 babies were born. Then, mice infested my house. They went everywhere, and Candido [husband] and I were in the middle of them. Walter Took it to my house for pity of the animal (Nilza Vieira, 2019 apud Borba, 2021, p. 170).

About the dissection or vivisection of animals in practical classes, José Antônio also recalled the execution of this activity by teacher Walter, emphasizing that teacher Nilza would instead work differently:

I remember that teacher Walter liked opening the creatures and dissecting them. She, on the other hand, wanted the creatures alive. They could even use it to do the same practice, but I never watched it. It was nice, one complementing the other. She would show the animal alive, and he would dissect it, stuff it, and show the digestive tract. The students loved it. There was a period when they would come with live snakes on their hands. I would go up the stairs, which was funny, because if a snake appeared in front of me.... I swear to God! There were people running in desperation (José Antônio dos Anjos, 2019 apud Borba, 2021, p. 170, emphasis added).

Respecting the dissection and vivisection practices, as well as the use of dead animals in practical classes, Veronica added that a zoological collection was gradually being created from specimens that arrived at school, already lifeless, without teachers having to sacrifice them and use them in their classes:

Walter would take a dissected opossum they had, take it to the middle, and open it there. Everyone looked, studied compared anatomy right there. [...] *No one has ever killed*

animals. People used to take dead animals to them because they knew there were two Science teachers and a lab at the school. Moreover, that's how this collection started: every dead animal was taken to them. They dissected some dead animals and left them in formaldehyde for the animal anatomy class (Verônica Vieira, 2019, apud Borba, 2021, p. 171, emphasis added).

In contrast to these memories of Nilza, Veronica, and José Antônio, Irma Rizzini remembered a class with amphibian vivisection held by the teacher, but, on the other hand, she agreed with other reminiscences linked to the management of live snakes. These indications of memories remind us that these are productions and constructions influenced by several factors, including the narrative that one wishes to hegemonize, even if unconsciously:

I remember [Nilza] dissecting a frog. Poor little frog! I didn't dissect it, it was in a group, and I just looked. She taught us how to dissect, cut, open the frog and observe... And the frogs died. [...] I also remember that there was a snake. There was a class where she took out the snakes, it was the fake coral snake, and we were fascinated. It was alive, and Nilza put it in our hand and said we could take it while explaining the differences between a false and a real coral snake. She explained what a poisonous snake was and showed the difference in the head, body patterns, and teeth. She showed the patterns as the snake passed through our fingers. It was the one time in my life that I held a snake (Irma Rizzini, 2019 apud Borba, 2021, p. 171, emphasis added).

These narratives are relevant to historically situate the experiences and pedagogical practices involving the use of animals in Nilza's classes and how she dealt with social, political, and cultural issues. According to Magalhães, Massarani and Norberto Rocha (2021), activities with animal experimentation were encouraged by the Movement for the Renewal of Science Teaching. By analyzing didactic works and some publications in the São Paulo press, these authors could indicate that, in the 1960s, this practice was well accepted and considered relevant in science learning. Later, they began to be restricted and avoided in the following decade. Thus, over time, discussions related to bioethical issues gained strength and pushed for the regulation of the requirements for the creation and handling of laboratory animals, contributing to restricting the usage of animals to strictly scientific experiments under controlled and legally determined conditions. From the mid-1970s, bills that aimed to prohibit practices of dissection or vivisection of animals in schools emerged and were approved, culminating in Federal Law number 6.638 (Brasil, 1979), which vetoed, once and for all, the use of animal experimentation in Science teaching.

Despite having nurtured a differentiated professional exercise, which positively impacted different social and educational fields, the management of live animals ensured by the mini zoo within the school

became unsustainable in the face of the opposition inside the institution. These practices and vivisections for didactical purposes conflicted with what Nilza defended as animal affection development. The decline of this space, well represented by both the naturalistic and environmentalist auspices of the teacher, in the late 1980s, might have been a decisive factor for her to stop working at the school:

There was a time when everyone was picky about the excrement from the mini zoo. So, they reported it – I don't know who – and the Ibama came and closed the zoo. When it was over, everyone was shocked by the situation because nobody expected it to happen the way it happened. They came, took the animals, and that was it. She cried a lot, and she got very sad. Poor thing. In fact, not only her. We got sad too, mostly her because she was responsible for it. After that, it was finishing, finishing, finishing. Then she moved away from school (José Antônio dos Anjos, 2019 apud, Borba, 2021, p. 172, emphasis added).

