
The Phenomenology of Animal Tracking

Exploring the Fullness of What it is to Be Human

Michael Lensi - 2017



Executive Summary

Phenomenology matters: as a project, it provides insight into the metaphysics and epistemology of our existence, and as an exercise, it provides access to parts of ourselves which are too often ignored in this Age of Empiricism. Animal tracking, as I'll discuss, is the ultimate Phenomenological exercise.

There are four major sections (then Conclusions, and Notes and References):

Introduction - in which I discuss animal tracking as a liminal activity between perceiving and science.

Metaphysics in Cartoons - in which I arrange philosophical basics to contrast later with my own models, and make a framework for jumping into conceptual evolution.

Human as Animal - in which I introduce metaphysical and epistemological models for understanding human cognition.

Human as Human - in which we further explore cognitive models, the role of Phenomenology in understanding ourselves, and get ready to return to animal tracking.

Introduction

Walden Pond is far, far away from Dallas, Texas, both physically and metaphorically. Of all the metropolises in all the world, the Dallas area is in the top 30 by population, and from my experience after two years there, probably number one in Keeping Up with the Jones's. Yet even here there is a world apart, room for spiritual recharge from nature which I was seeking that summer day of 2004. One just has to look hard enough.

So it was as I walked my dog Apollo under State Highway 114. I took a deep breath. I looked up at the blue, cloudless sky to stretch a fresh canvas over the lenses of my eyes, and when I looked back at the cracked mud, there they were. Among the 7 million people of the metropolis, the sizzle of thick afternoon traffic, the gridlock of airliner contrails, and buildings taller than any mountain for about 200 miles, here were the front and hind paw prints of a bobcat.

When night falls and diurnal humans go to sleep, an entire secondary set of creatures awaken and take up the mantle as lords of the planet. Our need for sleep (among its role in our perception/cognition loop which I'll mention later) creates the room for the bulk of Earth's creatures to



Bobcat Tracks in Mud. Dallas, TX.

“be”. Their tracks give us a window into those rooms. There I was in that moment, voyeur of a bobcat’s world.

If you could follow the tracks of that bobcat with enough mastery, you could follow them back to its birth, identify its mother, follow her tracks, and etc on down their lineage. Bobcat homeranges are quite large (even the homeranges of outdoor house cats can span for acres and acres); I can’t say for sure if that adult male bobcat had lived in Dallas all its life, but probably. When its line came to Dallas, I couldn’t say. But what is amazing is that the line of bobcats from which that male came survived with no necessary help from humans, and to the extent that they flourished at all, they did so despite their diurnal counterparts - humans - daylight custodians of the world.

Yet there was a time when we were more like them. In an era before the skyscrapers and jet engines and Dallas - before tracking was a simple hobby - tracking was a survival tool. Tracking was life or death, for hunted and hunter. It is no surprise, then, that humans developed animal tracking into an art. According to Louis Liebenberg in his aptly named *The Art of Tracking, The Origin of Science*, this art literally became the first scientific activity as “systematic” (gathering of information) tracking became “speculative” tracking, which “involves the creation of a working hypothesis on the basis of the initial interpretation of signs, a knowledge of animal behavior and a knowledge of the terrain.” (Ref 1., p29) But systematic tracking, especially in difficult conditions, although not science, is hard enough, and certainly an art.

Accomplishing this first crucial aspect of tracking - actually seeing the tracks or sign - requires much more than just looking. Charles A. Eastman, aka Ohiyesa (full-blooded Sioux and founding member of the Boy Scouts), opens his chapter on tracking in *Indian Scout Craft and Lore*, “I will now ask you to enter the forest with me. First, scan the horizon and look deep into the blue vault above you, to adjust your nerves and the muscles of your eye, just as you do other muscles by stretching them. There is still another point. You have spread a blank upon the retina, and you have cleared the decks of your mind, your soul, for action.” (2., p26) In *Tracking and the Art of Seeing*, Paul Rezendes adds, “Our encounter with nature is largely a matter of seeing, and it relates to the quality of attention in our lives... Tracking may be a very good way to learn how to pay attention to our own



Opossum and Vole.

existence. This quality of attention is similar to a wild animal’s awareness of its surroundings.” (3., p20)

Therefore, in tracking, first we learn to engage in the act of perception by bracketing out the world. Then we observe the world, describe it, and finally analyze it.

