26 Captivated by life

The life sciences in the heretical tradition of Heidegger, Merleau-Ponty, and Ruyer

Jack Reynolds and Jon Roffe

Abstract
Although their work in the philosophy of biology is not well known, Heidegger, Merleau-Ponty, and Ruyer all offer interesting and heterodox accounts of the life and environmental sciences and the organism in particular. In this chapter, we discuss their respective views, with a focus on their shared criticisms of Neo-Darwinism and the way this tradition grasped the structural coupling between organism and environment. We also outline some significant differences between each of them concerning how to conceive of that holistic relation and the extent of "captivation" of the animal to its environment. Given that there are indications that the twenty-first century might be post-genomic/epigenetic, we argue that it is worth revisiting these neglected organicist trajectories that sought to navigate between mechanism and vitalism.

Keywords
Life Sciences; Animal; World; Umwelt; Biology; Heidegger; Merleau-Ponty; Ruyer

It has been said that the twentieth century was the century of the gene.[1] To be more specific, however, the century was dominated by the "modern synthesis" of genetics *and* Darwinian evolutionary theory. As such, it was another Darwinian century. But wherever there is an orthodoxy, there are other voices and trajectories. In this chapter, we consider some of the most important philosophers of the twentieth century—Martin Heidegger, Maurice Merleau-Ponty, and Raymond Ruyer—who constitute a minor tradition in philosophy of biology. They have not inspired biologists in the way that Henri Bergson did at the start of the twentieth century. Nonetheless, these three philosophers all offer interesting and heterodox accounts of the life and environmental sciences, and the organism in particular, and in doing so they all draw on the work of Jakob von Uexküll, Hans Driesch, Konrad Lorenz, and others. While there is some engagement between them, they do not comprise a tradition in any strong sense, being drawn together mainly by their opposition to Neo-Darwinism and their emphasis on the insufficiency of the way this tradition grasped the structural coupling between organism and environment. Even then, there are some significant differences between them concerning how to conceive of that holistic relation and the extent of "captivation" of the animal to its environment. Their reflections are, of course, conditioned by the biology of their time, which is prior to

1 Eve Keller, *The Century of the Gene* (Cambridge, MA: Harvard University Press, 2000).

DOI: 10.4324/9781003434801-28

Watson and Crick's discoveries concerning the structure of DNA after 1953, and which only became fully part of French research programmes and university curricula in the 1970s.[2] The main books that we are considering are Heidegger's *Fundamental Concepts of Metaphysics* from 1929, Merleau-Ponty's *Structure of Behavior* in 1938, and reflections from the 1950s—specifically Ruyer's diptchy *Neofinalism* (1952) and *The Genesis of Living Forms* (1958), and Merleau-Ponty's posthumous *The Visible and the Invisible* and his *Nature* lecture course. Given that there are indications that the twenty-first century might be post-genomic/epigenetic and even Lamarkian in some key respects,[3] it is worth thinking again about some of these neglected organicist trajectories that sought to navigate between mechanism and vitalism.

1 Heidegger, the life sciences, and the captivation of the animal

Much of Heidegger's philosophy is very well known, of course. Other parts of his oeuvre are not known about in the same detail, but some have still become central parts of the history and folklore of "continental" philosophy. This applies to his *Fundamental Concepts of Metaphysics* (hereafter FCM), a lecture course Heidegger gave in 1929–1930, but which was only published as a book in German in 1983, and afterwards translated into English. The lectures are known for their detailed analyses of boredom and (in) famous remarks about animality that have been subject to influential criticisms by Agamben, Derrida, and others. Heidegger repeats some of his conclusions in other texts, but it is only FCM that involves a serious engagement with the question of the animal and the relevant life sciences. *Being and Time*, by contrast, is largely silent on the question of animality and has no substantial engagement with biological science.[4]

In FCM, Heidegger explicitly and infamously differentiates between stone, animal, and Dasein, around the question of world-hood. According to Heidegger's guiding hypothesis, which he confirms through chapters 3 and 4, the stone is world-less; Dasein is necessarily being-in-the-world in terms of *Being and Time*; and the animal is *weltarm* ("poor in world"). The manner in which Heidegger unpacks these ideas sheds interesting light on the question of the relationship between philosophy and science, and sets the scene for our subsequent consideration of Merleau-Ponty and Ruyer who engage with similar terrain and some similar biologists, but reach quite different conclusions regarding the nature of the holistic interaction, the extent of "captivation" of the animal, and the significance of tools.

Although Heidegger is known for insisting on a methodological and ontological difference between philosophy and science throughout his career, his reflections on animals

2 Laurent Loison and Emily Herring, "Lamarckian Research Programs in French Biology. 1900–1970," in *The Darwinian Tradition in Context: Research Programs in Twentieth-Century Evolutionary Biology*, ed. Richard Delisle (Dordrecht: Springer, 2018). Neither Ruyer nor Merleau-Ponty refers to DNA in the works we are examining here. As we will see, Ruyer does later engage with post-synthesis genetics, although entirely in terms of these works of the 1950s, and in a critical vein.

3 Eva Jablonka and Marion Lamb, *Evolution in Four Dimensions: Genetic, Epigenetic, Behavioral, and Symbolic Variation in the History of Life* (Cambridge, MA: MIT Press, 2005). Also see Maurizio Meloni, *Impressionable Bodies: From the Archaeology of Plasticity to the Sociology of Epigenetics* (London: Routledge, 2018).

4 That said, Heidegger's *Being and Time* is structured by an "ontological dichotomy of human existentiality and natural categoriality." For more on this, see David Storey, *Naturalizing Heidegger* (New York: SUNY Press, 2016), 77; cf. also Claude Romano, *At the Heart of Reason*, trans. Claude Romano and Michael B. Smith (Evanston, IL: Northwestern University Press, 2016), 248.

in FCM begin with some statements that are initially difficult to reconcile with that view: i.e. "we cannot separate metaphysics and positive research"; "the inner unity of science and metaphysics is a matter of fate" (FCM 189). These are interesting comments because Heidegger also admits that they have come apart as a matter of ontic fact. The "inner unity" of which Heidegger speaks, then, is not about facts nor ontic ways of proceeding, but something ontological (or fate). In terms of the ontic situation, Heidegger arguably diagnoses the right problem:

> Between them, the hyper-sophistication of philosophy and the intransigence of the sciences create the hopeless situation in which both parties obstinately persist in talking past one another and foster the spurious freedom in which each eventually leaves the other to its own devices.
>
> (FCM 190)

But what is Heidegger's own solution exactly? He doesn't tell us and says it can't be taught. Rather, "it is a matter of an inner maturity of existence" (FCM 191). "Fate" or "inner maturity of existence"? Either way, this is rather opaque.[5]

Heidegger then goes on to grant zoology and other sub-disciplines within the life sciences a certain privilege, as Merleau-Ponty and Ruyer will also do. None of them have a thesis of the unity of science, with physics at the top of the hierarchy of sciences and within which the other sciences must be situated and perhaps reduced. For that reason alone they constitute a heretical tradition in regard to contemporary physicalism, as well as the more mechanistic conceptions of biology of their own times. For them, biology is viewed as rather more philosophical, struggling to ground its conception of "life" as autonomous to chemistry and physics, albeit without embracing vitalism.