Besides broader transformations in the organization of the municipal and state educational systems, from the 1990s onwards, the shared spaces used by ECCB and Manuel Bandeira State College also underwent modifications. Renovations in the school structure at a state level aimed to share in a more hermetic way the areas each educational institution could use. Such movement was crucial to decisively interdict Nilza's actions at Camilo Castelo Branco School, preventing her from continuing with the practical classes and activities with live animals:

There was a time of a crazy renovation in which they [the authorities responsible for the spaces] ended with all our laboratories. [...] I was also affected because I lost a typing lab. We were all harmed at the time, and Nilza was one the most affected at that because she lost her lab space on the third floor and the mini zoo she kept down there. It was in the 1990s. It was a difficult period for us. Then, she was gone. Nilza was transferred to another school and we have never met again (José Antônio dos Anjos, 2019 apud Borba, 2021, p. 172, emphasis added).

Despite the mini zoo's outcomes and the laboratories contributing to Nilza leaving the school, Verônica revealed that an invitation allowed the teacher to continue working with the biodiversity and the environment aligned to the teaching of Sciences matters. In this way, this severe tension of work kept on an experimental and naturalistic basis may have further boosted her approach to environmentalism and contributed to the development of environmental educational practices that aimed at broader matters, going beyond biological knowledge by itself:

At the same time this happened [renovations in the school and invalidation of Nilza's spaces], the invitations for her to create the first Science Pole arrived. She migrated from Camilo to Ipanema CIEP and inaugurated the first Science and Mathematics Pole in Rio. In the end, there were ten poles: one per CRE and hers was the first⁷. [...] It was

an environmental education thing. Environmental education has always been in that socio-environmental view, contextualizing the political view (Verônica Vieira, 2019 apud Borba, 2021, p. 173).

In this sense, another critical aspect to be highlighted is that the approaches to environmental education exercised by the teacher have also been changing over the years. Suppose the first dialogues and actions align more with the macrotrend that Layrargues and Lima (2014) categorize as a conservationist. In that case, from the 1990s, near the end of her career in General Education, Nilza approached a critical, emancipatory strand of work with the environmental issue from the problematization of social and cultural issues interconnected to the environmental theme.

We can affirm this because, until she entered into the Master's Program in Education at the Fluminense Federal University (UFF), the teacher did not bring socio-environmental debates as constituents of her classes: the discussions of environmental themes circumscribed to the taxonomical, physiological and ecological bias. For that matter, Verônica also observed a change in her mother's trajectory and her positioning towards socio-environmental issues, with a decisive rupture after the Master's degree:

She had a more preservationist view, focused on zoology and botany, under a biology approach. She became more involved in politics when she began studying with politicized people. She began to address the social issues together with the environment, having a more critical environmental education even with a socio-environmental view. Then I didn't care about the part of zoology and botany solely and started to work on this inserted in the ecosystem matter, the pressure on the ecosystems, the planet, and the historical question of how the country suffered the impact of colonization. Her view, which already was a different view of valuing native fauna and flora, was becoming more political (Verônica Vieira, 2019 apud Borba, 2021, p. 174, emphasis added).

The interviewee recalled the difficulty and risk for her mother to work with social, economic and political aspects integrated into the discussions on the environment during the civil-military dictatorship. Firstly, because of the censorship and violent persecution that the regime made of anyone who seemed an opponent, it was enough to nurture and disseminate any critical and problematizing thinking of the hegemonic status quo. Secondly, because the reflections on environmental issues themselves were still little consolidated in the country in the mid-twentieth century:

I was born in 1968, but I know they [my parents] were terrified. Local authorities called them a few times to clarify some things in the book. They were terrified, but she wasn't politicized then; she was only concerned about biology and preservationism. What, at the time, was an

avant-garde view of preserving the environment for future generations. [...] When she was more of a preservationist, she had Pierre Lucie, an educator, [Ronaldo de Freitas] Mourão, from the Planetarium, and Maurice Bazin, a physicist, as references. They were scientific references, saying. Pure science. After she became the politics goody-goody, her references became Nilda Alves, Marcos Arruda, Frei Betto, and the more politicized people. She changed her profile (Verônica Vieira, 2019 apud Borba, 2021, p. 174).

These observations are essential to show transformations in the teacher's knowledge, discourses and practices, but in no way do we intend to be anachronistic. We are aware that, in Brazil, the first attempts to relate the work with environmental themes to the teaching of Sciences emerged in the early twentieth century (Carvalho, 2005) and were intensified in the 1970s and 1980s from pressures of social movements, environmental organizations and international incentives resulting from events such as the Stockholm Conferences in 1972 and Tbilisi in 1977 promoted by the United Nations (Loureiro, 2008; Carvalho, 2008). Thus, as Carvalho (2008) points out, only in the mid-1980s did a more consistent and significant public debate begin to be shaped in the Brazilian scenario, driven by the re-democratization and the approximation of the environmental discussion with popular education.