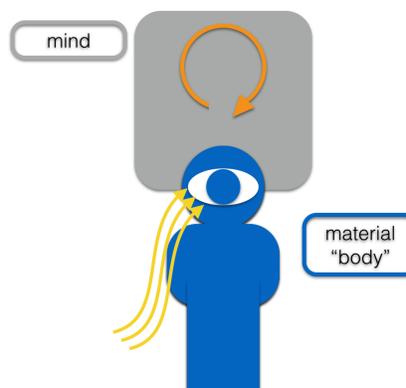
Metaphysics in Cartoons, or Ingredients: Spacetime Granules

I knelt upon the hard mud and studied the tracks. That they were cat tracks I could tell by their gestalt: they had the shape of cat tracks, showed four toes with no claw marks, were not dog tracks because there was no tell-tale mound between the metatarsals and phalanges, each track fully or partially registered over the next, and were skewed in that cat way as if someone italicized each paw print. That they were bobcat tracks I could tell by their size - not quite as long as my index finger (as long as one segment of my index finger - house cat; longer than my index finger - cougar). I perceived all of this, yet none of this I knew in any sequential or outright or fully cognizant way.

Start with Descartes

I’m going to enshrine some basic philosophical tenets into cartoons. Why I’m even going to bother doing this will become more apparent later when I add and blend details. Since I’m committed to doing this, I might as well start with the Dualism of Descartes. If he’s a good enough target for Maurice Merleau-Ponty, he’s a good enough jumping-off point for me.

Here we have classic Dualism, with mind and material being the two essential, non-reducible aspects of metaphysical reality, shown existing together as a person. I should explain my homunculus here, it looks like that for a reason. It has one giant eye because that is a stand-in for all our human senses and sense organs, from the proprioceptors embedded in our muscles to our eyes to our skin, etc. The homunculus has a blue body, representing our material selves, and it has a gray brain representing the internals of our mind which will be

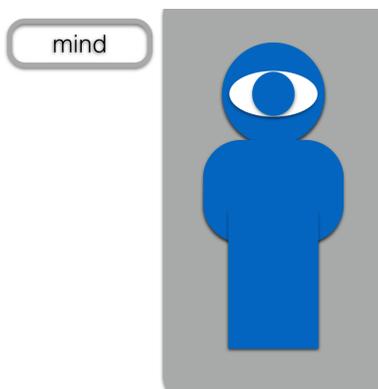


Cartoon 1: Dualism.

discussed at length in this document, although no one is arguing that this too isn't also material, or with at least a material component.

Unless you're an Idealist. I have a cartoon, rather boring, for that too. Here, the homunculus is shown inside the mind, and I could have made it entirely "mind" gray instead of "material" blue here but I didn't, as I'm not going to dwell on Idealism.

What I want to get to is Materialism, for that is my metaphysical starting point, and I want to be clear about this upfront to minimize confusion later. That said, I want to acknowledge that there are important philosophical standpoints which are neither wholly Materialist, nor Idealist, nor Dualist, and Kant's Transcendental Idealism is one, at least functionally, wherein material noumena are posited to exist a priori but can never be perceived.



Cartoon 2: Idealism.

More to this point, the Phenomenology of Maurice Merleau-Ponty as expressed in his *Phenomenology of Perception* fits like a large amorphous peg into the neat squareness of the canonical categories, i.e. not at all. Why, then, having just confessed to Materialism, am I also insisting on making Phenomenology so central to this small treatise? I have two reasons for that: Materialism as a description of the structure of human reality is in need of a supplementary Philosophy (just as physics is in need of biology, though the latter is completely subsumed by the former), and this supplementary framework is perfectly provided by Phenomenology.

End in Existentialism

On the former, Materialism on its own doesn't get very far in explaining the wonders of being human - how our humanness develops from material. It's like labelling a jar of peanut butter not with "Ingredients: Peanuts, Salt" but rather "Ingredients: Spacetime Granules" (more on those in the next section). Phenomenology, on the other hand, *does* get at what it's like to be human, and does it well. More importantly, it helps us hack into the complicated business of sensing-perception-cognition-being which we do not merely do but of which we *are*.

Phenomenology does this by first reminding us that unfolding the structure and essence of ourselves and the world is complicated enough to require a sophisticated

approach. It then provides an approach by intensely examining the interface between ourselves and the world which is our sensing / perception of “phenomena”.