Despite this, Heidegger offers little sustained engagement with particular experiments or results from the life sciences, other than recounting some interesting experiments (concerning bees) and a discussion of Driesch and Uexküll that we will shortly consider. FCM remains primarily a work in first-philosophy, unlike Ruyer's work, which is much more saturated in the relevant sciences. It is also important to note that, for Heidegger, it is *not* dialectical engagement with the results and presuppositions of those sciences that he thinks is required. In fact, he describes the dialectic as a philosophical embarrassment (FCM 187), but Merleau-Ponty's engagement with science *is* much more (hyper)dialectical and explicitly named as such in *Structure of Behavior* and *Nature*, despite some similar language being employed by both concerning the capacity of philosophy to deepen and/or radicalize scientific analyses.[6]

On the one hand, Heidegger argues that animals are not well conceived of as having purely functional utility, nor mechanistically, and thus adequately grasped by a decompositional analysis of their component parts. Nonetheless, the animal also does not have equipment available to it à la Dasein in the mode of ready to hand. Heidegger thus buys into a long history conceiving of "man" as uniquely the tool-using animal, with and before Thomas Carlyle. Of course, at this point (in 1929), it wasn't as obvious that this

5 The rhetoric is also disturbingly reminiscent of his Rectoral address and Nazism from 1933, albeit without the direct socio-political context.

6 In *Phenomenology of Perception*, Merleau-Ponty argues that Gestalt psychology needs to be interpreted philosophically to see how it "points beyond itself," and we will shortly see that Heidegger says something similar regarding Uexküll's work.

was either false or a significant simplification since Jane Goodall's detailed primatological work on wild chimpanzees and their tool use in Tanzania (from 1960) had not yet come out.[7]

But without considering vertebrates here, and it is telling that Heidegger himself does not do so at any length, let us begin where he does: with bees. Their complex and hierarchically structured activities have long intrigued philosophers and biologists alike. Although they are familiar with their environment, Heidegger argues that bees do not recognize the manifestation of honey. They do not respond to the blossoms as stamen, nor apprehend the number of stamens and leaves (FCM 193). Bees simply respond to stimuli, whereas the world of humans is envisaged as much richer, involving an apprehension of number, and even something like higher order thought or cognition, even if Heidegger would eschew such terms. He admits that such reflections have a suspiciously self-evident appearance to them and that a question arises concerning why the bees inevitably stop after a while and fly away (FCM 241). Does this imply that they recognize the absence of honey from a particular blossom? On Heidegger's account, related to the ongoing discussion of the Sphex wasp and its repetitive and instinctual behaviour,[8] it does *not* indicate they recognize the absence of honey. He makes this claim on philosophical grounds concerning what it is for something to be manifest and to be recognized *as* this or that, and the basic conviction that animals are captured by their stimuli, absorbed in it in such a way that its "worlding" is not apparent. For one of the only times in his career he also draws on experimental research to corroborate his views, discussing studies showing that bees will keep going indefinitely if their sac is taken away. Of course, if we never felt satisfied with our basic needs (i.e. hunger, thirst), it is hard to say what humans would do, so precisely what this comparative ethology proves is up for debate.

For Heidegger, however, both bees and animals more generally—which is surely a much too quick inference—are characterized as involving a "being taken." As William McNeill and Nicholas Walker note, these terms are their efforts to translate a series of variations on the German *nehmen* (FCM xxi), the German for animals being *Benehmen* and *Verhalten* for humans. For Heidegger, the key point is that "the behavior of the animal is not a doing and acting, as in human comportment, but a driven performing [*Trieben*]" (FCM 237). He elaborates on this distinction between comportment and behaviour later in the text too, and they appear to constitute a difference in kind. As Heidegger puts it: "Such a relation to something, which is thoroughly governed by this letting be of something as a being, we are calling comportment [*Verhalten*], in distinction from the behaviour of captivation" (FCM 274).[9] Heidegger hence treats animals in a behaviouristic manner, narrowly construed, as responding to and captivated by certain stimuli, even if they are not mere mechanisms. The animal is absorbed in itself, and behaves within an environment but never a world. As he puts it, "the entirety of its being, the being as a whole in its unity, must be comprehended as behaviour" (FCM 239). And behaviour is not, Heidegger insists, a relation to beings as such, but a captivation by drives. And: "captiva-

7 For a contemporary overview of animals and tools, see Amanda Seed, and Richard Byrne, "Animal Tool-use," *Current Biology* 20, no. 23 (2010): R1032–R1039.

8 See Daniel Dennett, *Consciousness Explained* (New York: Penguin, 1991) and Raymond Ruyer, "Bergson and the Ammophilia Sphex," trans. Tano Posteraro. *Angelaki* 24, no. 5 (2019): 134–144. Also see Tano Posteraro and Jon Roffe, "Instinct, Consciousness, Life. Ruyer contra Bergson," *Angelaki* 24, no. 5 (2019): 124–134.

9 This discussion of the German is indebted to Andrew Inkpin.

tion is the inner possibility of behaviour as such," rather than a state that accompanies behaviour. The animal is encircled by its ring which it cannot escape from and within which something is open (FCM 249), but nothing else can penetrate it (FCM 254). This captivation is the "condition of possibility" of being poor-in-world. While it is not clear how such a view can accommodate facts regarding the evolution of a species and indeed the evolutionary interaction between species,[10] on Heidegger's account this "encircling" ring and manner of captivation is "eliminativist" (FCM 250). Other things are eliminated from the purview of the animal, restricting its capacity to use tools or to adopt complex strategies over a long period to obtain food, mate with partner(s), or kill one's prey. There are many potential counter-examples to this view. We might consider the complex feigning behaviour of the plover to distract potential predators from their off-spring, or the elaborate hunting behaviour of the Portia jumping spider.[11] Heidegger gives no attention to these sorts of cases which threaten his neat distinction between comportment and behaviour, and we will shortly see that Merleau-Ponty's characterization of animal behaviour in *Structure* is not eliminativist in Heidegger's specific sense.

Heidegger summarizes his general position as follows: "An animal can only behave but can never apprehend something as something; which is not to deny that the animal sees or even perceives. Yet in a fundamental sense the animal does not have perception" (FCM 259). Again, then, we arrive at a paradox concerning whether the animals perceives or not. The animal appears to have a world in one sense, in that it has capacities and is driven towards something in the environment, perhaps chiefly evolutionary biology's so-called "4Fs"—feeding, fighting, fleeing, fornicating—but it does not have a world in another stronger sense. He notes in passing that this is partly about language, but also contends that naming presupposes a prior pre-linguistic understanding of being, which is characteristic of Dasein alone (FCM 259), even if that understanding is infamously "shrouded in darkness" and concealed as he says in *Being and Time*.

Heidegger then engages with Driesch and von Uexküll, arguing that they are responsible for "two decisive steps" that he endorses:

> The first step concerns the recognition of the holistic character of the organism… Wholeness means that the organism is not an aggregate, composed of elements or parts, but that the growth and the construction of the organism is governed by this wholeness in each and every stage… The second step is the insight into … how the animal is bound to its environment.
>
> (FCM 261)

To what extent these insights challenge Darwin or the modern evolutionary synthesis is a complex issue, rendered more difficult to assess by Heidegger's own reluctance to seriously engage with either. Nonetheless, his implicit reasoning here seems to be that while adaptation is important to Darwinians, the environment is still a strictly external condition, at most a selector rather than inducer of change. In addition, he suggests that neo-Darwinians conceive of the animal as present-at-hand, and hence cannot comprehend the depth of its relational structure and cohabitation with the environment, albeit

10 James Williams, *A Process Philosophy of Signs* (Edinburgh: Edinburgh University Press, 2015).

11 Mark Okrent, *Rational Animals: The Teleological Roots of Intentionality* (Athens: Ohio University Press 2007); Louise Barrett, *Beyond the Brain* (Princeton: Princeton University Press 2011).

noting again that the nature of that relation—captivation—remains radically different from Dasein.

