

## THE TIME AND PLACE OF THE ORGANISM: MERLEAU-PONTY'S PHILOSOPHY IN EMBRYO

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We perceive a world of things that make sense.<sup>1</sup> In what phenomenology calls the natural attitude, it appears obvious that the sense of each thing is local to that thing itself, or to its parts, that things or their parts bear immediately within themselves their own determinacies. This obvious point informs our traditional ontology, as in the atomist view that there must be some least amount of being—some irreducible part—that already contains, local to itself, the determinacy that makes being be sensible.

But is this point so obvious? From its very start, Merleau-Ponty's philosophy challenges this point and the doctrine behind it, which I here call "ontological localism."<sup>2</sup> In *The Structure of Behaviour* (1942; 1965) he argues that the sense of things (both their physical organization and their sense for us) is precisely structural, spreading laterally through things into their surround and back. And the *Phenomenology* shows how a

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1. Confusion, ambiguity and even nonsense are not cases of an utter lack of sense, but of a world in which sense and non sense are constitutive issues.

2. The designation "localism" fits with and is inspired by a theme running through the lecture course studied here. See, e.g., Merleau-Ponty's initial, critical introduction of Cartesianism as a philosophy that adequates "*Sosein* to *Sein*" by claiming that "the figure of the world is inevitable as soon as extension exists" (LN 265/205; see note 6 for citation convention), i.e., by claiming that local determinacies of extension determine being. Also see his point that studying life vs. "physicochemistry" requires something more than "the series of individual spatiotemporal facts at a unique locale" (LN 268/207). The theme of "locale" continues in the sections on Driesch studied below. Also see the discussion in Behnke (1999) of Merleau-Ponty's criticism of an ontology of "frontality." Frontality takes the determinacy of things to be given in a front that is detachable from further depths of being; it is a species of localism.

thing's perceptual sense arises in tensions that cross the body and things, things and space, and so on. Sense, for Merleau-Ponty (and as suggested by the multiple connotations of the French word "*sens*") is precisely meaning as fit together with and oriented by being and its directions. A thing's sense is not local to it, but emerges in the global dynamics and directions of a field of being.<sup>3</sup> To demonstrate this, Merleau-Ponty must counter the natural attitude and what Bergson called the "logic of solids,"<sup>4</sup> which take ontological localism for granted. Merleau-Ponty's method for doing so is to appeal to phenomena—for example, illusions, disturbances, even paintings—that have a "wild sense"<sup>5</sup> that is non-local and that appears in advance of and counter to our cognitive biases.

My hypothesis in this paper is that Merleau-Ponty's later study of embryogenesis serves to extend this method of countering localism. This is because the embryo, as we shall see, is a thing that itself exemplifies a sense that is not local to or entirely present in the thing—its sense is not something already contained in it or its parts, but emerges in a process that extends beyond and across restricted locales. Embryogenesis thus gives us a lens into the operation of non-local sense.

To develop this hypothesis I contextualize and reconstruct Merleau-Ponty's critique, in his 1959-60 course on "The Concept of Nature: Nature and Logos: The Human Body," of Hans Driesch's embryology.<sup>6</sup> I must emphasize that my target is first of all Merleau-Ponty's negative problem, not the positive solutions that he entertains, and that I am reconstructing this problem, not giving anything like a full interpretation of Merleau-Ponty's lecture notes. Anyone who has studied Merleau-Ponty's lecture notes on nature will realize they pose daunting hermeneutic problems: they are part of a later thought that is still "in the making," to borrow a Merleau-Pontean phrase; they draw on details of a wide variety of scientific literature without yet fully clarifying Merleau-Ponty's view of those details (and often he gives no specific references); and the notes are sketchy, sometimes amounting to little more than enigmatic lists of topics to be elaborated in lecture.

My aim, then, is to broadly reconstruct the problem that Merleau-Ponty develops by introducing it in terms of deeper background problems. The reconstruction shows that Merleau-Ponty is interested in embryogenesis because it involves a process of sense-generation that is

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3. Cf. Merleau-Ponty's argument in the chapter on the phenomenal field, in the *Phenomenology*, which is cited in the form: *PhP* pg # in Merleau-Ponty (1945)/ pg # in Merleau-Ponty (1962).

4. Bergson (1998), ix.

5. Merleau-Ponty (1964b), 13/ Merleau-Ponty (1964a), 161.

6. Citations of the lectures on nature are in the form: *LN* pg # in Merleau-Ponty (1995)/ pg # in Merleau-Ponty (2003b). I have modified the English translation in a number of places.

irreducible to the plenitude of space or to spatial distributions of material, yet this process is inseparable from spatial facts. Embryogenesis is symptomatic of a genesis<sup>7</sup> of sense through space itself. But this would mean that there is a sort of 'depth' or 'hollow' internal to "flat being," which depth operates as a not-yet-given 'source' of sense. And this requires a sort of 'ontological surplus' internal to space. I think that the science of Merleau-Ponty's time did not give him the resources for understanding this 'surplus,' so I turn, in Merleau-Pontean fashion, to some recent scientific accounts—of bees, termites, and embryogenesis—to elucidate it and its role in sense generation. This means turning from space as extensive to place as intensive, for it is the intensity of places, rather than the extensity of already delineated spaces, that affords sense generation. There is also a connection here with the intensive time of institution.