As mentioned previously, I find particularly attractive here the Philosophy of Maurice Merleau-Ponty at large and in his *Phenomenology of Perception*. Given the radical nature of his projects, I want to devote the rest of this section to justifying my use of it, although a full treatment of his work is beyond the scope of my document, though I would happily provide it.

As Merleau-Ponty himself said, “The philosopher is marked by the distinguishing trait that he possesses *inseparably* the taste for evidence and the feeling for ambiguity.” (4., p4-5) This makes philosophy particularly well suited to tackling difficult problems such as what it is to be human. For some, however, this feeling for ambiguity presents problems. In her analysis of *Phenomenology of Perception*, Monika Langer describes the issue, “Further, the reader might challenge the conclusions... by arguing that they are mere theoretical constructions of alleged experience and that Merleau-Ponty is himself guilty of tailoring observations to fit his own preconceptions concerning the nature of our normal experience.” (5., p171) Langer’s proposed way out for Merleau-Ponty is to add further guidance to the reader on how to interpret his text - “detail the meaning of ‘facts’, ‘data’ and observations” (5., p171). For me, however, the *Phenomenology of Perception* becomes more complete simply by owning its glorious ambiguities and beautiful nuance, thus opening it to Merleau-Ponty’s own view of philosophy at large.

Insofar as Merleau-Ponty’s specific conception of metaphysics in his *Phenomenology of Perception*, and my use of it here, I’ll just add one final thought. Sticking with Langer’s translation and analysis here, from Merleau-Ponty “...we are neither things nor pure consciousness but instead, incarnate subjectivities inhering in a situation which we assume and modify.”

Merleau-Ponty uses this metaphysics to make an epistemological point, “It is not a matter of having to choose between determinism on the one hand and absolute freedom on the other...” (5., p147) I extend this thought and reflect it back on the metaphysics. It is not a matter of having to choose between Materialism and Phenomenology. What we want, is insight. Merleau-Ponty, as I’ll reference throughout the rest of this document, provides insights in spades.



A Family of Raccoons.

Having thus made some effort to build a bridge between Phenomenology and Materialism, I'll need to discuss exactly what insight Phenomenology gives us into what it means to be human. But before that, I need to discuss Materialism itself.

A Granular Network of Events

As promised, here is a cartoon for Materialism. Represented here is the very stuff from which everything is made, from ions to ideas - the "Material" in Materialism. It is a very crude cartoon. Or is it? Even if we take our understanding of material from the most advanced physics in the history of all mankind (as I will), crude is the best we can do, as our understanding is, always, when it is at the fringes of science: it employs models which are unmeasurably far from reality. On the other hand, our understanding is sophisticated in that it is built upon a banquet of objective knowledge. We are, once again, embracing the ambiguity of Merleau-Ponty.

Here I have meant to illustrate the very granules of spacetime (aka "spinfoam", "fields on fields", "a granular network of events") itself as postulated by Loop Quantum Gravity (alternate proposal to String Theory in the quest to bridge Quantum Field Theory and General Relativity). Aside from the implications of this theory on the concept of time, which I will briefly mention later, it is not necessary here to further describe this "material" other than it is (theorized to be) fundamental, irreducible. For further reference, and better cartoons, see Reference 6.

To bring my Materialism cartoon inline with my earlier metaphysical cartoons showing how humans fit into the world, voila, the picture becomes something like this. The world is material. We are a subset of material in that world.

All that is left to elucidate now is, well, since these cartoons explain very little: *everything*. I can do *everything* in three steps. In the rest of this section, I'll briefly explain how to go from Materialism cartoon 3 to cartoon 4, i.e., from a bunch of undifferentiated material to "life". In the next major section, I'll start the process of explaining what it is like to be human by considering our legacy from earlier lifeforms. Finally



Cartoon 3: Materialism (sans Homunculus).



Cartoon 4: Materialism (with Homunculus).

in the last major section, we'll fold back in Phenomenology, animal tracking, and further explore the fullness of what it is to be human.

Until (Heat) Death do Us Part

If we start with the Big Bang, as I will, then we can say that material would inevitably begin to differentiate and coalesce in the presence of even the most infinitesimal variations in heat. Per Carlo Rovelli, one of the founders of Loop Quantum Gravity, "Therefore, when heat is diffused to the gravitational field, time and space themselves must vibrate. But we still don't know how to describe this well. We don't have the equations to describe thermal vibrations of a hot spacetime. What is vibrating time?" (7., p58) Obviously, it is beyond the scope of this text to go deeper here, but this is the proposed mechanism for the very start of the universe, the very very start of humanity.

