**A Leibnizian Fieldwork: Zebra Stripes and the *Monadology***

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Abstract: The first proposition of Leibniz’s *Monadology* —  ‘the monad … enters into the composites’ — is difficult to understand. How can an immaterial monad (i.e. a point of view) enter into material bodies (the composites in Leibniz’s vocabulary)? This proposition, I argue, can be grasped more easily with a concrete example. I found such an example in the work of the biologist Tim Caro on the origin of zebra stripes. By paying attention to the points of view of some companion species of the equid, namely the lions, the hyenas, and the flies, Caro concludes that zebras have stripes in order to deter the insects. Thus, if the flies perceived the world differently, the zebra would have another coat. In a certain sense, in the dynamics of evolution, the fly’s point of view has entered into the zebra’s body, a conclusion that comes back to the monadological proposition. In the article, I show how the fieldwork of Caro illuminates various aspects of Leibniz’s perspectivism. I also explain that Caro’s work is perspectivist not merely because of its conclusion; perspectivism is at the core of his fieldwork.

Keywords: Philosophy of biology; Gottfried Wilhelm Leibniz; Perspectivism; Zebra stripes; Body.

**Fieldwork and philosophical propositions**

Many fieldworkers, in particular ethnographers, entertain a critical stance against ‘armchair philosophers.’ For instance, Philippe Descola affirms that no amount of suspension of belief — a classical method in philosophy — could ever come to question our preconceptions in such a radical way as encounters with societies where our most widely accepted ideas are rejected.[[1]](#endnote-1) However, even if he criticizes a particular philosophical approach, his work has been discussed among philosophers. For instance, without being a field philosopher himself, Michel Serres enriched his thinking with knowledge constructed by Descola in the field.[[2]](#endnote-2) Ethnography is probably one of the important field disciplines that communicates with philosophers, in part because a lot of ethnographers, such as Descola, but also Claude Lévi-Strauss or Clifford Geertz, were in fact students of philosophy so that their questions remain informed by it.

Other field disciplines are, among others, geography, archaeology, or biology. Often, social scientists have criticized those fieldworkers for collecting knowledge from their fields by imposing their naturalist framework without learning other ways of thinking. This is the case of the search for new pharmaceuticals known as ethnoprospection. The historian Londa Schiebinger shows how scientists hid the source of their knowledge to reinforce the idea that only Europeans were rational, but also to conform to the naturalist notion that the components of pharmaceuticals are active in themselves, independently of the context in which they are used.[[3]](#endnote-3) Bruno Latour offers another clear but less politically charged example by following a multidisciplinary team studying the soil of the Amazonian forest.[[4]](#endnote-4) In order to extract knowledge, the scientists transformed a parcel of the forest in a kind of laboratory, neutralizing the richness of the forest.

Laura Rival’s work is original in that she describes how biologists and other scientists do not only extract knowledge, but in some situations, learn also new ways of thinking thanks to their fields.[[5]](#endnote-5) The field scientists she observed in the Amazonian Ecuador and Southern Guyana interact with local communities which teach them, for instance, manners of relating to the environment. Rival, an ethnographer, has seen in those biologists ‘ethnographers of a sort.’[[6]](#endnote-6) Those scientists, she argues, could even be better ethnographers than classical ethnographers because they don’t ask questions, but invite the communities to participate in projects, empowering them and thus taking their voices seriously.

Could a philosopher say of some fieldworkers that they are ‘philosophers of a sort’? Could, in some cases, fieldworkers even be better philosophers by making some abstract philosophical propositions more concrete? This is what I argue through the example of the fieldwork of the biologist Tim Caro. Even if this case cannot and should not be generalized in a transcendental rule — philosophers should read or become fieldworkers —, this example shows nevertheless that philosophers could find new, generative ways of understanding classical theses by studying the writings of fieldworkers. Recently, Justin Smith has argued in favour of enlarging the sources of philosophy among other by considering some practices, yoga for instance, as philosophical.[[7]](#endnote-7) Fieldwork could also be a practice to include into philosophy since it can stimulate thought in the fieldworkers themselves as much as in their readers.

In this article, I begin by presenting the philosophical proposition that I will comment, namely the monadological proposition of Gottfried Wilhelm Leibniz (section 2). I continue by showing how Caro’s fieldwork enriches the interpretation of Leibniz’s thesis (section 3). In the two last sections, I underline the importance of examples to think with (section 4) and the ecological dimension of Leibniz’s philosophy which makes it maybe particularly appropriate to read in dialogue with fieldworkers (section 5).