In other words, on the centenary of Merleau-Ponty's birth, I look to the birth of the embryo to trace the genesis of sense within being and to find a philosophy of sense in embryo.

Why should we or Merleau-Ponty turn to embryos to study the genesis of sense? To answer and to develop a context for understanding Merleau-Ponty's critique of Driesch, let us begin from the central problem of embryology. The problem is this: How does one totipotent egg cell, which can multiply into any type of cell, in fact grow into an organism with cell types distributed just so, such that the organism exhibits the body-type characteristic of its species, with a head here, a leg there, and so on? In other words, the developed embryo is an organized body with a determinate sense. But this sense is not yet manifest in the egg. Where does this sense come from?

We might claim that this sense is already wholly contained in the egg at birth—it is just not yet developed. This is the thesis of preformation or "*emboîtement*," which claims that the sense of the mature organism is already 'boxed' into the egg. Stages of development merely release senses already contained in a nested set of such 'boxes'.<sup>8</sup> The term "evolution" is originally deployed to designate this hypothesis, for in Latin "*evolvere*" means to unfold: the organism unfolds from something already given, as

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7. The problem of the genesis of sense goes back to Husserl, see e.g., Husserl (1998) and the *Origin of Geometry* in Husserl (1970). For Merleau-Ponty's view of this problem and its linkage to Husserl's *Origin*, see, e.g., Merleau-Ponty (2002), and Lawlor's very helpful introduction to that volume. It must be emphasized that the problem is not about an already or previously given origin of sense, but of the genesis of sense from something that is not yet given. In this respect, the problem links with the problem of *Ereignis* in Heidegger and the critique of presence in Heidegger and Derrida.

8. For background on these issues, the preformation and epigenesis debate, and their role in philosophy, see Smith (2006); Richards (1992); Amundson (2005); Zammito (1992), chs. 8-10.

the piece of origami (to use Proust's image) unfolds into a flower when dropped into water. This thesis is thus compatible with a creationism in which God, at creation, boxes fully determined templates for all possible organisms into one original germ. It thus boils sense down to an already given origin, rather than allowing for a genuine genesis of sense.<sup>9</sup> Kant already saw that this thesis led to problems explaining hybrids and genuine changes of organic form.<sup>10</sup>

On the other hand, we might say that the sense of organisms is not specified at their biological genesis, but by some mechanical process operating after that genesis, by "epigenesis." While epigenesis allows for hybridity or change, the problem is how mere mechanism, as Kant might put it, could ever give rise to organized form in the first place.<sup>11</sup>

What I have just outlined is the preformation vs. epigenesis debate. This debate goes right back to early modern philosophy, and its terms are at work in Kant and German idealism, in *Naturphilosophie*, and in formative work on embryology in Germany (by figures like Ernst Haeckel and Karl Ernst von Baer) in the later 1800s.<sup>12</sup> A genetic version of the preformation-epigenesis debate remains operative in present controversies, to which we return. And the debate is background to the problem tackled by the German embryologist Driesch in the work that Merleau-Ponty is studying, namely Driesch's Gifford Lectures on *The Science and Philosophy of the Organism*, which were delivered in 1907 in English at the University of Aberdeen, published in English in 1908, with a second edition in 1929, and translated into French in 1921 with a preface by Jacques Maritain.<sup>13</sup> In his lectures Driesch explores "entelechy" as a source of embryological organization, between preformation and epigenesis.

In the 1959-60 nature course Merleau-Ponty studies nature as a "privileged expression" of ontology (LN 265/204), in order to gain clues to the ontology of being (see esp. LN 267-69/206-7). The genesis of natural forms such as the human body is of interest because it is symptomatic of an ontology that allows for sense-genesis, and Driesch's embryology lets Merleau-Ponty zoom in on this ontology. In the "fourth sketch" of the course, Merleau-Ponty rehearses Driesch's data and his argument for entelechy in such a way as to bring them to the point of what Merleau-

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9. See note 7 on genesis vs. origin.

10. See Kant (2000), §81; Kant (2001); Kant (Forthcoming); cf. Zammito (2003).

11. See the famous comment in Kant (2000), §75 on the uselessness of hoping for a Newton who could explain even a blade of grass.

12. See references in note 8.

13. The first edition, Driesch (1908), is available online through the University of Toronto library; the second edition, Driesch (1929), is available as a reprint from kessinger.net. The French edition is Driesch (1921).

Ponty calls "autocritique." Like the dialectical analyses of *Structure* and the *Phenomenology*, this "autocritique" shows how Driesch's own concepts themselves demand a different ontology. (Merleau-Ponty's study is thus a critique, in the Kantian sense of a study that seeks deeper conditions already inherent in a given field.)

This "autocritique" not only echoes Merleau-Ponty earlier dialectical *method*: the dialectic of preformation vs. epigenesis echoes the *content* of the dialectic of rationalism and empiricism that is central to the *Phenomenology*. Like classical preformationism, rationalism accounts for sense only by appealing to an ideal sense already formed.<sup>14</sup> So rationalism fails to explain the expressive, creative sense that Merleau-Ponty discovers in the body, in the way that preformation fails to explain genuine changes of organic form. A similar point holds for mechanical epigenesis and empiricism. We can thus hear echoes of Merleau-Ponty's earlier quest for a philosophy of dynamic sense in his later study of embryology.