What I can, and will, do in this text however is take up this thread here and explain the metaphysical origins of life from among a mess of non-living material. Not, I note, the chemical mechanisms of the origins of life, but the more philosophical, conceptual origins. How is life even different from the material from which it is made?

Before this, though, one quick return to the Big Bang to discuss an important epistemological implication of this starting point. As Colin McGinn notes of the Big Bang in *Basic Structures of Reality: Essays in Meta-Physics*, "...everything had to be implicit in the initial super-hot plasma; everything that followed had to be a form of what was there at the start. All novelty works with the raw materials of the primal singularity (just as the big bang itself had to be a conservation of what was there earlier). But if so, then consciousness must be somehow implicit in the big bang too; it must be a working out of the matter/energy there at that instant, like planets and organisms." (8., p181) I take this seriously and thus stand with Determinism. Yet I also stand with Free-Will in the sense that, although Free-Will is ultimately an illusion, it is an illusion at the deepest level, the same exact level, I'd argue, as our illusion of time. And time, to be extremely brief, according to Rovelli, is "the expression of our ignorance of the full microstate" (9., p8), that is to say, there would be no need for time, no need for Free-Will, if we could know Everything, with a capital 'E'. In the words of Merleau-Ponty, "We have seen that there is no natural time, if we understand thereby a time of things without subjectivity. ... It is, as it were, a constant disappointment and failure." (10., p453)

But, we cannot know everything. This is actually the perfect segue as we return to the conceptual origins of life. In a universe in which an organism cannot know everything, how is it to know anything of consequence? By constructing a *model* of everything. The model, being an approximation of what is really there, will naturally be imperfect. But it will at least express some fundamental rules derived from that reality. In Merleau-Ponty's words, "Our perception in its entirety is animated by a logic which assigns to each object its determinate features in virtue of those of the rest, and which 'cancel out' as unreal all stray data..." (10., p313). This is the Complex Adaptive System of Murray Gell-Mann (11., p17), "...a complex adaptive system acquires information about its environment and its own interaction with that environment, identifying regularities in that information, condensing those regularities into a kind of 'schema' or model, and acting in the real world on the basis of that schema. In each case, there are various competing schemata, and the results of the action in the real world feed back to influence the competition among those schemata." Or, as I like to say, we - as Complex Adaptive Systems - are mini representations of the world, and in our interactions with others we ask to see their models of the world, thus making adjustments to our own, to ourselves. In our interactions with the world, we ask it the same questions. This is the heart of both Philosophy and Science.

Complex Adaptive Systems, and thus all life, arise from nonliving material as they represent the maximal complexity a given system of nonliving material can have. That is, they arise when the entropy of a given system (say, Earth) is at a middle ground between complete order (i.e. one single microstate, complete homogeneity) and complete chaos. Thus, if for no other reason, life in the universe will eventually extinguish on account of the tendency of the universe toward maximal entropy, or heat death, in which the conserved energy of the universe remains, but exists in a fully random (maximum number of microstates but all macroscopically the same) - thus fully useless - form. Thankfully - more accurately, by definition - we live in a time when there is room for entropy to grow, and thus for pockets of localized low entropy to form. From Gell-Mann, "As the entropy - the overall disorder - of the universe increases, self-organization can produce local order, as in the arms of a spiral galaxy, or the multiplicity of symmetrical forms of snowflakes... to complex adaptive systems." (11. p229. See also Reference 12., Chapter 14.)



Porcupine Sign.

Human As Animal, or “You are Only Lost if You Have a Place and a Time to be There”

As I spread out my vision, more bobcat tracks popped into view, and as more tracks entered my awareness I could discern more things about this particular bobcat. I measured its stride: between two and three hand lengths. With this, and that this animal was alone (no other bobcat tracks in the area), this was an adult. Given that this was an adult, I could tell it was probably a male because its hind tracks, and thus hips, regularly fell within the width of its fore tracks, thus broad shoulders.

A Model within a Model

“We have great-grandparents in common with butterflies and larches.” So notes Carlo Rovelli as he examines the philosophical nature of humankind in the final chapter of *Seven Brief Lessons on Physics*. He continues, “Mirrored by others, and by other things, we learn who we are.” (7., p67) He does not speculate into the realm of conceptual evolution as I will here, but this is a beautiful and relevant expression of the fact that we cannot begin to understand who we are as humans unless we consider the life from which we’ve come.