In addition to offer an example where a fieldwork provides a rich understanding of a philosophical proposition, Caro’s work is distinct from the cases studied by Rival. While Rival shows how scientists learn from their fields through their interactions with humans, in Caro’s case, it is through interactions with animals that he became sensible to other ways of constructing knowledge. By emphasizing the importance of interactions in the construction of knowledge about animals, I consider my work as a possible prolongation of Vinciane Despret’s thought.[[8]](#endnote-8)

**The monadological proposition**

The *Monadology*, a short text of 90 paragraphs written in 1714, is one of Leibniz’s most significant works.[[9]](#endnote-9) In it, he tried to synthesize his philosophical system, but its brevity makes its understanding sometimes difficult. In fact, the problems of interpretation begin with the very first sentence where Leibniz states one of the most important, but also one of the worst understood propositions of his philosophy: ‘the monad … enters into the composites,’ ‘la monade… entre dans les composés.’ I will call that thesis the ‘monadological proposition.’ To make that proposition clear, I have omitted the middle part of the sentence which in full states that ‘the monad, which we shall discuss here, is nothing but a simple substance that enters into the composites*.*’ I have slightly modified Robert Ariew and Daniel Garber’s translation by adding the definite article ‘the’ before ‘composites’ to better reflect the French original. That point is also important because, as I will argue later, following my interpretation, each monad enters into all the composites, not only into some composites as Ariew and Garber’s translation could imply. I intentionally cut out the middle part also because I will not focus here on the status of monads as substances nor on their simplicity, two notions I will only be able to comment briefly

When Leibniz speaks of ‘composites,’ he means material bodies.[[10]](#endnote-10) For instance, at the beginning of another opuscule, also written in 1714, *The principles of nature and grace*, our philosopher speaks of ‘composites or bodies’ as synonyms.[[11]](#endnote-11) Furthermore, Leibniz draws the concept of monad close to that of point of view. In paragraph 57 of the *Monadology*, Leibniz uses the concept of point of view to refer to the monad. In paragraph 14, he already indicates that the monad is a perceptual centre. He also suggests that the monads are immaterial substances: in paragraph 3, he says that it has ‘no extension, no shape.’ Later in the argument, I will explain why I believe it is possible to say both that a monad *is* a point of view and that it is a substance that *has* a point of view, that latter formulation being preferred by Leibniz in order to underline the stability of the monad through time.

With those elements in mind, the monadological proposition poses a problem. Commentators cannot make sense of the idea that a monad, which is an immaterial point of view, enters into composites, i.e. material bodies. Some, such as Jonathan Bennett, laugh at it outright: Leibniz is ‘a great philosopher’ who tries ‘to make bricks without straw.’[[12]](#endnote-12) In a similar vein, Glenn Hartz affirms that ’… acts of metaphysical legerdemain are common in [Leibniz’s] philosophy: what could be a more spectacular stunt than pulling monads out of a hat?’[[13]](#endnote-13) John Carriero tries to solve the problem by avoiding thinking of monads as centres of perception.[[14]](#endnote-14) He proposes instead to understand them as centres of action. By neglecting the perceptive nature of monads, he nevertheless loses rich insights of Leibniz’s philosophy.[[15]](#endnote-15) Others, such as Donald Rutherford or Robert Adams, try to minimize the ontological status of bodies.[[16]](#endnote-16) Immaterial monads, as sole real existing entities, would erase the very existence of the bodies Leibniz nevertheless affirms they are contained within. In their reading, bodies are appearances, not real entities. However, Justin Smith provides an answer to such commentators: ‘the invocation of these basic entities [i.e. the monads] underlying body is not intended by Leibniz as a means of *explaining away* body. Instead they offer a means of *accounting for* body.’[[17]](#endnote-17)

I will come back to some of these commentators later, but for now I want to expound how I came to understand the monadological proposition. As I will explain, the commentators often fail to feel the actuality of Leibniz’s thought partly because they do not work with empirical examples. I must also signal that philosophers who are not writing detailed commentaries can nevertheless guide our reading. Gilles Deleuze, for instance, provides a very enthusiastic reading of Leibniz.[[18]](#endnote-18) However, with his metaphor of a two-stage house, one for the bodies, the other for the monads, Deleuze missed the opportunity to understand the monadological proposition which asserts that the monads are not separated from the bodies, but are in them.

**Zebra stripes**

Thus, it is neither a commentator nor a philosopher that helped me grasp Leibniz’s proposition. As strange as it might sound, I came to understand it with a zoologist and the animals that he studies. I have a vivid memory of the day I read Caro’s article on the zebra stripes published in *PlosOne* in January 2016.[[19]](#endnote-19) It is then that I began to feel the importance of Leibniz’s idea.

In that scientific article, Caro and his team ask a child’s question: why does the zebra have stripes? Since the time of Charles Darwin, Francis Galton and Alfred Wallace maintained that the stripes are a camouflage against their predators, in particular the lion and the hyena. That hypothesis was in fact counterintuitive. The zebras were indeed known to be animals visible from far away. However, Galton, who took part in a two-year expedition in Namibia, explains in a letter to Wallace that: ‘in twilight, the zebras are not at all conspicuous.’[[20]](#endnote-20) Their singular skin could be a form of camouflage, because at twilight, at the moment of the predators’ attack, they are not that visible.