But the later study gives the earlier dialectic an ontological twist, and this twist comes through *space*, because Merleau-Ponty's critique of Driesch effectively addresses the preformation-epigenesis dialectic by taking it up in specifically *spatial* terms. Embryogenesis gives Merleau-Ponty clues as to spatial-ontological underpinnings of dynamic sense-*genesis*.

To understand why space becomes an issue, we must note how Driesch formalizes the problem of embryogenesis. He has us conceive the spherical organism as opened into a tube and then topologically flattened into "a plane of two definite dimensions, *a* and *b*." The problem of embryology can then be formalized in terms of finding the mathematical function that specifies the prospective value, that is, "fate," for each point (*x*, *y*) in this plane, whether the point is going to be nerve, muscle, etc. Driesch thus conceptualizes the sense of the organism as a function of the space it occupies.<sup>15</sup>

But in doing so Driesch immediately confronts two problems. First, the organism's occupation of space can be manipulated in various ways without drastically changing the sense of the organism that eventually develops. For example, the embryo can be squished in specific ways, or specific sections of it can be removed and grown on their own, yet we can end up with a organism that looks normal, even if perhaps smaller. It is as if a section ripped from a mosaic floor, or folded over onto itself, ended up looking the same as the original. In technical vocabulary, embryos exhibiting this property are regulative, vs. mosaic: their

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14. Kant scholars have in fact argued that Kant's appeal to the a priori is influenced by the biological doctrine of preformationism. See, e.g., Sloan (2002).

15. See Driesch (1908), 122-125/ Driesch (1929), 88-91.

structure is not merely determined by the mosaic pattern of the cells in the early stages of the embryo, but by a regulative process that grows the embryo according to type even if cells are spatially displaced. Driesch therefore acknowledges that his function does not merely depend on the set of points  $(x, y)$  in the original plane of the organism, but on factors that represent the size and limits (relative to the original plane) of the section grown, and on the factor  $E$  which stands for "entelechy" (a term Driesch is adapting from Aristotelian philosophy). The latter factor, which is not spatially indexed, is required to explain how distortions or subsections of the organism can grow according to type. The explanation could not be merely local to points in the organism, because sectioning and distorting displaces these points and their interrelation; determinacies local to points would thus appear in the wrong place in the distorted organism. As Merleau-Ponty puts it, "development... "is regulated" independent of topographical mechanisms" (LN 293/230), there is evidence of a "nondependence with regard to place, to topography" (LN 294/231). This echoes Merleau-Ponty's earlier critique of atomism, empiricism, and the constancy hypothesis, for regulation manifests a sense that remains constant over and above atomic elements and their spatial arrangement.

On the other hand, some sectionings and distortions of the embryo do mutate it, as does exposure to chemicals. But, as Merleau-Ponty observes, "if there were a separated principle of invariance it would regulate even then" (LN 296/232). What generates sense cannot be separated from the space of the organism. This echoes Merleau-Ponty's earlier, phenomenological critique of rationalism: if the sense of a visually perceived figure were determined by a separated idea, then we would recognize an inverted or distorted mosaic picture, but in fact the distorted mosaic looks qualitatively different.

Overall, the problem of regulation leads Merleau-Ponty to claim that Driesch's concepts internally mark "the limits of the spatial, but not yet the presence of a metaspatial" (LN 296/233). The genesis of sense in the organism can neither be reduced to local points in space (as in empiricism), nor inflated to something ideal beyond space (as in rationalism). Sense arises from something in space, yet something more than what is already locally given in space. As Merleau-Ponty puts it, what Driesch's "entelechy" indicates is "not an aspatial substance—and yet it is not "in the place/locale"" (LN 300/236). What is the ontology/spatiality of such a sense?

Here we must briefly turn to Driesch's second problem. The function that Driesch seeks is supposed to determine the prospective value, or "fate," of each cell in the organism's plane. But each such cell has a prospective *potency* that is far greater than its actual prospective fate. (A cell that in a given case ends up being fated to turn into a nerve could

have been fated to turn into muscle.) Localizing the eventual sense of the organism in the potency of its several cells is a problem, for we could not say how the cells themselves would restrict their potency to just one actuality. As Driesch puts it, "If in each point of the germ something other than what is really formed in each case can be formed, why exactly does it produce what is produced in each case, and nothing other?" Why or how would something that has the potential to turn into anything bear within its very potency a restriction that turns it into just one of its potencies? With respect to this problem, Merleau-Ponty notes that "there are not only several possibles in each point, there is also an invariance of result... There is not only a plurality of local possibilities, but a "species of order"" that goes beyond local points (LN 295/232). But where does this overall order come from? If possibilities strictly local to each point conditioned growth, then there would be no overall coordinated growth according to type. Suppose, on the other hand, that possibilities local to points were coordinated with each other in the manner of Leibnizian monads. In this case it would be hard to say why the reduction of possibility to actuality requires development through determinate stages in response to contingent spatial inputs (rather than something precisely and already contained in 'intermonadic' possibilities, independent of inputs): why does the embryonic 'monad' in fact have windows, and need these windows to grow? The above articulates a problem analogous to the problem of perceptual learning in the *Phenomenology*<sup>16</sup>: the embryo must 'seek' something more than what is local to each point if it is to grow to type, but if the type 'sought' were ready-made as an ideal, metaspatial possibility, then it would be hard to explain why development unfolds through determinate stages sensitive to spatial inputs. There must be something concretely running across the space of the embryo that modulates its possibilities such that its sense is more than local to each point, yet is not beyond its space of growth. Development must be a "creative operation" within the field opened by the organism.<sup>17</sup>