A note upfront as I move from the origins of life into the origins of human cognition. This is the most conjectural material in this text. There are no references - it is wholly my own. Further, this is not a complete treatment of the subject - there is only enough here to bridge the gap as we move from fundamental Materialism to a more detailed consideration of our minds within the parameters of a short text. A more detailed treatment would be a worthy future project.

Let me start from the most basic of all possible life, one which interacts with its environment wholly through an adaptive body with no real brain - no mind. Such a hypothetical creature, from a functional standpoint, might look like the creature in Cartoon 5. This creature has a mouth for eating with a single sensor - a chemical sensor like a rudimentary tongue. The body responds to food-like chemicals (those it evolved to most associate with food) by wiggling its one “limb”, thus causing forward motion toward that chemical, toward food. This creature might even be able - with its one sensor - to distinguish another class of chemicals which it has identified (through evolution) with predators, thus



Cartoon 5: Creature from Early Conceptual Evolution.

causing a move-backward response in its limb. It is even possible in this type of simple system to affect turning toward (i.e. seeking) regions of denser food chemicals, and subsequently moving forward - all with hardwiring between the sensor and the limb - an advance in nervous system compared to the forward-backward only creature, but no brain for sure.

After that, what might the next step in conceptual evolution be for such a creature? It could - and this, as I'll put forth, would be momentous - develop a nervous system to "map" its world - where are the food and predators (at one moment in time - more on this later). I would argue that this would be the most rudimentary brain possible, as - while not conscious - it would lead to the development of consciousness, because once you have a Complex Adaptive System which has invented a way to map, you have one component of a system which can *take advantage of folding its processing back in on itself*.

I want to briefly distinguish this concept from the more familiar concept of *recursion* in Computer Science. Recursion is simply the reuse of code or circuitry to either save memory or otherwise make a device or piece of software more compact. It is clever, in a logical way, but it can always be rewritten to accomplish the same goal with non-recursive loops, and it *never* results in an amplification of processing or abstractive power - in the jargon of Complex Adaptive Systems, it never results in improved schema.

What I'm talking about with maps is, if a system develops an architecture which can keep track of entities in space, then that architecture - *itself* a collection of entities in space - might further develop into a system which applies its own mapping structures to map itself, thus resulting in a new and more powerful architecture. In the realm of conceptual evolution, then, this is a plausible beginning to how higher-order brains developed from simpler nervous systems. Only a system which is naturally designed to process spatial / temporal data with mapping and memory could possibly take advantage of mapping and memory abstracted internally. No computer as we know it today could do this - could abstract its power by adding more of the same architecture. But I'm getting a little ahead of myself.

Once a creature can map, and make maps with maps of maps, the stage is set for the next major step in conceptual evolution. If you can create a map, then you can modify your map - you can add and delete elements. There is nothing special in this - you go to spatial position Y to retrieve food which you earlier marked at Y. If the food is still there, you eat food at Y, and you erase Y from your map. Or you find the food has already been eaten, so you also erase Y from your map. However, if you begin to use your map to in essence

overlay maps in time, you develop the next (and perhaps ultimate as we'll see soon) ability in the realm of conceptual evolution. You can make *predictions*. In other words, spatial and temporal processing architecture could be developed in such a way as to take advantage of turning its processing back onto itself, which develops maps into maps of maps, and these into predictive schemata. Now, whereas once such a creature was wholly a Complex Adaptive System by bodily architecture alone, now it is that Complex Adaptive System architecture with another Complex Adaptive System inside of itself - its brain. It is a model of the world, within a model of the world. It is all material. Yet it is mind and body. And that is us.

The specific nature of this mind within us can be cracked with objective reasoning as above. And it can be hacked with Phenomenology.

Human As Human, or Of Qualia and Cogito

I had been under that overpass more times than I could count, in every season, over the course of an entire year. Why had I never noticed these bobcat tracks before? And here was the nutria sign - the bobcat's prey - which I'd never noticed either. Surely our nocturnal counterparts had not suddenly shifted wholesale into the heart of Dallas. It was I who changed.