Uexküll, of course, challenges the neo-Darwinian orthodoxy by theorizing a very tight connection between organism and environment. Heidegger comments that Uexküll's "investigations are very highly valued today, but they have not yet acquired the fundamental significance they could have if a more radical interpretation of the organism were developed on their basis" (FCM 263). In his slightly idiosyncratic presentation of Uexküll, Heidegger contends that Uexküll's reflections on the *Umwelt* really mean "nothing other than what we have characterized as the disinhibiting ring," an approach which Heidegger thinks is manifestly insufficient in regard to the human world and from which it is separated by an "abyss" (FCM 264). While "belonging, intimacy and dwelling" are all central to Uexküll's famous talk of the "worlds" of the tic—and this harmonious picture might be criticized—these "worlds" and behaviour are not analysed as a lack or absence in the way that pervades Heidegger's discourse. For Heidegger, by contrast, it is a series of paradoxical formulations that capture the poverty of the animal: "being open in captivation is the essential possession of the animal" (FCM 269); "a not-having of world in the having of openness for whatever disinhibits" (FCM 270).

Heidegger considers the objection that such formulations presuppose an anthropomorphic standard or comparison, rather than capturing any sort of essence of animality. Somewhat tentatively, however, he concludes that we do not have the right to drop the hypothesis of animal as poor-in-world, which has as its condition of possibility the idea of the "captivation" of the animal by its environment, and a distinction between comportment and behaviour that broadly recapitulates the ontological dichotomy of human existentiality and natural categoriality that framed *Being and Time*.

2 Merleau-Ponty: nature, animality, and the structure of behaviour

There is little doubt that Merleau-Ponty was significantly influenced by Heidegger, even if not by his writings on animality in FCM that he did not have access to.[12] Although Merleau-Ponty was more knowledgeable about Husserl's oeuvre, some of his transformations to the Husserlian phenomenological project resonate closely with Heideggerian reflections on key methodological issues at the heart of phenomenology, including how to understand the phenomenological reduction and eidetic analysis. In his "Preface" to *Phenomenology of Perception*, Merleau-Ponty hence seeks to reconcile these twin directions of phenomenology—Heideggerian and Husserlian—embracing a certain kind of pluralism about phenomenology in the process.

But his pluralism also involved him in long reflections on, and interactions with, non-phenomenological forms of philosophy and science, sometimes in the process challenging the boundaries of phenomenology. Unlike both Husserl and Heidegger, for example, he systematically engaged with the life sciences throughout his career, perhaps more than any other classical phenomenologist.[13] This gives his thinking a more naturalist orientation than his phenomenological predecessors. In addition, he is less Kantian

12 So argues Robert Vallier, the translator of Merleau-Ponty's *Nature: Course Notes* (Evanston, IL: Northwestern University Press, 2003), 286, fn. 21.

13 Darian Meacham, "Sense and life: Merleau Ponty's Philosophy of Nature and Evolutionary Biology," *Discipline Filosofiche*. 24, no. 2 (2015): 137–163.

than either when it comes to assigning a strict methodological and epistemic division of labour to philosophy and science.[14] His early work arguably evinces a weak sort of methodological naturalism,[15] aiming to be consistent with findings of sciences over the long haul, even if sometimes also seeking to go beyond or reveal the "unthought" of certain scientific developments or orthodoxy (often Gestalt psychology). His later work is more expressly ontological, involving a rethinking of nature, and it is perhaps less methodologically naturalist because of this: after all, most methodological naturalists rule out any *philosophy* of nature as rather too speculative and metaphysical to evince continuity with the various sciences and their diverse methods and ontological commitments.

Although plausible as a starting position, this way of framing Merleau-Ponty's "early" and "late" work is perhaps too starkly put. Even in his later work, exemplified by texts like *The Visible and The Invisible* and his *Nature: Course Notes*, his "indirect ontology" did not delineate any strict differences between philosophy and science and he always took himself to differ from Heidegger in this respect. In *Nature* (hereafter N), the point is expressed as follows:

> the radical opposition, traced by Heidegger, between ontic science and ontological philosophy is valid only in the case of Cartesian science, which posits nature as an object spread out in front of us, and not in the case of modern science, which places its own object and its relation to this object in question.
>
> (N 85)

Moreover, throughout much of his career, including his first book, *Structure of Behavior* (hereafter SB), there is a general critique of objectivist views of nature, understood as *partes extra partes*, wherein nature is conceived of exclusively as a multiplicity of external events bound together causally.

In *Structure*, his analyses and descriptions of animal behaviour and ethology are oriented around the French term *comportement*, translated in English as "behaviour." As this translation decision itself indicates, his work is not committed to a difference in kind between comportment and mere behaviour of the sort we have seen endorsed by Heidegger in FCM. Indeed, it is not just behaviour but also other key terms from *Structure* that are expressly *not* restricted to the human: notably, "form," "structure," "Gestalt," all of which are presented as structures or forms that emerge from, but are not reducible to, their component parts. As he puts it:

> Form, in the sense in which we have defined it, *possesses original properties with regard to those of the parts which can be detached from it*. Each moment in it is determined by the grouping of the other moments, and their respective value depends on a state of total equilibrium the formula of which is an intrinsic character of "form."
>
> (SB 91, our italics)

It is not clear to what extent Merleau-Ponty is indebted to British Emergentism, but these ideas resonate with many of those expressed by Samuel Alexander, C. D. Broad,

14 Samantha Matherne, "Toward a New Transcendental Aesthetic: Merleau-Ponty's Appraisal of Kant's Philosophical Method," *British Journal for the History of Philosophy* 27 (2019): 378–401.

15 Jack Reynolds, *Phenomenology, Naturalism and Science* (London: Routledge, 2018).

and others, at a similar time on the other side of the channel.[16] This connection is perhaps not as surprising as it initially appears, even if there is no historical or causal link between Merleau-Ponty and British emergentism. After all, emergentism purports to offer a middle way between reductive naturalism and non-naturalism and between determinism and freedom,[17] and these were also the aims of Merleau-Ponty. There has been a relative lack of recognition of this emergentist strain in Merleau-Ponty's thought,[18] presumably due to Merleau-Ponty's phenomenological inheritance and thus some sort of commitment to the idea of bracketing the natural (and scientific) attitude. Still, no such overt phenomenological commitments frame *Structure*, and his reception of the "reduction" in *Phenomenology of Perception* is itself very complex, given his famous understanding of it as "incompleteable."[19] In *Structure*, in any case, these emergent structures are the outcome of the phylogenetic and ontogenetic engagement of the organism with its environment, and a process of reciprocal co-determination that engenders novelty and cannot be predicted in advance or understood through either term in isolation.

Merleau-Ponty begins by pointing out what is wrong with Pavlov and Watson's behaviourist treatment of animals, as well as C.S. Sherrington's influential work on reflexes and the integration of the muscles and nervous system. His main aims here are to criticize psychological and physiological atomism, with Pavlov/Watson and Sherrington presented as exemplars of each. As we have already suggested, Merleau-Ponty contends that the reciprocal determination (or causality) between the organism and its environment, and between whole and part, is only available to dialectical thinking. Atomistic thinkers, by contrast, cannot properly grasp this "structural coupling" between organism and environment:

> Since all the movements of the organism are always conditioned by external influences, one can, if one wishes, readily treat behavior as an effect of the milieu. But in the same way, since all the stimulations which the organism receives have in turn been possible only by its preceding movements which have culminated in exposing the receptor organ to the external influences, one could also say that the behavior is the first cause of all the stimulations.
>
> (SB 13)

Focusing on either aspect of this dialectic, alone, is ultimately insufficient. As he puts the point:

> The adequate *stimulus* cannot be defined in itself and independently of the organism; it is not a physical reality, it is a physiological or biological reality. That which

16 While the unity of science and questions to do with the reducibility of biology and chemistry to physics provide the immediate context for British emergentism, Merleau-Ponty himself grapples with these questions in Part 3 of *The Structure of Behaviour*, trans. Alden L. Fisher (Boston: Beacon Press, 1963), 137–145: "Structure in Physics."