To make a long and complex story short, Merleau-Ponty's view is that the problems internal to Driesch's analysis call for a new ontology. Driesch's fundamental conceptual problem, Merleau-Ponty suggests, is an uncritical conception of possibility as a positively given, ready-made "sack of possibles" (LN 297/234) in the space of the embryo. In contrast, development, Merleau-Ponty says, "is not explained by the preexistence of the possibilities, but by their elimination" (LN 296/233); "not by a positive factor, but by a set of vanishing equilibria liberating a set of regulative causalities" (LN 300/236). This negative process is a

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16. See Merleau-Ponty's version of the seeker's paradox at *PhP* 36/28.

17. See *PhP* 74/61. On the significance of this creative operation see Lawlor (1998).

depreciation (*amortissement*) in which “the adjustment [*aménagement*] of a certain place where forces bog themselves down” allows “other forces to come into play” (LN 300/236). Development is not driven by a positively given entelechy as Driesch suggests, it is a matter of restrictions in, and open to, the space of the embryo. What eventually plays out in these restrictions is something not yet ready-made or locally given, and this drives development by causing further (intensive) restrictions from within this space. There are unmistakable Bergsonian and even Deleuzian resonances at this point.

But here there are also ontological difficulties. Merleau-Ponty writes that he is seeking a kind of negative that explains the genesis of sense, a negative that operates as a “hinge of being.” This negative is not an already determined positive absence of something, but a not-yet, a sort of gap in being. Merleau-Ponty understands this gap spatially. His question is “How to understand this gap, this negative, encrusted between the [localized] situation and the [metaspatial] response [to it]: Is it spatially between them?” But if we conceive this gap positively, then we reduce it to the spatial or metaspatial alternatives that we have already ruled out. So “[t]here is a solution only by putting the ontology of the in-itself back in question.” (LN 301/237) The embryo is thus symptomatic of a new ontology and a new sense of space. Life, as Merleau-Ponty says, is not a “separable thing...but a hollow in Being,” it is not an already determined negativity, “but a pattern of negations” that must be conceptualized in terms of a field or dimension that is “the depth for flat beings” (LN 302/238).

In sum, Merleau-Ponty tells us that in order to account for the genesis of life, for embryogenesis, for a process that does not arise beyond space, but is open to space, yet is not reducible to what is already localized in space, we need to think of space and being not as something positive and flat, but as internally hollow<sup>18</sup> or deep. This hollow at once opens a place for the play of forces, yet restricts forces so that determinate sense can arise. How are we to conceptualize this?

Here is where I think Merleau-Ponty starts getting into trouble. Frankly (at least in my view), his efforts to articulate this negative are near impossible to understand. This is in part because of the terse, exploratory, and enigmatic character of his notes, but also, I think, because he was lacking some resources that we can find in recent science, to which I now turn. This also requires a turn from space as extensive to

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18. The “hollow” is an enduring theme in Merleau-Ponty. It is anticipated in *Structure's* discussion of an interiority of being, and proliferates in later works. See, e.g., *PhP* 249/215, 278/240, 492/431, and the *Visible and the Invisible*, where it is mentioned around 20 times, including a discussion of embryogenesis as preparing a hollow within the organism (Merleau-Ponty (1964c), 287; Merleau-Ponty (1968) 234).



place as intensive. To briefly explain the latter, against an extensive clock time already parcelled into divisible units via an externally imposed metric, Bergson has us think of *durée* as intensively determining its own meter or rate from within, e.g., the difference between the quick time of old age vs. the slow time of youth, where these two 'times' are incommensurable and irrepeatable. So too we can think of place as having an internal metric or curvature in virtue of intensively determined differences within and across unique, irrepeatable places.<sup>19</sup> In the way that *durée* stands in opposition to an already mensurated clock time, intensive place stands in opposition to extensive space as an already mensurated manifold of commensurable locations.

Keeping in mind this concept of intensive place, let us look at how bees decide on a new place to live. A thriving colony of honey bees will divide itself in two by "swarming," a process that begins when the old queen and about half the workers leave the hive to cluster on a nearby branch.<sup>20</sup> How does the swarm, which may consist of up to ten thousand bees, find its new nest? If it moves to the first nest site it finds, it may not find the best nest, but if it exhaustively surveys all possible nest sites, it may expose itself to danger by taking too long to find a nest. Remarkably, swarms nearly always swiftly pick out the best nest site.<sup>21</sup> Recent work reveals how they do this. Briefly, a number of scouts fly out from the swarm in random directions. When a scout finds a nest site, she flies back to the swarm, and performs a waggle dance. Such dances normally direct bees to food, but the scout now dances to attract fellows to the nest site she has found. The dance's central "waggle run" indicates the direction and distance to the nest site. More important, the number of repetitions of the dance indicates the scout's estimation of the site. For example, one hundred repetitions indicates an excellent site, a dozen indicates a so-so site. (225) Having finished her dance, the scout returns to her site, and others who have followed her dance may join her. Then the scout will return from the remote site to the swarm, to repeat her dance. But, crucially, on each return, she will "decrease the strength of her dance advertisement by about 15 dance circuits," effectively indicating a bit less certainty about her estimation. (226) But, on the other hand, if she has recruited other scouts to her site, and they share her estimation, then they will also come back and dance for the site. A feedback can thus arise in which the number of dances for the site and thence the number of scouts

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19. My distinction between place vs. space is inspired by Casey (1993), Casey (1997), Malpas (1999), and Delanda (2002) on intensive curvatures of space.