I Kant Even: Return of the Homunculus

From the last section, I have shown how a bodily sensor evolutionarily blends into the work of a brain. That bodily, or more purely bodily, sensing is part of our evolutionary history as humans. If we call this more-purely-bodily-sensing something else, say, "pre-reflective self", we have then arrived back at the Phenomenology of Merleau-Ponty (all the caveats I made earlier notwithstanding). I want to introduce next important details of the inner workings of the human mind - arguably the most human part of the human mind, the neocortex - via a model which was put together in the last 20 years. Before I do, however, note this: Maurice Merleau-Ponty embedded into the *Phenomenology of Perception* important high-level insights yielded by this model at the end of World War II, *about 50 years sooner*.

That said, there is indeed a lot more to this perception/cognition model - generated with insights from Neuroscience, Behavioral Biology, Computer Science, etc. - than could have possibly been contained in the scope of a single work of Philosophy - the work of any

single discipline. My hope is that future work between all aforementioned disciplines can come together and work their common problems of intelligence (whether artificial or more familiar), mind-body, metaphysics, etc.

With that as an introduction, let me briefly describe Hierarchical Temporal Memory (HTM). This is Jeff Hawkins' project which for the *first time* in the field of Artificial Intelligence attempts to actually model the high level structures of the neocortex (See Reference 13). Hawkins' model suggests that as information comes into the first layers of neocortex (initially from sensors but later from feedback from other cortical regions), that information is passed to the next highest physical layer as digested and abstracted information, thus creating new schemata of the same data, and so on up the hierarchy. Thus raw data of the world becomes sensed data (as in the very basic creature of the last section) and then modeled data (as in the more advanced creature of the last section). I'll have more to say about HTM but first, note that in this chain, sensed data is very much of-the-world, as in Merleau-Ponty's formulation of perception. It is bodily. And it becomes at some point in



Mountain Lion.

the mind much more, something else entirely, another thread which runs throughout Merleau-Ponty's *Phenomenology of Perception*. As I fill in some details on HTM, I'll reference where Merleau-Ponty anticipates such details. But here is Merleau-Ponty anticipating HTM in a general sense: "Now here the data of the problem are not prior to its solution, and perception is just that act which creates at a stroke, along with the cluster of data, the meaning which unites them - indeed which not only discovers the meaning *which they have*, but moreover sees to it that *they have a meaning*." (10., 36)

HTM as I've thus far described it could be confused with an earlier concept from neuroscientists Hubel and Wiesel which also showed "that each layer of the cortex became increasingly sophisticated. Point-for-point mapping at the first layer indicated that these neurons 'know' about dots of light. The neurons in the second layer of the cortex 'know' about straight lines of light..." and so forth, leading to the prediction of so-called "Grandmother Neurons" which might contain the concept of "grandmother". (14., p22) These were never found, and more to the point, this is not HTM.

What I've just described is more akin to artificial neural networks, and I contend that these are simply glorified logic compared to HTM. HTM is more inline with the work of neuroscientist Vernon Mountcastle. The concept applies to cortical regions, not individual

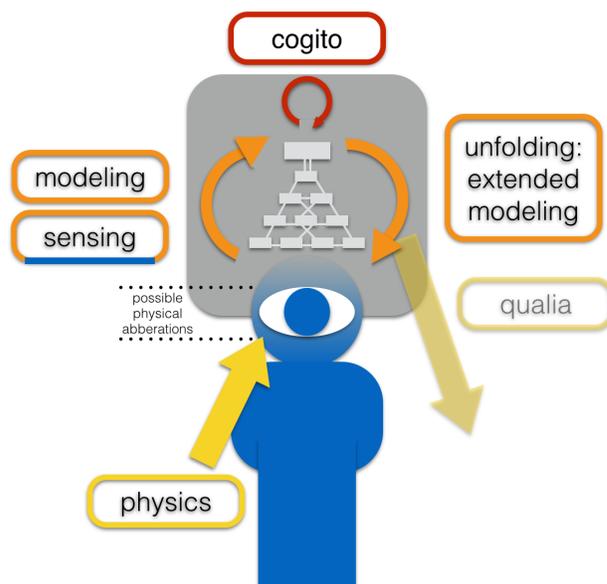
neurons. It further postulates that 1) the neocortex stores sequences of patterns, 2) these patterns are recalled in an auto-associative (piece-activates-the-whole) manner, 3) the patterns are stored in an invariant (relationships independent of details) form, and 4) the patterns are developed and stored in a hierarchy. (13., p70) Further details are beyond the scope of this text but there is one more very interesting and salient aspect of the theory.