Therefore, the teacher remained attentive to the changes and adapted herself to the new times, ensuring the preservation of her prestige. Her "love" for animals, nature and her passion⁸ for science made her develop a particular taste for teaching, finding a way to signify and realize some of her dreams in the school. According to the interviews, the approaches to environmental problems constructed by Nilza also began to incorporate elements from other knowledge areas beyond the biological jurisdiction.

From Loureiro (2008), we can reflect on variations in Nilza's work trends and the plural understandings about what would be to develop environmental educational practices in which the teacher operated over the years. A diversity of conceptions, agents and regulations constituted the beginnings of the Environmental Education field in the country, creating specificities in the Brazilian environmental debate trajectory connected to the teacher's life history. As pointed out by the author, state-sanctioned documents and legislations that guided the subject in the 1970s and 1980s, amid the civil-military dictatorship and without widespread involvement, associated the approach of environmental issues to work with ecological relations from a behaviourist and technical perspective. There was an expectation that conserving the Brazilian natural heritage would favour the country's development, but there needed to be more room for social and cultural discussions.

It should be noted that the Brazilian environment was under attack by Brazilian developmental processes, either in urban centres or in fields and forests, as the uncontrolled and concentrated population growth, especially in São Paulo, the construction of the Transamazônica Highway and the intense devastation of the Atlantic Forest through-

out the Brazilian coast. Add to this the fast pace and carelessness of industries with the air quality, water and life, threatening the migrant populations and the poorest segments, including the Afro-descendant contingent that remained without fundamental rights. Such populations watched unresponsive to the increase in buildings – as the song *Construção de Chico Buarque* (1971) sadly recorded.

In this period, where environmental education was strictly connected with the teaching of ecology, Nilza began to have a higher interlocation with worries about the environment, which could not reflect on her pedagogical practices. It is worth mentioning that, as Lima (2019) argues, this historical marker is still present in current daily curricula: on the other hand, the legislation signals that environmental education practices should be interdisciplinary or even transversal, the school subjects Science and Biology remain the refuge of the main initiatives for environmental themes discussions in schools.

Although nowadays, actions restricted to the conservationist perspective and behaviourist thinking are subject to harsh criticism (Layrargues; Lima, 2014; Loureiro; Lima, 2009), a socio-historical analysis of the issue prevents us from ignoring the contributions of environmental movements for the development of the Environmental Education field in Brazil. As Carvalho (2008) points out, militants of the conservationist cause who, based on ecological knowledge, demanded a response from the Education field for the environmental issues, inserting pedagogical dimensions in this debate.

Final Considerations

This way, in front of the recovered images and the testimonies given, one can think whether Nilza Vieira radically lived the environmentalist ideology by striving to settle any separation among society, culture and nature, even noticeable in the custody of living animals in her own house as an improvised experience while an appropriate space was not yet provided at school or both things. Authors such as Carvalho (2005) and Loureiro and Lima (2009) point out that the Western and modern distance built between humanity and the natural environment was a significant catalyst of the environmental crisis. Also, the environmentalist discourses and practices on the rise since the 1970s try to problematize this distinction, reducing the distance between humankind and nature.

Throughout the investigative process recovered by this text, it became increasingly evident that fostering knowledge building about biodiversity and didacticize them from an evolutionary perspective was one of Nilza Vieira's main pedagogical concerns between the 1960s and 1970s. However, from the 1980s on, it was possible to identify a turn in her intentions as a teacher. The purposes of her work started to be increasingly correlated with environment preservation, bringing it closer to the Environmental Education field that was beginning to organize itself in Brazil (Carvalho, 2008).

Like Dubar (2005), we understand that identities are not tight but constructed continuously and procedurally. They are also forged from the insertion of the subjects in social plots, and the unfolding of the identity processes takes place fluidly throughout life. Under this perspective, it seems possible to infer that the teacher was initially driven by a “love of animals” nurtured in her life history and biological formation, firmly naturalistic. Years later, she may have realized that this careful work with animals held meanings that she had not yet realized but would become increasingly more visible and valued. The improvisations caused by the students – who brought dead or living animals, injured or not – were drawing possibilities to combine pedagogical and personal purposes.