That hypothesis, based ultimately on the human eye or even more specifically on the eye of Francis Galton, was carried over from generation to generation without being put thoroughly to the test. Some psychologists have shown that stripes could indeed confuse the vision of students trying to detect objects moving on a computer screen, but here too human vision was still at the centre of the investigation.[[21]](#endnote-21) In fact, the human eye has led the camouflage studies more broadly. As Graeme Ruxton shows through a review of the literature, it is very difficult to study non-visual crypsis or even visual crypsis aimed at hiding from nonhuman eyes.[[22]](#endnote-22) Notwithstanding, Caro wants to test Galton’s hypothesis, as he says in the title of the 2016 article, ‘through the eyes of the predators of the zebras.’[[23]](#endnote-23) Therefore, with his team, Caro tries to reconstruct how those predators see the zebra, at different distances, in different environments, and in different light conditions. Figure 1 offers a little sample of such reconstructions.

[Figure 1: Image of a solitary plains zebra at a distance of 6.4 m as it may appear to a lion (left) and a spotted hyena (right) under day light. Creative Common: Melin *et al*., ‘Zebra stripes.’]

It is hard work to reconstruct the point of view of a specific animal. It demands collaboration between physiologists who describe the form of the eye, ecologists who know the habitual conditions of the animals, and animal psychologists who try to make experiments in order to measure perceptual capacities.

However, whatever the amount of effort, the reconstruction could never be perfect. In the first place, because it is impossible to know perfectly how someone else perceives the world, all the lesser how an individual from another species could perceive it. In addition, even if we could reconstruct the point of view of the lion, the fact that we would only see the result through human eyes would already encompass a bias: we would only see the point of view of the lion through a human point of view, whereas the lion perceives directly the content of its perception.

Moreover, the graphic reconstruction provided by the scientists stabilizes artificially the perceptions that are in fact in a constant flow (Leibniz insists that ‘fluidity is original’).[[24]](#endnote-24) Depending upon what one sees just before or just after a given perceptual experience, the perception is different. A same colour can look more obscure after having seen lighter colours for instance. A point of view or a perception changes constantly, but there is a relation between one perception and the antecedent and subsequent perceptions. It is that relation that Leibniz wants to underscore by speaking of the substance that has perceptions. However, if, as I have just explained, a perception or point of view is inseparable of the series of previous and following perceptions, then the monad can be said to be the point of view, since the concept of substance (the underlying series) is already contained in any perception. It is thus the inseparability of a perception and the series of previous and following perceptions that explains why, in my opinion, we could say both that the monad *is* a point of view and that it is a substance that *has* a point of view.

In addition to stop the flow of perception, the graphic reconstruction separates vision from the other perceptual modalities. This creates another artifice, because a perception is a whole where a change in one sense affects the other senses. We know that watching a movie without the sound triggers a very different experience from that of watching it while hearing the soundtrack. When Leibniz speaks about the simplicity of the monad (as in the first sentence of the *Monadology*), he refers to the interconnection of its whole perceptual experience. A monad is simple because the perceptions it has are indivisible. If a little detail in the sound changes, the visual experience also changes.

However, even if it is impossible to reconstruct in a completely adequate way another’s point of view, by aiming to it, we already obtain relevant information. Leibniz states something very similar in the *Monadology*, paragraph 15: ‘it is true that the appetite cannot always completely reach the whole perception toward which it tends, but it always obtains something of it, and reaches new perceptions.’ Caro’s appetite tended toward the lion’s and the hyena’s points of view. Although he didn’t completely reach those points of view, he nevertheless obtained something, at least enough to be able to assert that the stripes don’t hide the zebra from his main predators, because those predators begin their attack run before they can visually perceive the prey’s body, be it striped or not. In fact, it seems that for hunting they use olfactory and auditory cues instead of visual ones.

Interestingly, Caro also studied the perception of another ‘companion species’ of the zebra.[[25]](#endnote-25) With the help of his team, he asked how flies perceive the body of an equid (we know that flies, more specifically the tsetse fly, are dangerous to mammals because they carry parasites). Obviously, it is much more difficult to reconstruct and to represent the perception of an insect than that of a fellow mammal (but even this should be modulated because some perceptual capacities of mammals are difficult to imagine as the bat’s echolocation famously commented by Thomas Nagel).[[26]](#endnote-26) An indication of that difficulty is the absence of such a reproduction in Caro’s articles or in his book where he summarized his almost two decades of work around zebra stripes.[[27]](#endnote-27) He was able to approximate and put on paper the points of view of the lion and of the hyena, but not that of the fly.

Notwithstanding his inability to reproduce the fly’s point of view, Caro could guess and maybe feel that point of view based on experimental results. As the anthropologist Alfred Gell explains, traps are ‘lethal parodies of the animal’s *Unwelt*.’[[28]](#endnote-28) They inverse the point of view of the animal in order to entrap them. In trying to know the fly’s point of view, Caro used traps, following a long tradition of hunting. In one experiment, he placed insects’ traps, some covered with a zebra coat, others with a black coat. At the end of the day, he could count the number of insects that became trapped: there were more on the black trap than on the striped one, confirming other experiments in the laboratory concluding that flies have a repulsive reaction to stripes. Since tsetse flies use movements also as a cue, Caro made other experiments where he dressed up as a zebra and walked more than 20 kilometres in the Tanzanian national park with that dress. During that experiment, Caro carried a trap which allowed him to count the number of flies attracted by the zebra coat; there were few, which corroborate the results obtained in the previous experiment.