To understand it, let me reintroduce the homunculus from the Metaphysics section. This is a detailed view of the same homunculus from the Materialism diagram, only with the surrounding world material largely removed, and with emphasis placed on the inner workings of the material mind. (Brief aside:

note that with this emphasis, the Materialism cartoon kind of looks like the Dualism cartoon, only more detailed. Interesting, no? Do not be fooled like Descartes!) Again, we have a blue material body, and although I'm showing the mind blending into Idealism-gray, here it merely represents evolution, or what is internal to the material mind, which as I showed earlier from a conceptual evolutionary standpoint is merely an extension of a sensing body. Internal concepts or processing of the mind are noted in orange, and you can see sensing starts as a bodily phenomenon (blue), then transitions to a more fully internal one, as it acts on

material data from the world (physics, yellow). This is the perception of Merleau-Ponty, and with all the blending and evolution and processing going on you can see why his philosophy required such a radical departure from earlier conceptions of metaphysics and epistemology.

That the problem of perception is so complex is at once testified to and elucidated by considering what happens as we continue processing through the Hierarchical Temporal Memory model (pyramidal graphic in the middle of the gray area) of the neocortex, and this is the final aspect of HTM that I need to discuss, which I alluded to earlier. As more-purely-bodily-sensing becomes modeling (recall the hallmark of Complex Adaptive System from an earlier section), further modeling is achieved *by passing information back down the hierarchy, back to the sensors themselves*. In the words of Jeff Hawkins, "There is no such thing as direct



Cartoon 6: Materialism, Detailed.

perception... Your perception of the world is created from these patterns, nothing else." (13., p63) Or, in the words of Merleau-Ponty, "...if we try to describe the real as it appears to us in perceptual experience, we find it overlaid with anthropological predicates." Or further, and with more phenomenological language, "The thing is inseparable from a person perceiving it, and can never be actually in itself because its articulations are those of our very existence, and because it stands at the other end of our gaze or at the terminus of a sensory exploration which invests it with humanity." (10., p320) I would say, this extended modeling of the world back to the senses becomes the *qualia* of our perception.

That such a feedback loop exists was specifically anticipated by phenomenologists starting at least with Heidegger and is everywhere present in *Phenomenology of Perception*. "Temporality temporalizes itself as future-which-lapses-into-the-past-by-coming-into-the-present." - Heidegger as quoted by Merleau-Ponty (10., p420) is an exact description of feedback. For a poetic description of HTM feedback specifically, you couldn't do better than Merleau-Ponty himself - "With the arrival of every moment, its predecessor undergoes a change: I still have it in hand and it is still there, but already it is sinking away below the level of presents... in order to retain it, I need to reach through a thin layer of time." and "The sensible gives back to me what I lent to it, but this is only what I took from it in the first place." (10., p416 and p214) This concept is also present in *Phenomenology's* use of the word "thickness", as in "Between my sensation and myself there stands always the thickness of some *primal acquisition* which prevents my experience from being made clear to itself." (10. p216) Would knowing that an objective explanation existed have turned Merleau-Ponty away from *Phenomenology*? I should hope not. But I'm sure he would have loved this model; I only wish we could have seen where Merleau-Ponty would have went from there.

The Philosophical implications of this are astounding. As I've noted, Merleau-Ponty himself understood this. Depending on the strength of that feedback circuit, you can have the interplay between Plato's forms and Aristotle's Empiricism, all the way to Kant's unknowable noumena. This - the extended modeling of our world by at least partially replacing sensed data with abstract representations of it - represents another major step in the conceptual evolution of our cognition. But why would we ever have evolved such a strange mechanism?

Considering Kant and the work of Donald Hoffman gives us a plausible and intriguing explanation. Kant's noumena would be at the extreme where our sensor data from physics was buried so deep within the HTM feedback loop that the actual physical world was unrecognizable in our perception of the world. Why would we ever evolve to mask the real

world? According to Hoffman, “*Simple drives truth to extinction... Evolutionary pressures do not select for veridical perception; instead they drive it, should it arise, to extinction.*” (15.,



Cottontail Tracks in Compressed and Melting Snow..

p20) This was his team’s conclusion after creating a simulation in which perceptual information came at an energy cost to two kinds of creatures: those who developed a simple model of reality which though simpler cost less energy to enact, and those who had direct perception of the world and all its complexities, which came at a higher price. Whether or not Hoffman and Kant are fully correct here, even in the less dramatic case where sense data is only partially replaced by abstract representations, this still suggests an appropriate evolutionary mechanism.