17 See Mario DeCaro, "Emergence and Naturalism," in *Emergence in Science and Philosophy*, ed. A. Corradini and T. O'Connor (Routledge: London, 2010), 190–211; and J. Ganeri, "Emergentisms, Ancient and Modern," *Mind* 120, no. 479 (2011): 671–703.

18 A notable exception is Evan Thompson's *Mind in Life* (Cambridge, MA: Harvard University Press, 2007).

19 This emergentist structure arguably plays a role in *Phenomenology* too: see Jack Reynolds, "Embodiment and Emergence: Navigating an Epistemic and Metaphysical Dilemma," *Journal of Transcendental Philosophy* 1, no. 1 (2020): 135–159.

> necessarily releases a certain reflex response is not a physico-chemical agent; it is a certain form of excitation of which the physico-chemical agent is the occasion rather than the cause.
>
> (SB 31)

In regard to Sherrington, Merleau-Ponty contends that his categories and concepts surrounding reflexes don't adequately fit the behaviour he is trying to explain (SB 33). For Merleau-Ponty reflexes are special cases of behaviour, not the means through which the remainder of animal behaviour is to be understood. Rather, we need to begin with structures of behaviour that are non-atomistic (SB 46). On such a view, the animal's behaviour is not to be construed as strictly passive or captivated by the environmental stimuli. And unlike Heidegger, Merleau-Ponty considers a large variety of different animals, including vertebrates with a variety of different ecological and cognitive capacities. In more or less detail, he addresses scientific research on frogs, mammals, cats, dogs, children, monkeys, rats, chickens, earthworms, sea urchins, and others.

He also criticizes Pavlov's behaviourism, which treats behaviour as a thing. Merleau-Ponty's basic retort is that geographical and behavioural environments cannot be identified; thus, no reduction to the strictly physical will be tenable (SB 129). Watson and Pavlov's behaviourism is also charged with an impoverished conception of both the stimulus and the response (i.e. a mechanistic or law-like conception) that does not pay sufficient attention to bodily habits, learning, and the activity of the organism. Again, it is important to see that the animal behaviour in question is not well characterized as a captivation. Consider some behaviourist experiments concerning cats that Merleau-Ponty cites as indicating how behaviourism pushes beyond some of its own precepts and limits. If the cats manage to get access to some food through trial and error, say by eventually activating a lever with their paw, the next time they undergo the same experiment they might just as readily use their teeth. Merleau-Ponty takes this to indicate that there is learning and integration here pertaining to the whole organism, and some flexibility: it is not just rote conditioning (SB 96).

For classical behaviourism, however, there is a direct captivation of the animal to stimuli. Some behaviourists think that more complex forms of this "captivation" also explain human behaviour, whereas for Heidegger this reflects the basic difference between humans and animals. But for Merleau-Ponty, in contrast with both classical behaviourism and Heidegger, the animal experiments that present the animal as poor-in-world do so either by forcing their behaviour into a rather reductive form (deprived of a meaningful milieu in the laboratory, presented with too much or too little food outside of characteristic environmental niches), or by downplaying the flexibility of the behaviour that is apparent (as with the cats who can activate the lever in various ways that differ from the action that first produced the reward or punishment).

Despite this, behaviourism remains prima facie promising for Merleau-Ponty, even if too positivistic in its usual guises. Why potentially promising? It treats the organism as closely tied to its environment, and it potentially allows a holistic explanatory priority to be given to the whole organism in interacting with its milieu rather than seeking to explain behaviour through an atomistic, decompositional method. Although he criticizes Edward Tolman's "purposive behaviorism" as still being too materialist in *Structure* (SB 182), Merleau-Ponty came to have a more positive attitude to Tolman's behaviourism, explicitly recognizing that the Watson/Pavlovian promise may even have been fulfilled in Tolman's version of behaviourism issuing from the late 1940s. Briefly, Tolman

distinguishes between molar and molecular behaviourism: roughly, non-reductive and reductive, with the former admitting of a complex interplay between proximate and distal causes.[20] In lectures presented in *Child Psychology and Pedagogy*, Merleau-Ponty hence says: "in admitting the legitimacy of the behaviorist enterprise, in reexamining the notion of behavior and defining it as a dialectical notion, *we* can fulfill the initial project proposed by Watsonian behaviorism."[21]

In *Child Psychology and Pedagogy* he accepts that this version of behaviourism is able to be aligned with his own thinking. In regard to *Structure*, it is also clear that Tolman's hybrid version of behaviourism and Gestalt psychology is much more readily reconcilable with sentiments like the following from Merleau-Ponty:

> physical stimuli act upon the organism only by eliciting a global response which will vary qualitatively when the stimuli vary quantitatively; with respect to the organism they play the role of occasions rather of cause; the reaction depends on their vital significance rather than on the material properties of the stimuli.
>
> (SB 161)

This idea of vital significance is not meant to involve any sort of recourse to vitalism. Rather, it is to argue that there are meanings and norms involved in the interaction between organisms and their milieu, "optimal conditions of activity and its proper manner of realising equilibrium," neither of which are given much attention by Heidegger, despite his indebtedness to Uexkull. As Merleau-Ponty goes on to elaborate:

> Here, between the variables upon which conduct actually depends and this conduct itself there appears a relation of meaning, an intrinsic relation. One cannot assign a moment in which the world acts on the organism, since the very effect of this 'action' expresses the internal law of the organism. The mutual exteriority of the organism and the milieu is surmounted along with the mutual exteriority of the stimuli. Thus, two correlatives must be substituted for these two terms defined in isolation: the milieu and the aptitude, which are like two poles of behavior and participate in the same structure.
>
> (SB 161)

For Merleau-Ponty, there is emergence and "structural causality" across all three orders of the physical, vital, and human. But we should take note of his remark that "matter, life, and mind should not be defined as three orders of reality or three sorts of beings, but as three planes of signification or three forms of unity" (SB 201). And unlike Heidegger's severe distinction between comportment and behaviour, "these three categories do not correspond to three groups of animals: there is no species of animal whose behavior *never* goes beyond the syncretic level nor any whose behavior *never* descends below the symbolic forms" (SB 104).

20 Nikolai Alksnis and Jack Reynolds, "Revaluing the Behaviorist Ghost in Embodied Cognition and Enactivism," *Synthese*. 198 (2021): 5785–5807. https://doi.org/10.1007/s11229-019-02432-1.

21 Maurice Merleau-Ponty, *Child Psychology and Pedagogy: The Sorbonne Lectures 1949–52*, trans. T. Welsh (Evanston, IL: Northwestern University Press, 2010), 343.

Indeed, it is important to recognize that "consciousness" and "knowledge," for Merleau-Ponty, are not distinctive of the human order, but present to varying degrees in the vital order. He argues that:

> the true organism, the one which science considers, is the concrete totality of the perceived organism, that which supports all the correlations which analysis discovers in it but which is not decomposable into them. It is true that the convergent efforts of intellectualism and mechanism withdraw any original determination from the perception of the organism. But, both in psychology and biology, the apprehension of structures should be recognized as *a kind of knowing* which is irreducible to the comprehension of laws.
>
> (SB 156)

Animals hence have a kind of knowing which includes a sense of bodily orientation and goal-directedness, as well as pain or sentience and some interiority concerning each. At the same time, however, it would be a mistake to think that *Structure* affirms any levelling—ontological or otherwise—between the human being and the animal. The classical phenomenological significance of intentionality marks his analysis of both knowledge and behaviour in humans, such that he will write: "Man can never be an animal; his life is always more or less integrated than that of an animal" (SB 181).