Nilza expressed a caring feeling towards the animals she kept, carrying her actions with affectionate references. On the one hand, humanizing and introducing them into their daily routine and sharing them with students; on the other hand, she was probably driven by a desire to teach students about respectful handling of wild animals since many of them had no contact with wildlife and could not easily access biological knowledge that the teacher considered necessary. However, one cannot leave it unnoticed that, by keeping them captive, Nilza reproduced ways of domestication that conflict with current bioethical knowledge and attitudes regarding this behaviour. It is necessary to consider that social and even scientific values were not questioned at the time of these experiments. Despite the records collected from Nilza and her former students, her pedagogical intentionality was placed in favour of caring values that made sense with what she taught in the classroom or fieldwork.

The perception allowed Nilza to accept herself as an environmentalist and an environmentalist teacher. As can be seen in her interview rhetoric, this aspect was a crucial factor in the production of her narrative of herself: Nilza started to see herself as a conscious environmentally teacher, almost as if she had always been like that, regardless of the conjunctural changes that throughout her years of teaching were shaping and favouring as much the discourses as the environmentalist practices.

Finally, focusing on all the knots related to the mini zoo built by Nilza at the ECCB, we can highlight that a permanently present and easily identifiable aspect in Nilza Vieira’s trajectory is what Goodson (2015) calls the ecology of commitment. By mobilizing the life histories of professionals such as teachers and nurses, Goodson (2015) argues that there are people who build their careers supported by a sense of personal mission that intrinsically accompanies professional development. Hence, these professionals invest a lot of time and energy in their labour activities, including interconnecting them to other sectors of their lives. Thus, if Nilza’s teaching foci were gradually changing, on the other hand, her commitment to teaching remained high and was the tone for the production of practices that could be inscribed in the sources we analyzed.

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Notes

- 1 The article is based on the doctoral thesis of the first author, developed within the scope of the Education Program of the Fluminense Federal University. The research was part of a research project broader, entitled *Teacher narratives and generational dialogues in the construction of the school discipline Biology*, which has the promotion of the National Council for Scientific and Technological Development (CNPq).
- 2 In order to facilitate the article reading, we use the term “biodiversity” to refer, in general, to the variety of species found in a territory during some time period due to the wide circulation and assimilation of this concept in the present time. We know, however, that the concept of biodiversity was constructed and legitimized by ecologists only in the late 1980s (Frank, 2013). That is, before that, the concept was not established and was not actionable by Nilza Vieira in her classes.
- 3 According to Magalhães, Massarani and Norberto Rocha (2021), live animals' use in classes was well accepted and encouraged in the 1960s. This scenario began to change in the following decade until the establishment of legislation that prohibited such practices, as will be discussed later.
- 4 The squirrel tamarins (*Saimiri* sp.) are primates popularly known for passing urine through the body, giving them a characteristic odour used for communication and territory demarcation. They are small in size, are not very aggressive with other monkeys, usually live in groups and have a generalist diet. They are considered invasive species in many places, including in the fragment of the Atlantic Forest that connects to the Botanical Garden of Rio de Janeiro, which brings environmental impacts due to anthropic action. For their physical and behavioural characteristics, these monkeys are a common wildlife trafficking target, which often results in the subsequent release into inappropriate environments (Oliveira; Grelle, 2012).
- 5 According to Nora (1993), the *places of memory* are material, symbolic and functional spaces characterized by a ritualized and non-spontaneous aura that collaborates to transform memory into history. In addition to preserving and attributing meanings to collective memory, the places of memory also corroborate the invention or reinforcement of identities.
- 6 Dissection consists of opening the body of a dead organism to study its anatomy. Vivisection is the opening of an anaesthetized or sedated organism, but still alive, which allows the observation of the functioning of organs and systems *in vivo*, favouring the understanding of physiological aspects. Since the 1970s, dissections and vivisections have fallen into disuse in Science and Biology classes, becoming unusual practices in schools due to bioethical debates that questioned the use of animals in experiments for didactic purposes. The Federal Constitution of 1988 and Law 11,794/2008 endorsed the prohibitions of this type of activity in schools in a more vehement way, especially involving vertebrate animals.
- 7 From 1995 to 1997, the teacher remained in an extra-class function, working in a Science and Mathematics Pole that served municipal schools in the south area of Rio de Janeiro, focusing mainly on developing curricular materials and teacher training activities aimed at environmental education.

8 Throughout the text, we use quotation marks in “love of animals” because we understand it is a colloquial expression. We understood the appreciation, care and affection by Nilza Vieira for these animals, but the feeling was not exactly equivalent to the love she felt, for example, for her daughter.

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Natural History and Environmental Education in Dialogue in Science Teaching

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