Traps are interactive devices where a predator (or a scientist) subverts the point of view of the prey (or the studied animal). In general, it is only through interactions that we, i.e. all living beings, can approach another’s point of view (even without being able to put a reproduction on paper). Carla Hustak and Natasha Myers analyse a beautiful example of such perspectivist interactions.[[29]](#endnote-29) The orchid simulates the sexual pheromones of the bee in order to attract them inside their flowers; in that sexual and playful interaction, the orchid takes into account the perspective of the insect. At another level, Darwin, in order to study the sensibility of the orchids, tickled them in sensual ways. The orchids play with the bee’s point of view, the scientist with that of the plant. Even if Caro’s experiments are less sensual, they are not any less interactive.

We don’t know what precisely in the stripes perturbs the flies. Caro is nevertheless able to conclude that those insects feel some sort of repulsion for the striped body. He also analysed the places where the zebras lived and those where tsetse flies prosper. It seems that there is a high correlation between the presence of tsetse flies and the abundance of stripes on the equids. From the experiments and those statistical correlations, Caro concludes that it is highly probable that the stripes act as a defence against those little insects.

The companion species of the zebra, in particular the fly, are thus, to speak loosely, ‘part and parcel’ of the zebra’s body. If the flies perceived differently, the zebra stripes — zebras as we know them — wouldn’t exist. In the dynamics of evolution, *the point of view of the flies entered into the body of the zebras*. It’s a real ‘involution’ to borrow Hustak and Myer’s concept.[[30]](#endnote-30) And here we are back to our Leibnizian proposition, ‘the monad enters into the composites.’

When we speak of a monad being ‘a part of’ of body, we are speaking loosely, because Leibniz draws a conceptual distinction between parthood and inherence.[[31]](#endnote-31) Parthood indicates a relation between homogeneous terms: a part of a body must itself be a body (the foot, which is a part of an animal body, is itself a body). In contrast, inherence indicates a relation between non-homogeneous terms. Following Leibniz, in mathematics, we can say that a point is ‘in’ a line, but not that the point is ‘a part of’ the line, because the line has two dimensions, whereas the point is one-dimensional. The same is true for the monad which enters into the body without being a part of the body since the body is material and the monad immaterial.

**Examples to think with**

Leibniz was certainly not thinking about the zebra and the fly when writing the *Monadology*. However, following the above, those animals in interaction provide a concrete example that allows us to grasp the monadological proposition intuitively. It is at least, I believe, a much better example than the ones the commentators use. When they try to make sense of the monadological statement, they propose simple examples. For instance, during a plenary session of the 2016 Leibniz Congress, Massimo Mugnai affirmed, while touching the table, that there should be little monads insideit.[[32]](#endnote-32) Shane Duarte also understands that each ‘animal’s body’ is made up of a given ‘collection of monads;’ those monads are inside that given body. So, he entertains the idea that there are ‘monads in a muscle fibre in one of the biceps of the human being.’[[33]](#endnote-33)

To defend his idea, Mugnai could invoke microbes and other tiny beasts, which, it’s true, exist and are in the table. However, the examples of the table and of the biceps as taken by the authors are not good ones, because they could be understood as presupposing that monads have an extension, some being smaller, others bigger (the monads in the biceps should be smaller than those in the whole human body). In contrast, Leibniz insists, in paragraph 3, just two lines after positing the monadological thesis, that monads are neither small nor big: they have no extension. Indeed, how could we say that the point of view of the fly is smaller than that of the lion? Its body is bigger than that of the former, but we cannot compare points of view with a measuring tape. Mugnai and Duarte are cautious to clarify that the monad as such has no extension, but that the ‘organic body’ associated to the monad has. In the *Monadology*, the concept of organic body is introduced after explaining, in paragraph 60, that all monads perceive the infinity of the world, even though their ‘representation is only confused as to the detail of the whole universe.’ The monads are different from one another because they perceive the world differently. So, both the tiny insect and the big mammal perceive the same infinite world, but in different modes.[[34]](#endnote-34) In paragraph 62, Leibniz continues by arguing that, even if each monad perceives the whole universe, each is associated to a body in particular, its ‘organic body’ which the monad perceives more distinctly. Mugnai and Duarte use that concept to distinguish, for instance, the muscle fibre (a material body) and the monad associated to that body. However, to think about the relation between monads and bodies, those authors propose only examples where the monad entering a body A is a monad associated with a smaller organic body B and that lives inside body A. So, Duarte’s main example is that of a monad associated to the muscle fibre that enters into the organic body associated with the monad of a human being. Even if the commentators try to avoid a physical interpretation of monads, such examples tend to conceptualize monads as smaller or bigger than others.