A few pages later, we have one of the only citations from Uexküll in *Structure* and a brief commentary on it by Merleau-Ponty, albeit one that concerns Ruyer (and Barbaras) regarding consciousness and knowledge and Merleau-Ponty's alleged idealism. But as Merleau-Ponty puts it a little later on:

> In speaking here of knowledge and consequently of consciousness, we are not constructing a metaphysics of nature; we are limiting ourselves to denominating the relations of the milieu and the organism as science itself defines them as they should be denominated.
>
> (SB 161)

As such, this looks like a dialectical engagement with science, and a weak methodological naturalism.

What is distinctive about the human order, for Merleau-Ponty? The milieu is described as "perceived situation-work" (SB 162), which is different from the perception-action connection that is characteristic of *both* humans and animals (hence our intertwining with the animal as he puts it in *Nature*). And the structure of perceived situation-work is also necessarily intersubjective and historical, referring to "activities (ensembles of intentional actions) that transform physical and living nature and thereby modify the milieu and produce a new one."[22] We have seen that animals have norms and meanings. They also have signs. They do not have symbols, however, according to Merleau-Ponty. Unlike Heidegger, Merleau-Ponty discussed chimpanzees and their use of tools at some length, recognizing a difference between monkeys and human tool use. A paradigmatic example of human tool use might be a knife fashioned for an immediate given context, but also for

22 Thompson, *Mind in Life*, 2007, 77.

repetitive use thereafter, or the complex construction of a village over multiple generations, unlike the beaver's dam. Merleau-Ponty contends that this kind of situation-work is quite different from the use of tools that chimpanzees are capable of, whether in the laboratory or in the "wild" (SB 175). We might take issue with this, of course, but in terms of theorising the structures of behaviour characteristic of humans and animals, and doing justice to the nature of their intertwining, Merleau-Ponty's work appears to constitute an improvement on Heidegger's, especially in the admittedly anachronistic light of what we now know about contemporary biology. But the question of the human-animal interrelation also brings with it a series of more metaphysical questions that the notion of "form" began to grapple with in *Structure*, but to which he gave greater consideration in his later work.

3 Intertwining life and matter, animality and culture

While the account presented in *Structure* is our main concern here, it is important to note the shifts marked in *The Visible and the Invisible* and the *Nature* lecture notes, not least because it is this later approach that provides the resources to respond to some of the criticisms mounted by Ruyer. Two points in particular seem important.

The first concerns the status of causation. While *Structure* rejects the Newtonian model of cause-effect relations, Merleau-Ponty's later work embraces a much more far-reaching transformation of this paradigm. Like Ruyer, and following the work of the ethologist Tinbergen, he comes to see cause in terms of an *evocation* of "a sense or a meaning" (N 277). More broadly, the category of instinct is subject to a profound revaluation. As he memorably puts it, instinct "does not obey the law of all or nothing" (N 195). There is instead an interplay between evocative encounters with the environment and the ongoing, oblique construction of meaningful behaviour: *instinct is a complex institutional process* rather than a set of discrete (animal) locks and (environmental) keys.[23]

The second correlative point concerns the status of the environment. As the *Nature* notes put it,

> each action of the milieu is conditioned by the action of the animal: the animal's behavior arouses responses from the milieu… In brief, the exterior and the interior, the situation and the movement are not in a simple relationship of causality.
>
> (N 175)

While this seems to repeat the claim already made in *Structure*, Merleau-Ponty will follow this conclusion much further. On the one hand, he will enrich the notion of milieu by attributing to it many of the features of human existence: "we can speak in a valid way of an animal culture" (N 198). Instead of seeing intentional consciousness as marking an irreducibly human relationship to the environment, he will argue for a shared mode of intertwining between life and world, for both human and animal. On the other, the kind of dialectical relationship that holds between animal and milieu is also found to be in play in a large number of other registers, most notably between life and the inanimate physical and chemical (N 214). Both the sciences and the scientists that Merleau-Ponty

23 In this regard, he is very close to early work by Gilles Deleuze. See, e.g., "Instincts et institutions," *Revue philosophique de la France et de l'Etranger*, 144 (1954): 280–281; and *Empiricism and Subjectivity. An Essay on Hume's Theory of Human Nature*, trans. C. Boundas (New York: Columbia University Press, 1991).

is interested in also shift. In particular, he gives more attention to anatomy, embryology, dynamic morphology, and morphogenesis, and key scientists include not only Uexküll but also George Coghill and Arnold Gesell, among others.[24]

3.1 Raymond Ruyer

As the tradition of phenomenology was being transformed by Heidegger and Merleau-Ponty, another quite anti-phenomenological thinker was taking up the relationship between philosophy and the life sciences: Ruyer (1902–1987). At the present moment, Ruyer remains an obscure figure in twentieth-century philosophy. But even a cursory examination of the *Nature* lectures shows that this was not at all the case for Merleau-Ponty. Indeed, Ruyer appears to be the most significant philosopher with whom Merleau-Ponty engaged in the process of formulating a non-Cartesian thought of the *physis-logos* relationship. It is difficult to assess in turn the impact that the completion and publication of this work might have had on Ruyer's fortunes. We might even say that Merleau-Ponty's death deprived us of the work of two philosophers as a result. The latter oversight, at least, can be corrected.

Ruyer's work is characterized by an attentiveness to science whose rigour is of a particularly high level. His sources are only rarely philosophical—and then are only marginal figures, like Samuel Butler and Antoine August Cournot—instead consisting in a battery of scientific and technical studies. With Merleau-Ponty and against Heidegger, Ruyer insists on an intimate relationship between philosophy and science. Indeed, a stronger form of the relationship would be hard to formulate:

> It is my profound conviction that philosophers, like theologians, have been wrong to try to claim for themselves either a domain or a specific method, whether it be intuitive, critical, dialectical, or phenomenological. The truth is one. Knowledge is scientific or false. The aim is only to collaborate on the progress of knowledge by working towards an indivisible Science-Philosophy, capable of critiquing and generalizing itself—with or without 'specialists in generalities'—to the extent that the real reveals itself in all of its inexhaustible subtlety. Against a dogmatic mechanist science of the kind that appeared in the 19th century, and with the goal of reducing human being to the functioning of a system of particles, philosophy was justified in calling for a better informed science, provisionally relying on the irrefutable intuitions of living human beings, who have the experience of being reasonable, and of working towards meaningful ends.[25]

If we quote at length, it is because this passage contains references to two of Ruyer's major methodological commitments: his commitment to experimental science as the source of all knowledge; his rejection of classical physics, from Newton to the nineteenth-century mechanists.

Much of Ruyer's work functions to play twentieth-century science—in particular, quantum physics, embryology, and animal ethology—off against classical physics, errant philosophical conceptions of science (often themselves involved in a confusion of science

24 For more on this, see David Morris, *Merleau-Ponty's Developmental Ontology* (Evanston, IL: Northwestern University Press, 2018).

25 Ruyer, "Raymond Ruyer par lui-même," *Les Études philosophiques* 1 (2007): 13.

with Newtonian physics), and something akin to what Althusser called "the spontaneous philosophy of the scientist."[26] The positive correlate of this critical movement is a neo-Leibnizian account of nature as composed of vital and yet immaterial individual subjectivities: self-organizing absolute forms whose relationships with each other are to be understood not in terms of brute physical interactions, *partes extra partes*, but as discrete agents engaged in complex, non-deterministic signalling interactions.