To conclude this section, let me note briefly that as I envision it, what we call “*cogito*” or higher level reasoning is simply another level of brain function, informed by HTM but not of it. It is an acting upon or “*doing*” of qualia. Together with qualia it is the seat of consciousness. It is what accounts for dreams when the frontal cortex goes offline (14., p82-83) and direct sensory inputs are completely blocked (no light) or inactive (touch, taste) or attenuated (smell, sound, etc). It is imagination. It is what allows for the scientific method, as we develop even further models of the world for testing and revising (models within a model within a model, to continue the chain of conceptual evolution). In relation to animal tracking, Louis Liebenberg even postulates, “If speculative tracking developed at the same time that the modern brain evolved, then selective pressures for modern tracking may have been at least partially responsible for the evolution of the modern brain.” (1., p39) It is extremely interesting, but further discussion is unfortunately beyond the scope of this text. Of note here is only that, together with qualia (the later portion of HTM), I identify cogito with the “*reflective*” portion of our experience to which Merleau-Ponty refers in his *Phenomenology of Perception*.

Conclusions, or Go Outside

I had recently begun a program of self-directed meditation. I would undertake strange exercises, such as staring at the spaces between the leaves of trees, or the shadows of rocks, and insisting that these were real; that it was the leaves and rocks which were secondary representations of the spaces and shadows. I began to reject the normal descriptions of the world around me, to describe it from a more raw perspective, and in that way I began to really see it. Thus nuances of the landscape such as animal tracks began popping into the foreground of my perception.

Without knowing it, I had created and seen to completion a Phenomenological project which resulted in what you might call a pre-reflective communication with the world, or at least, as close to it as I could get. This, combined with a background in the observe-theorize-test-revise-repeat tradition of the scientific method, as it turned out, was the perfect combination to enjoy a lifelong passion for animal tracking. Without both of those aspects - the reflective and the pre-reflective - my experience in that art surely would have been lacking. Without both, the fullness of being human is impossible to comprehend.



*Turkey Vulture, Leaning
Forward to Drink Water.*

Notes and References

All images in this document are my own. The following materials contribute mightily to my understanding and enjoyment of the world; I highly recommend them all. They have also contributed to this text, both directly and indirectly. To the extent that I have used them directly, they are listed here in order of appearance.

1. Liebenberg, Louis. *The Art of Tracking, The Origin of Science*. David Philip Publishers, 1990.
2. Eastman, Charles A. (Ohiyesa). *Indian Scout Craft and Lore*. Dover Publications, Inc., 1974.
3. Rezendes, Paul. *Tracking and the Art of Seeing*. HarperCollins Publishers, 1999.
4. Merleau-Ponty, Maurice. *In Praise of Philosophy and Other Essays*. Translated by Wild, Edie, and O'Neill. Northwestern University Press, 1963. Originally published 1953.
5. Langer, Monika M. *Merleau-Ponty's Phenomenology of Perception, a Guide and Commentary*. The Florida State University Press, 1989.
6. Rovelli, Carlo. *Loop Quantum Gravity*. *Physics World*, Volume 16, Number 11, November 2003. p37-42.
7. Rovelli, Carlo. *Seven Brief Lessons on Physics*. Translated by Simon Carnell and Erica Segre. Riverhead Books, 2016.
8. McGinn, Colin. *Basic Structures of Reality: Essays in Meta-Physics*. Oxford University Press, 2011.
9. Rovelli, Carlo. *Forget Time*. Retrieved from Cornell University Library's arXiv system, *General Relativity and Quantum Cosmology* section, arXiv:0903.3832v3, 2008.
10. Merleau-Ponty, Maurice. *Phenomenology of Perception*. Translated by Colin Smith. The Humanities Press, 1978. Originally published 1962.
11. Gell-Mann, Murray. *The Quark and the Jaguar*. W.H. Freeman and Company, 1994.
12. Carroll, Sean. *Mysteries of Modern Physics: Time*, Course Guidebook. The Great Courses, 2012.
13. Hawkins, Jeff. *On Intelligence: How a New Understanding of the Brain Will Lead to the Creation of Truly Intelligent Machines*. Macmillan, 2007.
14. Sapolsky, Robert. *Biology and Human Behavior: the Neurological Origins of Individuality*, 2nd Edition, Course Guidebook. The Great Courses, 2005.
15. Hoffman, Donald D. *The Interface Theory of Perception - Natural Selection Drives True Perception to Swift Extinction*. Cambridge University Press, 2009.