If the example of the table is meant to be simple, it’s not a good one. Nevertheless, I think that we could deploy that example and ask ourselves, as Leibniz invites us: what monads, what perspectives, cross that material object? In fact, I came to like the example of the table, because my brother is doing an ethnography of tables and other material devices.[[35]](#endnote-35) In a classroom in Morocco, he tries to describe the variety of points of view that enter into the tables, the blackboard, the schoolbooks. The perspectives of the teachers, of the director, of the pupils and their parents: there is a great variety of perspectives bearing on and constituting a table. We could paraphrase paragraph 68 of the *Monadology* and say that even if the tables don’t perceive, they are full of monads.

The question Leibniz asks us is, in fact, to try to describe which points of view constitute particular material objects. To answer such a question, which will always be different from case to case, we need to cultivate an ‘art of noticing’ as proposed by Anna Tsing: ‘At the heart of the practices I am advocating are arts of ethnography and natural history. The new alliance I propose is based on commitments to observation and fieldwork — and what I call noticing.’[[36]](#endnote-36) That makes the comparison between the natural-historical work of Caro and the ethnographic work of my brother pertinent. Both traditions, as Tsing affirms, have cultivated that art of noticing.

**Ecological bodies**

Another aspect I want to emphasize is that the Leibnizian proposition pushes us to replace all bodies in their contexts. Like Alfred North Whitehead, Leibniz is very cautious of abstraction, that is to say of all techniques that abstract, that take a body out of its context. It is only by putting a body in its milieu that we can ask what perspectives bear on it, what perspectives cross that body. This is a reason why Leibniz’s thought is profoundly ecological: we must always ask ourselves why a given body appears at that precise place and time, in that specific milieu. My interpretation of the monadological proposition reinforces thus the reading recently provided by Pauline Phemister who studies the ecological dimensions of Leibniz’s thought.[[37]](#endnote-37)

Leibniz criticizes in a certain way the Modern naturalistic ontology that Descola understands as an ontology where bodies are supposed to exist independently of any perception.[[38]](#endnote-38) The philosopher, on the contrary, affirms that a body does not exist independently of the points of view that constitute it. In an obscure remark in the *New Essays*, Leibniz says that we should take into account the points of view of the animals only in ‘their initial formation,’ i.e. when studying their constitution, not while trying to describe their anatomy.[[39]](#endnote-39) Bennett thinks that Leibniz says that in order to avoid the conflict between a materialistic science and a teleological philosophy, but, the commentator continues, Leibniz should have admitted that in reality the perceptions were superfluous to the physical description of bodies.[[40]](#endnote-40) The structure of Caro’s book seems to provide a good answer to Bennett.[[41]](#endnote-41) In it, we find a chapter at the beginning explaining in a few pages the anatomical part of the zebra’s skin. This chapter is ‘abstract’ in the sense that it describes the body of the zebra independently of its companion species. However, the anatomical description doesn’t allow Caro to eliminate those companion species. The rest of the book looks at what Caro knows his abstraction hides. As Leibniz affirms, ‘an abstraction is not an error as long as one knows that what one hides is there.’[[42]](#endnote-42) Even if the physical description of the zebra is important, it cannot explain in itself why that particular coat emerged. Perspectives are important because they participate ‘in the formation’ of the bodies, they don’t stay inside the body as would a brick inside a house. When Leibniz states, in the monadological proposition, that the monads enter into the bodies, it means, following my interpretation, that the monads have played a role in their constitution.

The monadological proposition is an invitation to think relationally: we cannot study a body ‘right to the end’ without putting it in relation to its companion beings.[[43]](#endnote-43) By consequence, when Leibniz says that the monads enter into the composites, he does not want us to believe that the monads are smaller than the bodies wherein they enter (what Mugnai and Duarte’s examples could suggest). The flies are small, but their point of view is neither small nor big. However, there are monads contributing more to some bodies than others. In our example, the point of view of the lion was less present in the body of the zebra than the point of view of the fly; the lion’s perspective was probably nevertheless marginally present. We can even presume that the human point of view could also be in that body, but probably to a yet lesser extent. In other bodies, those proportions are different.

As we already underlined it, Leibniz says that ‘the monad enters into *the* composites,’ i.e. in all the composites, not only some. This follows also from the idea stated in *Monadology*, paragraph 60, mentioned earlier that each monad perceives the whole universe. If, by perceiving a body, a monad participates to its constitution, each monad must then contribute to all the bodies that are part of the universe, even if that contribution is marginal for the vast majority of bodies that are perceived only obscurely. By consequence, each body is different not because of the monads that enter into it since the same monads enter into all bodies. A body is different from another because of the particular balance that the same infinity of monads maintains in it. We could construct a new concept of body based upon the monadological proposition where each body is defined by such a balance of points of view bearing on it and affecting it.

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I would add two comments that are not immediately present in the *Monadology*, but that are important aspects of Leibniz’s philosophy and that we find implicitly in the monadological proposition. The first is that Leibniz worked all his life against what he calls the ‘idle hypotheses,’ les ‘hypothèses fainéantes.’[[44]](#endnote-44) He didn’t like, for instance, when people invoked miracles just in order to avoid asking more questions. If someone answered the question of why there are rainbows by simply affirming that it’s a miracle, Leibniz would retort that before speaking so fast, he should study a bit more optics and meteorology.