From the point of view of this positive project, science appears not only as the source of knowledge but also as a prominent source of the misrecognition of its own results. Because science conceives of living beings as the structured objects of perception (or instrumental measurement), it tends to identify things as static, composite mechanisms. In other words, the very appearance that these "living forms" enter into extrinsic relationships and form structures is the result of the scientific method. This is not incorrect, according to Ruyer, but it is necessarily partial:

> Science describes things correctly but backwards… The operation that passes from the most rigorously scientific of sciences to *gnosis* is demanded by science itself. It is a reversal on the model of the reversal which led from the 'material' atom to the quantum of action of a new thing. In thus passing from what is observed as a thing to the 'acting' which really is, we admit that this 'acting' can be seen in itself, as subject, for an acting cannot be a thing but a subject which does what it does, and what it knows how to do.[27]

Problems arise only at the point where this particular inert, structural perspective is taken to be definitive, and indeed exhaustive.

3.2 Gestalttheorie *and thematic activity*

Without space to elaborate Ruyer's position in detail, we will restrict ourselves to three summary points that relate to the Heidegger-Merleau-Ponty trajectory sketched above. Given his attentiveness to the life sciences in the twentieth century, it is perhaps ironic to note that, of the three philosophers, it is Ruyer who engages with Uexküll the least. He appears in passing in most of Ruyer's key works, but often as a thinker whose insights have been digested and worked into other more recent approaches.[28] When he is explicitly addressed, it is in notably critical terms. However, he suspects the absolute character of Uexküll's distinctions, beginning with the opposition between *Umwelt* and *Umbegung*, but encompassing a sequence of others in turn. He writes, for instance, that

> It is quite pointless to follow in von Uexküll's footsteps and to distinguish a plane of formation (embryogenesis), a plane of functioning (physiology), and a plane of repair (regeneration) for the organism. Everything is imbricated: a plant continues

26 Louis Althusser, *Philosophy and the Spontaneous Philosophy of the Scientists, and Other Essays*, ed. Gregory Elliot (London: Verso, 2003).

27 Raymond Ruyer, *La gnose de Princeton* (Paris: Fayard, 1974), 13–14. Or as he puts it in an early presentation of his method, "Metaphysics adds nothing to science but the affirmation of a *verso*, but a *verso* that corresponds exactly to the *recto*." (Ruyer, "Une métaphysique présente-t-elle de l'interêt?" *Revue philosophique de la France et l'Étranger* 119, no. 1–2 (1935): 85.)

28 See, for instance, Ruyer Éléments de psychobiologie (Paris: PUF, 1946), 38.

> to grow while functioning, and this is true of the majority of animals and of human beings.[29]

Ruyer will provide a series of examples that indeed seem to violate this division of labour. For instance it is clear that in embryogenesis, "the pulmonary artery, the lungs and many other organs are formed before they function. But even more frequently, functioning is closely implicated in formation: the umbilical artery and the heart are formed and function at the same time."[30] He also points out that any living body is perpetually repairing itself, regardless of the active projects it is engaged in: "An adult hand… imperceptibly repairs itself, for example, in the growth of fingernails and more generally in the incessant flux of molecules which circulate throughout its form."[31] A living being is not like a candle whose wick, burnt down, is spent.[32] More generally, his point is that the very division of labour itself is superficial, imposing an abstract, structural misunderstanding of the nature of life. There is no difference between morphogenesis, behaviour, and regeneration at all, except on the basis of the—misleading, if not entirely incorrect—postulate that life is mechanistic functioning *partes extra partes*.

But what is more interesting for us here is the fact that in the passages that these criticisms of Uexküll are presented, Merleau-Ponty is often also invoked. In the following illuminating passage from *Neofinalism*, Ruyer asks us to consider three levels that correspond to Merleau-Ponty's three orders described in *Structure*. For Ruyer, they are "the physical [A], the vital [B], and psychological consciousness [C]":

> *Gestalttheorie*, just like mechanism, seeks the unity of the three levels by starting from A. Merleau-Ponty, along with the idealists, seeks this unity by starting from interpretations based on C. We seek it by starting from B, or from C as living, because B as a living organism is the normal, in fact the universal, type of being: it is an autosubjective form, an absolute, self-surveying domain, synonymous with "self-perceiving."[33]

The problem with Merleau-Ponty's perspective, for Ruyer, concerns the way in which it separates out consciousness and purposive behaviour. Shortly after this previous passage, he cites Merleau-Ponty himself to this effect, before directly criticizing him:

> Von Uexküll's statement is perfectly on point: 'Every organism is a melody that sings itself.' But Merleau-Ponty's commentary, that 'this is not to say that it knows

29 Raymond Ruyer, *Neofinalism*, trans. Alyosha Edlebi (Minneapolis: University of Minnesota Press, 2016), 229, translation modified.

30 Raymond Ruyer, *The Genesis of Living Forms*, trans. Jon Roffe and Nicholas Barthel de Weydenthal (London: Rowman Littlefield International, 2019), 9.

31 Ibid., 10.

32 Ibid., 48.

33 Ruyer, *Neofinalism*, 200, translation modified. In *Structure*, Merleau-Ponty presents a similar division of kind, but his way of relating each to the other has a Gestaltist character absent from Ruyer's account. For instance: "neither the psychological with respect to the vital nor the spiritual with respect to the psychological can be treated as substances or as new worlds. The relation of each order to the higher order is that of the partial to the total…. The advent of higher orders, to the extent that they are accomplished, eliminate the autonomy of the lower orders and give a new signification to the steps which constitute them" (*Structure*, 180).

> this melody and attempts to realize it; it is only to say that it is a whole which is significant for a consciousness which knows it, not a thing which rests in-itself,' distorts the truth completely.[34]

Ted Toadvine makes the same point in more familiar terms:

> In *The Structure of Behavior*, the concept of structure attempted to hold together two incompatible approaches to nature: on the one hand, Merleau-Ponty saw in vital behavior an immanent and self-organizing intelligibility. But on the other hand, his commitment to phenomenological principles required him to treat this immanent intelligibility as an object for human consciousness.[35]

Of course, much here turns around the characteristics of consciousness itself, though, as we will see in what follows.

What is the nature of this melody for Ruyer? It is, and must be, mnemic in character, such that "In all organisms proper, organic memory constitutes specific potentials that can be reincarnated in innumerable individuals."[36] In turn, these memories are presupposed by the living being in question, such that they are memories that do not correspond to a prior experience of that being, but are ideal, latent traces of the activities of previous living beings. He thus writes of the egg that

> this unique cell which constructs by itself an organism possessing a nervous system and an extraordinarily complex brain, cannot contain in advance this complexity in the form of a trace or an architectural plan. If the egg constructs 'by habit', this habit is an act and not the functioning of traces, nor of any sort of micro-structure.[37]

Ruyer is close here to the Plato of the *Meno* (81d:4–5), for whom "seeking and learning are nothing but recollection," except that the process of anamnesis is not oriented by epistemological concerns but by the self-formation of the living being as such. This Platonism is nowhere more apparent in his insistence that these themes are ideal: "a true, thematic memory, invoked by a signal, is necessarily non-material or super-material. It is necessarily of the order of consciousness."[38]

It is worth pointing out that these mnemic themes can in no way be characterized in terms of DNA for Ruyer. He presents a whole host of arguments on this point, of which

34 Ruyer *Neofinalism*, 201, translation modified. The notion of "self-perception" might appear to constitute a critical departure from the kind of analysis of perception we saw above in Heidegger. This appearance is, though, somewhat misleading. For Ruyer, "self-perception" is equivalent to "self-formation," lacking any of the features of intentional consciousness relative to an exteriority. As we will see below, this ends up presenting Ruyer with a new set of problems.