20. The following material is from Seeley and Visscher (2004).

21. In a controlled experiment, nearly "all the test swarms chose the excellent nest box" over four mediocre nest boxes, even though "the excellent site was never the first to be found" (225).

flying to the site “snowballs.” Something called “quorum sensing” now comes in: when the number of scouts at the remote site reaches a quorum threshold of around 15, the scouts awaken the swarm and bring them to the site. The decision is thus made.

Simulations reveal that if the quorum threshold, or the decrease of dance repetitions on subsequent trips, were higher or lower than it actually is, then the decision might be split, take too long, or too quickly settle on an inferior nest. And these variables and what they indicate about the process of group decision making are of interest to biologists and sociologists because they can provide some insight, for example, into why human groups so often make bad decisions.

My interest here is not in these variables, but in the role that place plays in this process, in the bee swarm’s decision as (like embryogenesis) giving us a lens into the role of place in the genesis of sense. With their decision, the bees arrive at the sense of a nest site. What is the genesis of this sense? This sense does depend on an already built in sense (an instinct, we might say) that individual bees have for judging nest sites. But this general instinct does not yet give the sense of this particular site being the right one. And the process of deciding is such that judgement of rightness of the site is never local to any one single bee merely—it is precisely this non-locality that gives the swarm judgement its power. We have to ask how sense arises on this swarm level, without (mistakenly<sup>22</sup>) reducing the group’s judgement to a sum of individual choices that operate *partes extra partes* (as Merleau-Ponty might put it). But we should probably speak here of a partial genesis of sense, to acknowledge that the swarm-judgement relies on instinctual senses already available (rather than being a case in which sense is generated entirely ‘from scratch’).<sup>23</sup> My interest here is in the principle behind this partial genesis, as symptomatic of underlying, deeper principles of sense genesis in general.

Now the swarm’s collective choice does depend on a number of spatially distributed parts (the bees) working together in a complex choreography, but it neither reduces to the local spatial distribution of parts nor inflates to something metaspatial. Place has a role in the process, over and above spatial distributions. The bees decide by moving back and forth between places. These movements internally adjust the problem space until it depreciates (*amortissement*, see LN 300/236, quoted above) to a solution, and this can happen because differences of place break up and canalize the choreography of the swarm’s parts. It is because placial spreads intervene in the process, because they have to move back and forth and spread out to do their processing, that the bees

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22. On this mistake, see Morris (2005).

23. My thanks to Ted Toadvine for provoking this qualification and the response that follows.

do not congeal into a snap mob decision or reduce their decision to a ready-made space or "sack" of differences. Andy Clark and David Chalmers (1998)—and Merleau-Ponty too—conceive the mind as integrally extended into things like paper scratchpads. Here I am suggesting that *intensive differences across place* are integral to the genesis of sense in the bee-swarm. The bees cannot make their decision 'in their own heads' via metaspatial representations, nor do bees or sites finally contain, local to themselves, the sense of some particular thing being a nest; they do not execute a calculation via a centralized register (as in a computer processor), they decide by dancing across places. It is in supraindividual movement in and across places that the sense of the nest site develops. And place does not already contain, either locally or distributively, the sense that can develop through movement. Place rather gives the restrictive field—the differences—through which the bees, by moving around, "bog themselves down" in ways that depreciate into adjustments of places that restrict and release new movements that lead to new sense.

In his book *The Tinkerer's Accomplice: How Design Emerges from Life Itself* (2007), scientist J. Scott Turner shows something similar about the chimneys that certain termites build on their mounds. These chimneys are exquisitely structured to function as ventilators of the mound and are tilted precisely toward the average zenith of the sun. Is this because the chimney realizes some metaspatial type or because there is some possibility local to bits of dirt or space each on their own that determines the chimney shape? No, to make either of these claims is to think of the mound as a positively given thing. Turner argues that we must not do this. The mound is not a machine that is either spatially or ideally fixed in advance of its function. According to Turner, the chimney's spatial structure, its thingly manifestation, is rather the ongoing enactment of the thermodynamic function that it realizes. And given Turner's account, we must note that differences across place are ingredient in the chimney's ongoing function and structuration, in the way that differences across place are ingredient in the bee-swarm's decision. Briefly, Turner observes that termites are wont to pick up soil grains in high CO<sub>2</sub> areas and drop and glue them down in low CO<sub>2</sub> areas. The termites cultivate a fungus that provides bacteria crucial for termite digestive systems, and the heat and gas from fungal and termite respiration creates high CO<sub>2</sub> areas right above the termite nest. So collective termite movement constantly clears accumulating dirt from the area above the nest, thus forming a chimney hollow. The sun, heating just one side of the growing chimney, causes further pressure differentials such that soil-deposition prevails on the sunward side, while erosion by wind prevails on the shade side. Consequently the growing mound tilts toward the average zenith of the sun. A complex sense thus has its (partial) genesis in thermodynamic

flows and movements that gain their determinacy only through differences across places. Once again, differences opened by place are ingredient in (partial) sense-genesis.