There is, I think, a similar resistance against lazy hypotheses in his monadological proposition. He doesn’t refuse to study the anatomy of a body in a naturalist manner, i.e., independently of any perspectives, but we should always remember that doing so is an abstraction and that we should also consider the perspectives that enter into the body if we want to go ‘right to the end.’ It is not enough to look at a body, we should also see how that body is ‘multiplied,’ to use the metaphor in paragraph 57 of the *Monadology*, by the variety of points of view that bear on it and how those points of view play a role in that body and constitute it.

Constructing a purely abstract philosophy would be a lazy practice. That leads us to the second comment. Like Descartes’s *Meditations*, the *Monadology* is a paradigmatic philosophical work. It is a purely theoretical text without any concrete examples. However, contrary to Descartes who stressed that philosophy, as a methodological stance, should avoid the accumulation of empirical case studies,[[45]](#endnote-45) Leibniz always pushed for more observations. Leibniz thus draws an important link between philosophy and the field. A philosophical proposition is a general statement that does not only unify a lot of empirical singular cases, it should also prompt new explorations. The monadological proposition is a case in point. The proposition is very general: each body results from monads. However, it becomes interesting only once it allows the thinker to pay more attention to the variety of ways particular points of view form any given body. The proposition does not state a transcendent truth about all bodies, it invites us instead to observe bodies in a specific mode.

As we see, the monadological thesis is a methodological proposition. At first glance, Caro’s work is a beautiful example of a perspectivist study because its conclusion is perspectivist: the body of the zebra results from the point of view of the fly. In that statement, perspectives are considered active, which is the minimal definition of perspectivism. The flies do not just perceive the world. By perceiving it in a singular way, they change it. However, in a more essential way, Caro’s research is perspectivist because of its methodology. As a method, the fieldworker tried to approximate the various points of view that cross the zebra’s body. Therefore, he invented interactive experiments such as traps and costumes that are perspectivist devices.

That last point seems to me important to underline: Caro did not need to conceptualize his research as perspectivist in order to be so. Perspectivism does not emerge as an ontological system or a cosmology. It is primarily a methodology — a way through the world — invented by people and animals and plants. Perspectivism is an ecological practice, since it is a manner for each being of taking into account its companion species.

**Bibliography**

Allen-Harmanson, Sean. “So that’s what it’s like!” In *The Routledge Handbook of Philosophy of Animal Minds,* edited by Kristin Andrews and Jacob Beck, 157–167. London: Routledge, 2018.

Adams, Robert. *Leibniz: Determinist, Theist, Idealist*. Oxford: Oxford University Press, 1994.

Bennett, Jonathan. “Leibniz’s Two Realms.” In *Leibniz: Nature and Freedom*, edited by Donald Rutherford and Jan Cover, 135–154. Oxford: Oxford University Press, 2005.

Buchanan, Brett. *Onto-Ethologies: The Animal Environments of Uexküll, Heidegger, Merleau-Ponty, and Deleuze*. Albany: SUNY Press, 2008.

Caro, Tim. *Zebra Stripes.* Chicago: The University of Chicago Press, 2016,

Carriero, John. “Substance and Ends in Leibniz.” In *Contemporary Perspectives on Early Modern Philosophy. Essais in Honor of Vere Chappell*, edited by Paul Hoffman, David Owen, and Gideon Yaffe, 115-40. Guelph: Broadway View, 2006.

Deleuze, Gilles. *The Fold: Leibniz and the Baroque*. Translated by Tim Conley. Minneapolis: University of Minnesota Press, 1993.

De Meyer, Mathias. *Techniques et rituels scolaires : ethnographie d’une école de village au Maroc.* PhD diss., Université libre de Bruxelles, forthcoming.

Descola, Philippe. *Beyond Nature and Culture*. Translated by Janet Lloyd. Chicago: The University of Chicago Press, 2013.

Despret, Vinciane. *What Would Animals Say If We Asked the Right Questions?* Translated by Brett Buchanan. Minneapolis: University of Minnesota Press, 2016.

Duarte, Shane. “Leibniz and Monadic Domination.” *Oxford Studies in Early Modern Philosophy,* vol. 6 (2012): 209–248.

Gell, Alfred. “Vogel’s Net: Traps as Artworks and Artworks as Traps.” *Journal of Material Culture* 1, no. 1 (1996): 15–38.

Haraway, Donna. *When Species Meet*.Minneapolis: University of Minnesota Press, 2008.

Hartz, Glenn. “Leibniz’s Phenomenalisms.” *Philosophical Review* 101, no. 3 (1992): p. 511-49.

Hustak, Carla and Natasha Myers. “Involutionary Momentum: Affective Ecologies and the Sciences of Plant/Insect Encounters.” *Differences* 23, no. 3 (2012): 74–118.

Latour, Bruno. “The ‘Pedofil’ of Boa Vista: A Photo-Philosophical Montage.” *Common Knowledge* 4, no. 1 (1995): 144–187.