35 Ted Toadvine, *Merleau-Ponty's Philosophy of Nature* (Evanston, IL: Northwestern University Press, 2009), 28.

36 Ruyer *Neofinalism*, 149. That these melodies are mnemic in character is an important trait for distinguishing Ruyer's account from those of Uexküll and Merleau-Ponty on the same point. For the former, the melody comes from the past; for the latter, it essentially belongs to an ongoing, enacted present, still in the *Nature* lectures: "We think naturally that the past secretes the future ahead of it. But this notion of time is refuted by the melody. At the moment when the melody begins, the last note is there, in its own manner" (*Nature*, 173).

37 Ruyer, "Raymond Ruyer par lui-même," 8.

38 Raymond Ruyer, *L'embryogenèse du monde et le Dieu silencieux* (Paris: Klincksieck, 2013), 88.

the following four are emblematic. The first is logical in character. If we go looking for the location of the structure of life in matter, we are quickly led into an infinite regress. Ruyer makes this point, for instance, in attacking Dawkins's infamous selfish gene argument:

> At the very limit, we could agree that the cells of a higher organism have an interest in organizing a digestive system or a system of oxygenation, which led, along with natural selection, to the manufacture of a digestive tube, lungs and a heart. But what interest do the molecules have in organizing a complicated system of cells and multicellular organisms?[39]

Why, in other words, should we uniquely locate "selfishness" at the level of the gene and not some other register of organization? The second argument anticipates Ruyer's analysis of the signaletic character of stimulus we will discuss below. At best, he argues, the expression of genes can hamper certain biological processes, but it cannot be used to explain the advent of these processes themselves.

It is clear, on experimental grounds, that the absence or mutation of a gene can *trouble* development, just as the absence of a material component or the modification of a tool can trouble the construction of a house. But it is impossible to conclude from this that the *presence* of this component or tool explains construction. We cannot maintain that the progress of morphogenesis, from the virus-molecule to the human being, is explained by the accumulation of errors in the duplication of the "instructions" for the automated manufacturing of an automatic machine by an automatic machine.[40]

He adds a third argument on a related point, this time concerning the incapacity for genetic material to explain the specificity of morphogenesis. Even if we admit that the specific characteristics of a given organ (that is it a cat's liver, and not that of a human being) result from the expression of particular genes, what these genes cannot explain is "the fact that these particular embryonic cells will become a liver, or a tail, rather than a paw. This is particularly clear for the two, four or eight cells that first result from the division of the egg."[41] Correlatively, as famous grafting experiments have shown, "the destination of a group of cells can be changed practically at will. What would have become a paw becomes a tail, and vice versa."[42]

The fourth argument points to the more fundamental inadequacy of totalizing genetic explanations: "even the most dogmatic geneticist would not affirm that a "one-to-one" structural correspondence exists between the genes and the adult organism."[43] Embryogenesis provides the most obvious case here. If the development of the embryo was frozen at any particular moment, it would perhaps be possible to invoke this kind of structural correspondence, but any such static perspective is a pure fiction that bears no relation to the dynamic genesis of a living form.

So, unlike mechanist accounts of morphogenesis and behaviour, Ruyer argues that it is an ongoing self-formation of the living being through the actualization of these ideal mnemic themes or melodies that accounts for the characteristic features of any living

39 Ibid., 76.
40 Ruyer, "Bergson and the Ammophilia Sphex," 25.
41 Ruyer, *Genesis of Living Forms*, 157.
42 Ibid., 158.
43 Ruyer *Neofinalism*, 160.

being.[44] But Ruyer also notes another significant consequence of this divorce of activity and consciousness, this time concerning the meaning of animal behaviour. In order to account for this, he contends, Merleau-Ponty ends up having to posit something akin to the Kantian doctrine of *Zweckmässigkeit* (a finalist notion of goal or end). But without positing this end as a constant, immanent feature of formation and behaviour, Merleau-Ponty is left without any means to resolve

> the problem of the dynamic relation between overall behavior and physiochemical processes in the organism, and has a tendency to believe that the category of interpretation or description are categories that explain organic life in itself and as such, as if living beings belonged to a universe of thought and not to a universe of realities.[45]

In other words, at least on Ruyer's view, Merleau-Ponty's attribution of meaningfulness to consciousness remains too phenomenological: that is, too caught up with the trope of intentionality. As a result, he cannot explain how consciousness names self-forming activity itself.

By contrast, Ruyer will insist (with a caveat we will return to later) on the strict identity of the regime of consciousness and that of behaviour:

> Consciousness is not a passive knowledge, but the active unity of behaviour or perception. It is always a dynamic effort of unification, without which 'behaviour' would be a pure collection of movements and perceptions a pure juxtaposition of physico-chemical effects able to be imitated by machines.[46]

This is why the passage critical of Merleau-Ponty cited above continues as follows:

> before the listener, there is the singer or the song that sings itself, that has masters its own notes *itself*. A bird sings because it desires to sing, because it has a tendency to sing, in the same way that it had a tendency as an embryo to form its larynx. The bird's melody is, in the strict sense of the word, the continuation of the 'organic melody,' of the bird forming itself without witness or listener.[47]

As Ruyer indicates in this passage, his approach consists in starting with the category of the self-forming living being, and recasting Uexküll's notion of melody in order to account for both this self-formation and meaningful behaviour. The organism thus "forms itself with risks and perils; it is not formed… The living being forms itself directly according to the theme, without the theme having first to become idea-image and represented model."[48]

Now, Merleau-Ponty was certainly trying to resolve precisely this kind of problem, both by introducing the body into phenomenology and by elaborating on the later concept

44 That *all* genuine individualities—including atoms and viruses—are alive in this sense for Ruyer is an issue we put to one side here.

45 Ruyer *Neofinalism*, 198–199, translation modified.

46 Ruyer, *Genesis of Living Forms*, 160.

47 Ruyer, *Neofinalism*, 201.

48 Ruyer, "Bergson and the Ammophilia Sphex," 175.

of the Flesh. But to the degree that consciousness remains neutral with respect to biological formation in any direct fashion—that is, it remains a knowledge-consciousness, an intentional consciousness—explaining how it actually comes to bear in the formation of purposive behaviour is unclear. What remains unresolved is, as Barbaras points out, the problem of "the specificity of the living subject": "Merleau-Ponty does not renounce the transcendental subject, and this is why he runs into the insoluble problem of a consciousness which remains the origin of the world, while being at the same time immersed in it."[49] This is certainly borne out by the closing moments of *Structure* itself, where he poses the following obviously central questions: "What are the relations of this naturized consciousness and the pure consciousness of self? Can one conceptualize perceptual consciousness without eliminating it as an original mode; can one maintain its specificity without rendering inconceivable its relation to intellectual consciousness?" (SB 224).

It should also be clear that, from Ruyer's point of view, Heidegger's famous discussion of the *Weltlarmut* of animals in FCM loses the force of scandal, appearing instead as the inevitable consequence of the theoretical presuppositions brought to bear on the living. It is nevertheless a failed attempt to account for the living being, from Ruyer's perspective. It is not enough to recognize, as Heidegger does, the irreducibly holistic nature of the organism, if this whole remains passive in relation to captivating environmental stimuli. On the one hand, this approach is unable to explain the formation of the living being itself: a strange oversight on Heidegger's part, given his familiarity with Driesch. On the other, by deploying an account of stimulus that remains, for all of its sophistication, a relic of Newtonian physics, he robs himself of the means to grasp the genuine form of immersion in meaningful interactions that characterizes animal existence.