And these differences operate in a negative way. Turner writes that “The chimney exists not because the termites have engineered it for ventilation, but for the same reason a quarry exists: every soil grain deposited on the surface must be taken from some place deeper in the mound, leaving a void behind.” (24) This passage from Turner should remind us of the passage in *Creative Evolution* where Bergson writes that “the creation of the visual apparatus is no more explained by the assembling of its anatomic elements than the digging of a canal could be explained by the heaping-up of earth which might have formed its banks.”<sup>24</sup> Like Bergson, Turner’s point is that, against the materialist, the chimney’s ‘design’ is not reducible to or spatially localized in the cartloads of soil dumped in its walls, and against the finalist, it is not due to carters following a metaspatial plan. The ‘design’ of the chimney is not specified in anything positively given, but is rather what is left over when negative restrictions emerging from placial differences compound upon one another to intrude in moving processes.

The way placial differences restrict movements in these bee and termite examples thus gives us an insight into the kind of “pattern of negations” that open a “depth” in “flat being,” that internally opens ‘room’ for something more in being such that being can yield sense. The examples let us understand what might be behind Merleau-Ponty’s formula that “Structuration=by total functioning, the putting in place of local functioning in an interaction.” Merleau-Ponty compares this structuration to the “mode of resolution assigned to a melody from its very beginning, without the organizing principle graspable apart.” (LN 303/238) The internal tension between notes restricts the movement of the melody, internally generating the melody’s mode of resolution. Similarly, the internal, restrictive tension of *movements between places* internally generates structuration and sense, chimneys and nest sites, it hollows out being in a way that opens a new determinate possible that had not yet been there.

But what of the embryo? In fact, something like this internal, negative operation is suggested in current accounts of embryology. Let us go back to the problem of embryology, namely explaining how one totipotent cell grows into an organism characteristic of its type. The answer to this problem that predominated in the twentieth century was driven by genetics: the genes contain a ready-made blueprint for the body, and embryogenesis distributes cells according to this blueprint. This is a version of preformationism, although—crucially—the preformed genetic

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24. Bergson (1998), 93.

blueprint can evolve via inheritance and natural selection. Recent results, however, challenge this 'genetic reductionism' by emphasizing that "epigenetic"<sup>25</sup> processes and factors, over and above genes, can shape the organism's development and evolution. This is a central theme of evolutionary and developmental science, or "evo devo."

For example, Brian Goodwin (2001) and Alessandro Minelli (2003) show how morphogenetic constraints are important to embryogenesis. The ways that cells adhere to one another and the tensions that arise when they proliferate within tissues crucially inform the patterns of leaves in vascular plants, and the very same tensions inform the branching of bones in vertebrate limbs.

But let us turn to evo-devo scientists March Kirschner, John Gerhart and Sean Carroll,<sup>26</sup> who emphasize that the visible pattern of the animal body does not correspond to some sort of map inside the genes or body that codifies the visible pattern in a spatial way. The visible pattern of the animal body is to be understood in terms of a "compartment map" that is not at all visible in the developed body. The problem solved by the compartment map is how the body ends up with a leg here and an antenna there. But it does not solve the problem by, for example, specifying the locations in an extensive space where a leg is to grow. Roughly, in growing, the cells of the embryo spread through their place of growth. In doing so they send out waves of genetic signals that diffuse through this embryonic place. The overlapping of these waves defines compartments. Note that the language of compartments is a bit misleading: compartments are not defined by impenetrable walls, but only by overlaps of signals. What compartments do is restrictively allow further gene signals to figure as having differential functions. For example, one and the same signal might initiate the growth of a leg or of an antenna, but it is restricted to doing just one or neither of these things in a given compartment, because of the way the compartment differentiates and restricts the place of growth. When a leg grows in the place of an antenna, this is not because something has mutated in a ready-made plan (whether localized in space or metaspatial) that fully specifies where each leg and antenna is to be located. Rather, the mutation arises because something goes awry in the *place and time* of the embryo, in the process of waves intersecting to generate the compartment map.

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25. Note that this term here acquires a different connotation than it has in the original preformation vs. epigenesis debate. Epigenesis now refers to factors over and above genes, as well as or rather than factors over and above what is given at the moment of an organism's biological genesis.

26. Kirschner and Gerhart (2005) and Carroll (2005).

So the plan, the organism's sense, mutated or otherwise, is generated<sup>27</sup> in place, on-site, in-time, via restrictions on flows across places, in the sort of negative way that Merleau-Ponty was exploring. Merleau-Ponty comes close to this when he says (of Driesch on regeneration) that "[w]e have a section (intersection) that creates a new territory, and the place of the section decides what will be regenerated" (*LN* 297/234). This suggests an ontological model in which sense generation would depend on restrictions, on sections and intersections that remove flows. These restrictions are not positive or ontologically localizable, they do not on their own suffice to specify what they determine, they only determine things in relation to movements across them and across differences of place. In this way these restrictions are neither metaspacial—beyond space—nor reducible to localized spatial contents. And restrictions do not on their own constitute an already given "sack" of possibles, because their determinacy depends on further places and movements that are not yet given or localized.