Leibniz, Gottfried Wilhelm. *Die philosophischen Schriften von Gottfried Wilhelm Leibniz*. Edited by Karl Immanuel Gerhardt. Berlin: Weidmann, 1875-1890 (7 volumes).

Leibniz, Gottfried Wilhelm. *Philosophical Essays*. Translated by Roger Ariew and Daniel Garber. Indianapolis: Hackett, 1989.

Leibniz, Gottfried Wilhelm. *New Essays on Human Understanding*. Translated by Peter Remnant and Jonathan Bennett. Cambridge: Cambridge University Press, 1996.

Lodge, Paul. “Leibniz’s Notion of an Aggregate.” *British Journal for the History of Philosophy* 9, no. 3 (2001): 467–486.

Melin, Amanda, Donald Kline, Chihiro Hiramatsu, and Tim Caro. “Zebra Stripes through the Eyes of Their Predators, Zebras, and Humans.” *PlosOne* 11, 2016. doi:10.1371/journal.pone.0145679.

Mugnai, Massimo. “Leibniz’s Mereology.” Paper presented at the 10th International Congress on Leibniz, Hannover, 22 July 2016.

Mugnai, Massimo. “Leibniz’s Mereology in the Essays on Logical Calculus of 1686–90.” In *“Für unser Glück oder das Glück Anderer” Vorträge des X. Internationalen Leibniz-Kongresses*, edited by Li Wenchao, 175-94. Hildesheim: Olms, 2017.

Nachtomy, Ohad, Shavit Ayelet, and Justin Smith. “Leibnizian organisms, nested individuals, and units of selection.” *Theory in bioscience* 121, no. 2 (2002): 205-30.

Nagel, Thomas. “What is it like to be a Bat?” *Philosophical Review*83, no. 3 (1974): 435–450.

Phemister, Pauline. *Leibniz and the Environment*. New York: Routledge, 2016.

Rival, Laura. “Encountering Nature through Fieldwork: Expert Knowledge, Modes of Reasoning, and Local Creativity.” *Journal of the Royal Anthropological Institute* 20, no. 2 (2014): 218–36.

Rutherford, Donald. “Leibniz as Idealist.” *Oxford Studies in Early Modern Philosophy*, vol.4 (2008): 141–190.

Ruxton, Graeme. “Non-Visual Crypsis: A Review of the Empirical Evidence for Camouflage to Senses Other than Vision.” *Philosophical Transactions: Biological Sciences* 364, no. 1516 (2009): 549–557.

Serres, Michel. *Écrivains, savants et philosophes font le tour du monde*. Paris: Le Pommier, 2009.

Schiebinger, Londa. *Plants and Empire. Colonial Bioprospecting in the Atlantic World*. Cambridge: Harvard University Press, 2004.

Smith, Justin. *Divine Machines: Leibniz and the Sciences of Life*. Princeton: Princeton University Press, 2011.

Smith, Justin. *Nature, Human Nature and Human Difference. Race in Early Modern Philosophy*. Princeton: Princeton University Press, 2015.

Smith, Justin. *The Philosopher. A History in Six Types*. Princeton: Princeton University Press, 2016.

Stevens, Martin, Daniella Yule, and Graeme Ruxton. “Dazzle Coloration and Prey Movement.” *Proceedings of the Royal Society of London B: Biological Sciences* 275, no. 1651 (2008): 2639-43.

Tsing, Anna. *The Mushroom at the End of the World. On the Possibility of Life in Capitalist Ruins*. Princeton: Princeton University Press*,* 2016.

Whitehead, Alfred North. *The Concept of Nature*. Cambridge: Cambridge University Press, 1920.