3.3 Signal stimuli

If, as Ruyer contends, the unfolding life of any being consists in the conscious expression of virtual or ideal mnemic themes, then what role is played by the environment? Ruyer rejects in its entirety the classical response that adverts to the idea of extrinsic stimuli. His approach, though, does not consist in retreating entirely to the level of the ideal (as Leibniz does, for instance) but instead involves a renovation of the definition of stimulus itself.

In *The Genesis of Living Forms*, Ruyer presents a summary list of six "forms of efficacity," which run from the brute action of physical causes involved in the pumping of a bicycle tire to the deliberate deployment of signs characteristic of human language use.[50] The key difference lies between the fourth and fifth forms: between the idea of the stimulus as a *trigger* and the idea of the stimulus as a *signal*, an evocative "calling forth" in place of necessitation, *a tergo*. Both behaviour and formation unfold not as a complex mechanical system of causes or triggers but as something much closer to an ambient field of birdsong, where changes in morphogenesis are elicited or called for rather than caused. In positive terms, as Fabrice Colonna puts it, this is to say that "Chemical substance is a mnemotechnical means made use of by organic memory to accomplish its work."[51]

49 Renaud Barbaras, "Vie et extériorité. La problème de la perception chez Ruyer," *Les études philosophiques* 80 (2007), 17.

50 For a critical consideration of Ruyer's theory of signs, see Williams, *A Process Philosophy of Signs*.

51 Fabrice Colonna, *Ruyer* (Paris: Les Belles Lettres, 2007), 146.

Ruyer invokes the example of the signalling activity of bees:

> if the bee finds a source of food less than fifty metres from the hive, it will dance in a circle, indicating no direction. As J. B. S. Haldane notes, this dance is an *Auslöser* in Lorenz's sense, that is, a signal stimulus and not a sign. When this distance is exceeded, the bee will make use of true signs, or, if you like, its 'message'* possesses informational content: the 'waggle dance' describes a direction, and the number of dances per minute, the remoteness of the food.[52]

Arguably the same point is made both by Merleau-Ponty and by later enactivist thinkers, but Ruyer wishes to conclude something much stronger from these results. It is not just that a stimulus is always a signal, but that stimulus is only explicable in terms of a prior behavioural nexus, and indeed that there is, finally, nothing about stimulus qua signal that belongs to the exteriority of a milieu:

> In the structuration of a territory, behaviour in its totality dominates the perceptual indexes that guide it. It is not composed by the sum of automatic acts of obedience to perceived stimuli… And the proof is in the fact that the animal itself manufactures the sensory points of reference of which it makes use. The markings made by mammals through the medium of the products of glands, or by urine, clearly have the characteristic of being 'voluntary' signals. Urine above all plays the role of a veritable hormone-odour or an inductor for the extra-organic form of the territory, thus confirming the interpretation of embryological inductors as 'organic signals' subordinated to a total plan.[53]

For Ruyer, then, the Heideggerian claim that "the behavior of the animal is not a doing and acting, as in human comportment, but a driven performing" (FCM 237) is simply false; "the confusion of signal and cause must be avoided at every level."[54] Because Heidegger situates captivating causes in the pure exteriority of an environment, he robs himself of any means to explain how it can be any more than a brute push *a tergo* with respect to animal behaviour.

3.4 Ruyer and Merleau-Ponty on exteriority

It is notable that Ruyer's criticisms of Merleau-Ponty are essentially responses to the early *Structure* and only implicitly to the *Phenomenology*. But we know that his later engagement with the life sciences outstrips this perspective. Not only is he clearly familiar with the work that Ruyer himself is doing, but he engages with precisely the same suite of references in embryology and animal ethology we have just seen. Merleau-Ponty was, we can say, moving in the direction of something akin to a phenomenology of life or of the living being.[55] Conversely, from the point of view of Merleau-Ponty's later texts, an issue that potentially troubles Ruyer's own project appears. These texts are

52 Ruyer, *Genesis of Living Forms*, 76.
53 Ibid., 156.
54 Fabrice Louis and Jean-Pierre Louis, *La philosophie de Raymond Ruyer* (Paris: Vrin, 2014), 38.
55 On this point, see Toadvine, *Merleau-Ponty's Philosophy of Nature*.

underwritten by the well-known figure of the chiasm, intertwining, or what he sometimes calls *complicity*.

This thematic is absent from Ruyer's work. On the one hand—on the side of "inputs," as it were—he denies any role for immediate causality between living being and environment. On the other, by identifying consciousness with formation and behaviour, he appears to also rob himself of any way of accounting for reflective action on the side of "outputs." Strangely, then, it would seem that Ruyer and Heidegger end up in close proximity. In both cases, the intertwining of animal being and environment is dissolved in favour of one side of the pair: the living being for Ruyer and the environment for Heidegger. Neither the fact that Ruyer considers the conscious life of the living to be immensely richer than Heidegger's crypto-mechanist account nor the fact that the absence of mechanical causal effects on this life is outstripped by the role of mnemic themes discounts the fact that he too considers the animal to be poor in the world.

Ruyer partly ameliorates this problem by introducing a distinction between primary and secondary consciousness. As he puts it in *Neofinalism*,

> At root, there is only a single mode of consciousness: primary consciousness, the form-in-itself of every organism which is nothing other than life itself. Secondary, sensory consciousness is the primary consciousness of the cerebral areas. As the cortex is modulated by external stimuli, sensory consciousness presents us with the form of objects external to the organism. But this particular content represents in no way an essential character of consciousness and life.[56]

The critique of the idealist thought he associates with Merleau-Ponty proceeds in terms of primary consciousness, while secondary consciousness is identified with what phenomenology itself, among other traditions, identifies with the experiential layer, grounded in the functioning of the brain.

It is not clear that this distinction can carry the weight that Ruyer assigns to it. We need to ask, as Barbaras puts it, whether we are

> capable of accounting for the specific traits of secondary consciousness on the basis of primary consciousness that it fundamentally is?… More precisely, is it indeed possible to restore the intentionality proper to sensory consciousness (which is not only organization but actually consciousness of something) on the basis of[57]

primary consciousness, as Ruyer conceives it? It would appear that by inverting Merleau-Ponty's emphasis on the primacy of perception, Ruyer manages to avoid the threat of mechanism, but what he has replaced it with is a form of consciousness and its reflexive and intentional modification that makes the world towards which secondary consciousness would be oriented disappear.

56 Ruyer, *Neofinalism*, 98, translation modified.
57 Barbaras, "Vie et extériorité," 29.

4 Concluding remarks

In summary terms, we can say that the positions on the life sciences sketched here converge around two issues. The first concerns granting the living being a robust sense of agency with respect to environmental "inputs." The second concerns maintaining the meaningfulness of the transformations that the living being makes in the environment itself ("outputs," crudely put). Whether in fact any of these three philosophers are capable of resolving both problems at the same time is of course an open matter. Here, our concern was only to describe a certain partly obscured heretical tradition in the philosophy of life that runs from Heidegger into the French philosophy of the twentieth century. But it is one that is potentially worth rethinking today. From the point of view of the gene-dominated latter half of the twentieth century, all three thinkers look decidedly out of step with the times, but these times themselves have changed. With the prominence of questions concerning morphogenesis, autopoiesis, emergence, and epigenetics, it increasingly appears that they were less old-fashioned than that they were untimely. While only relatively few philosophers have returned to this terrain to think through developments in contemporary biology, there are rich resources here that can continue to be mined. In these unsettled and post-genomic times, philosophers and theoretical biologists may be of significant help to one another in grappling with life, the animal, and the nature of their intertwining.