But here I must urge that restrictions could not reduce to the manifold of an already given and determined extensive space. This would just be another metaspacial. Restrictions must involve the determinate and intensive manifold<sup>28</sup> of what I called place. This concept of the intensive manifold probably resonates with the thought that Barbaras finds in some notes by Merleau-Ponty on dynamic morphology, in which Merleau-Ponty suggests that the determinate identity of something such as sulphur is neither reducible to (extensively) localized, manifold bits of sulphur, nor inflatable to an ideal element, but stretches across the places and operations that internally give rise to sulphur as spread across places.<sup>29</sup> Further, because of the role of movement in this ontology, our focus on intensive place would have to intersect with a focus on intensive time. And this is precisely Merleau-Ponty's topic in the institution lectures, where he once again turns to the embryo for clues, this time for clues as to the ontology of institution vs. constitution.<sup>30</sup> But that is another story.

To put these concluding thoughts another way, earlier I noted that the empirical cases studied above (of bees, termites and embryos) involve only a partial sense-genesis: the sense generated relies on senses already

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27. Note here that once again this sense-genesis is partial, since it depends on senses already available in genes, cells, and so on.

28. See Driesch's intriguing equation of entlechy with intensive manifoldness, Driesch (1908), 144; Driesch (1929), 107; Merleau-Ponty comments on this at *LN* 299/235. Driesch's theme of intensive manifoldness should be compared with his discussion of manifolds earlier in Driesch (1929), 30.

29. Barbaras (2001), 35.

30. Merleau-Ponty (2003a), 49-52.

given. We might think that there is, in contrast, an absolute sense-genesis that does not rely on some already given sense. But my sense is that sense-genesis is never absolute. This is what distinguishes the concept of the genesis of sense from that of an *origin* of sense. An origin of sense would already contain the sense that it originates, it would be somewhat like a spring that already contains the water that springs from it. In contrast, sense-genesis is a process of making sense explicit, yet the sense that is eventually explicated is not yet already there. Sense genesis operates according to the paradoxical logic of expression studied by Merleau-Ponty in the *Phenomenology*. The paradox is that in creative, primary expression, what is eventually expressed is not yet contained in the X which is being made express; nonetheless, what is expressed does in fact express this X. The child's or poet's sad lament is not yet contained in their sorry condition, which condition motivates expression; but the lament nonetheless expresses that condition.<sup>31</sup>

Expression and sense genesis are conditioned by a condition that does not yet contain what it conditions. Sense-genesis does not depend on an origin that would already contain what it originates, and the sense that arises in genesis does not spring from an ideal, from a plenitude or presence. In other words, the condition of sense-genesis is a peculiarly generative condition (kin to the Kantian imagination). Sense genesis is thus always partial, it is always an elaboration of sense, rather than a production of sense from nothing. (At the very least, sense-genesis starts from a non-sense that would already depend on sense.) This generative condition entails an ontology in which being is not fully given (flat), such that it already would (or would not) contain future sense. Rather, being is internally hollow and generative, being is more than it is because it is not-yet-there.

The cases of partial sense-genesis studied above can give no positive proof of the ontology we are here venturing to explore. Nonetheless, they are symptomatic of and clues to such an ontology: these phenomena, if we think about them critically, correct our tendency to reduce the sense of things to positive determinations already and fully given; they clue us in to a different kind of ontology. What I think these phenomena tell us, and help us understand in Merleau-Ponty, is that the generative condition of sense-genesis involves place and time: it is because there are intensive differences of place and time, it is because being is not all one that being is generative of sense. (This "not" marks the sort of negative that Merleau-Ponty was seeking.) Being is not a plenum, it is emptied out by intensive place and time differences; but these differences, we must note, are not even yet given as such, we must not think that being is

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31. See Waldenfels (2000), Lawlor (1998).

*already* emptied out, for this would reduce negative differences to a positivity.

But these points remain hard to think, because they are at odds with our all too easy “logic of solids.” So my tracing of Merleau-Ponty’s “philosophy in embryo” itself remains in embryo, a philosophy yet-to-be.

## References

- Amundson, Ron. 2005. *The Changing Role of the Embryo in Evolutionary Thought: Roots of Evo-Devo*. Cambridge: Cambridge University Press.
- Barbaras, Renaud. 2001. Merleau-Ponty and Nature. *Research in Phenomenology* 31: 22-38.
- Behnke, Elizabeth A. 1999. From Merleau-Ponty's Concept of Nature to an Interspecies Practice of Peace. In *Animal Others: On Ethics, Ontology and Animal Life*, edited by H. P. Steeves. Albany: State University of New York Press.
- Bergson, Henri. 1998. *Creative Evolution*. Translated by A. Mitchell. Mineola, N.Y.: Dover. Original edition, 1907.
- Carroll, Sean B. 2005. *Endless Forms Most Beautiful: The New Science of Evo Devo*. New York: W.W. Norton & Company.
- Casey, Edward S. 1993. *Getting Back into Place: Toward a Renewed Understanding of the Place-World*. Bloomington, Indiana: Indiana University Press.
- — —. 1997. *The Fate of Place: A Philosophical History*. Berkeley: University of California Press.
- Clark, Andy, and David J. Chalmers. 1998. The Extended Mind. *Analysis* 58: 7-19.
- Delanda, Manuel. 2002. *Intensive Science and Virtual Philosophy*. London: Continuum.
- Driesch, Hans. 1908. *The Science and Philosophy of the Organism*. first ed. London: A. & C. Black.
- — —. 1921. *La philosophie de l'organisme*. Translated by M. Kollman. Paris: Rivière.
- — —. 1929. *The Science and Philosophy of the Organism*. second ed. London: A. & C. Black.
- Goodwin, Brian. 2001. *How the Leopard Changed Its Spots: The Evolution of Complexity*. Princeton: Princeton University Press.
- Husserl, Edmund. 1970. *The Crisis of the European Sciences and Transcendental Phenomenology*. Translated by D. Carr. Evanston, Illinois: Northwestern University Press.