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 Descola, *Beyond Nature and Culture*. [↑](#endnote-ref-1)
2. Serres, *Écrivains*. [↑](#endnote-ref-2)
3. Schiebinger, *Plants and Empire*. [↑](#endnote-ref-3)
4. Latour, “The 'Pedofil'.” [↑](#endnote-ref-4)
5. Rival, “Encountering Nature through Fieldwork.” [↑](#endnote-ref-5)
6. Ibid.*,* 226. [↑](#endnote-ref-6)
7. Smith, *The Philosopher*. [↑](#endnote-ref-7)
8. See for instance Despret, *What would Animals Say*. [↑](#endnote-ref-8)
9. For Ariew and Garber’s translation, see Leibniz, *Philosophical Essays*, 213-25. For a version of the original, see Leibniz, *Die philosophischen Schriften*, VI, 607–623. [↑](#endnote-ref-9)
10. Lodge, “Leibniz's Notion.” [↑](#endnote-ref-10)
11. Leibniz, *Philosophical Essays*, 206-13. For the French version, see Leibniz, *Die philosophischen Schriften*, VI, 598-606. [↑](#endnote-ref-11)
12. Bennett, “Leibniz’s Two Realms,” 140. [↑](#endnote-ref-12)
13. Hartz, “Leibniz’s Phenomenalisms,” 540. [↑](#endnote-ref-13)
14. Carriero, “Substance and Ends.” [↑](#endnote-ref-14)
15. Nachtomy, Shavit, and Smith have proposed a way in which Leibniz’s philosophy could be relevant to contemporary philosophy of biology. As Carriero, they also ignore the concept of point of view. See their “Leibnizian organisms.” In contrast, I try to show that it is possible to make Leibniz relevant to contemporary philosophy while maintaining the concept of perspective. [↑](#endnote-ref-15)
16. Rutherford, “Leibniz as Idealist;” Adams, *Leibniz*. [↑](#endnote-ref-16)
17. Smith, *Divine Machines,* 7, emphasis in the original. [↑](#endnote-ref-17)
18. Deleuze, *The Fold*. [↑](#endnote-ref-18)
19. Melin *et al*. (including Caro), “Zebra Stripes.” [↑](#endnote-ref-19)
20. Quoted in Caro, *Zebra Stripes,* 3, see also 24. [↑](#endnote-ref-20)
21. Stevens *et al.*, “Dazzle Coloration.” [↑](#endnote-ref-21)
22. Ruxton, “Non-Visual Crypsis.” [↑](#endnote-ref-22)
23. Melin *et al*., “Zebra stripes.” [↑](#endnote-ref-23)
24. Leibniz, *New Essays*, 151 (bk. 2, ch. 13, §23, translation modified). For the original, see Leibniz, *Die philosophischen Schriften*, V. [↑](#endnote-ref-24)
25. The concept of companion species, akin to Leibniz’s concept of compossibility, is from Haraway, *When Species Meet*. [↑](#endnote-ref-25)
26. Nagel, “Bat.” Nagel’s point was maybe too radical, one reason among other being that some humans can echolocate. See Allen-Harmanson, “So.” [↑](#endnote-ref-26)
27. Caro, *Zebra stripes*. [↑](#endnote-ref-27)
28. Gell, “Vogel’s Net,” 27. [↑](#endnote-ref-28)
29. Hustak and Myers, “Involutionary Momentum.” [↑](#endnote-ref-29)
30. Ibid. [↑](#endnote-ref-30)
31. Leibniz,“Notes on some comments by Michel Angel Fardella,” *in*: *Philosophical Essays*, 101-5; for a presentation of that distinction, see Mugnai, “Essays on Logical Calculus.” [↑](#endnote-ref-31)
32. Mugnai, “Leibniz’s Mereology.” The paper is now published, see his “Essays on Logical Calculus.” However, in the published version, he used another example, that of ‘a blade of knife which appears to us as perfectly smooth and without holes and fractures,’ which nevertheless is ‘an aggregate of an infinity of other aggregates (of corporeal substances)’ (p. 193). [↑](#endnote-ref-32)
33. Duarte, “Leibniz and Monadic Domination,” 230. [↑](#endnote-ref-33)
34. The concept of world is a loaded one in philosophical debates around animals at least since Martin Heidegger’s assertion that animals are 'poor in worlds' (see Buchanan, *Onto-Ethologies*, ch. 2–3) However, here, following Leibniz’s usage, I use the word 'world' in a nontechnical sense as that which animals or other living beings perceive. [↑](#endnote-ref-34)
35. De Meyer, *Techniques et rituels scolaires*. [↑](#endnote-ref-35)
36. Tsing, *The Mushroom,* 159-60, see also 37. [↑](#endnote-ref-36)
37. Phemister, *Leibniz and the Environment*. She also discusses the importance for Leibniz of paying attention to others, an idea similar to Tsing’s 'art of noticing' discussed earlier. [↑](#endnote-ref-37)
38. Descola, *Beyond Nature and Culture*. [↑](#endnote-ref-38)
39. Leibniz, *New Essays*, 139 (bk. 2, ch. 9, §11). To be more precise, Leibniz speaks of the animal’s ‘soul’ in this passage, though the point of view constitutes a main feature of the soul. Indeed, in Leibniz’s vocabulary, the soul is a monad 'where perception is more distinct and accompanied by memory' (*Monadology*, paragraph 19). [↑](#endnote-ref-39)
40. Bennett, 'Leibniz’s Two Realms.' [↑](#endnote-ref-40)
41. Caro, *Zebra stripes.* [↑](#endnote-ref-41)
42. Leibniz, *New Essays*, 58, foreword (translation slightly modified to conserve the verb 'hide,' 'dissimuler'). We find a similar assertion in Whitehead, *The concept of nature*, 163: 'The guiding motto in the life of every natural philosopher should be, Seek simplicity and distrust it.' [↑](#endnote-ref-42)
43. On the idea of 'pushing the analysis further,' see for instance: *Lettre to Foucher*, no date, 1687 (in *Die philosophischen Schriften*, I, 392); *Letter to Arnauld*, 9 octobre 1687 (in ibid.*,* II, 127). [↑](#endnote-ref-43)
44. *New Essays*, 66 (foreword). [↑](#endnote-ref-44)
45. On the Cartesian method, see the comment in Smith, *Nature*, 16. Descartes made also important empirical observations in works such as *Optics* or the *Treatise on light*, but as a method, following the French thinker, philosophers should at least once put into doubt all those observations. [↑](#endnote-ref-45)