- — —. 1998. Static and Genetic Phenomenological Method. *Continental Philosophy Review* 31: 135-142.
- Kant. 2000. *Critique of the Power of Judgment*. Translated by P. Guyer and E. Matthews. Cambridge: Cambridge University Press.
- Kant, Immanuel. 2001. On the Use of Teleological Principles in Philosophy. In *Race*, edited by R. Bernasconi. Malden, Mass.: Blackwell.
- — —. Forthcoming. On the Different Human Races: An Announcement of Lectures in Physical Geography in the Summer Semester of 1775. In *Philosophy and Race*, edited by R. Bernasconi and T. D. Sharpley-Whiting. Albany: State University of New York Press.
- Kirschner, Marc W., and John C. Gerhart. 2005. *The Plausibility of Life: Resolving Darwin's Dilemma*. New Haven: Yale University Press.
- Lawlor, Leonard. 1998. The End of Phenomenology: Expressionism in Deleuze and Merleau-Ponty. *Continental Philosophy Review* 31: 15-34.
- Malpas, Jeff E. 1999. *Place and Experience: A Philosophical Topography*. Cambridge ; New York: Cambridge University Press.
- Merleau-Ponty, Maurice. 1942. *La structure du comportement*. Paris: Quadrige/Presses Universitaires de France.
- — —. 1945. *Phénoménologie de la perception*. Paris: Galimard.
- — —. 1962. *Phenomenology of Perception*. Translated by C. Smith. Atlantic Highlands, New Jersey: The Humanities Press. Original edition, 1945.
- — —. 1964a. Eye and Mind. In *The Primacy of Perception*. Evanston, IL: Northwestern University Press.
- — —. 1964b. *L'Oeil et l'Esprit*. Saint-Amand, France: Galimard.
- — —. 1964c. *Le Visible et l'invisible*. Paris: Galimard.
- — —. 1965. *The Structure of Behaviour*. Translated by A. L. Fisher. London: Methuen. Original edition, 1941.
- — —. 1968. *The Visible and the Invisible*. Translated by A. Lingis. Evanston, IL: Northwestern University Press. Original edition, 1964.
- — —. 1995. *La nature: notes, cours du Collège de France*. Paris: Seuil.
- — —. 2002. *Husserl at the Limits of Phenomenology*. Evanston, Illinois: Northwestern University Press.
- — —. 2003a. *L'institution et la passivité: Notes de cours au Collège de France (1954-1995)*. Paris: Editions Belin.
- — —. 2003b. *Nature: Course Notes from the Collège de France*. Translated by R. Vallier. Evanston, Ill.: Northwestern University Press.
- Minelli, Alessandro. 2003. *The Development of Animal Form: Ontogeny, Morphology, and Evolution*. Cambridge, UK: Cambridge University Press.

- Morris, David. 2005. Animals and Humans, Thinking and Nature. *Phenomenology and the Cognitive Sciences* 4: 49-72.
- Richards, Robert John. 1992. *The Meaning of Evolution: The Morphological Construction and Ideological Reconstruction of Darwin's Theory*. Chicago: University of Chicago Press.
- Seeley, Thomas D., and P. Kirk Visscher. 2004. Quorum Sensing During Nest-site Selection by Honeybee Swarms. *Behavioral Ecology and Sociobiology* 56: 594-601.
- Sloan, Phillip R. 2002. Preforming the Categories: Eighteenth-Century Generation Theory and the Biological Roots of Kant's A Priori. *Journal of the History of Philosophy* 40: 229-253.
- Smith, Justin E. H. 2006. *The Problem of Animal Generation in Early Modern Philosophy*. New York: Cambridge University Press.
- Turner, J. Scott. 2007. *The Tinkerer's Accomplice: How Design Emerges from Life Itself*. Cambridge, Mass.: Harvard University Press.
- Waldenfels, Bernhard. 2000. The Paradox of Expression. In *Chiasms: Merleau-Ponty's Notion of Flesh*, edited by F. Evans and L. Lawlor. Albany: SUNY Press.
- Zammito, John H. 1992. *The Genesis of Kant's Critique of Judgment*. Chicago: University of Chicago Press.
- . 2003. 'This Inscrutable Principle of an Original Organization': Epigenesis and 'Looseness of Fit' in Kant's Philosophy of Science. *Studies in History and Philosophy of Science* 34: 73-109.