Machinic Phylum and Architecture

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Abstract. The chapter draws on the anti-substantivist and anti-hylomorphic legacy of two significant Deleuze and Guattari's interlocutors: Raymond Ruyer and Gilbert Simondon. Ruyer vehemently opposed the logic of mechanicism without regressing to (active) vitalism. His masterpiece *Neofinalism*, yet to be fully appreciated in architectural circles, is an ode to multiplicity or 'absolute form'. The title is to be read as a challenge to the hegemony of the step-by-step causation and partes-extra-partes mereology. According to Ruyer, non-locality is the key, not only to the question of subjectivity, but to the problem of life itself. Simondon too shies away from the metaphysics of presence. For him, the process of individuation cannot be grasped on the basis of the fully formed individual. In other words, the knowledge of individuation *is* the individuation of knowledge. Simondon's highest ambition in *On the Mode of Existence of Technical Objects* was to integrate culture and technics (*tekhne*). The conviction that culture need not be antagonistic to technology is particularly pertinent to the ecologies of architecture. In the second half of the chapter, the affordance theory meets contemporary neurosciences.

Keywords: Schizoanalytic cartography · Machinic desire · Ecologies of architecture · Ethico-aesthetics

Once it is no longer the goal of the architect to be the artist of built forms but to offer his services in revealing the virtual desires of spaces, places, trajectories and territories, he will have to undertake the analysis of the relations of individual and collective corporeality by constantly singularizing his approach. Moreover, he will have to become an intercessor between these desires, brought to light, and the interests that they thwart. In other words, he will have to become an artist and an artisan of sensible and relational lived experience (Guattari 1989) [1].

'Culture' is everything we don't have to do. We have to eat, but we don't have to have 'cuisines' […]. We have to cover ourselves against the weather, but we don't have to be so concerned as we are about whether we put on Levi's or Yves Saint-Laurent. We have to move […], but we don't have to dance. […] I call the 'have-to' activities functional and the 'don't have to's stylistic. […] The first thing to note is that the whole bundle of stylistic activities is exactly what we would describe as 'a culture' […] (Eno 1996) [2].

1 Nips and Bites

The chapter draws on the anti-substantivist and anti-hylomorphic legacy of two significant Deleuze and Guattari's interlocutors: Raymond Ruyer and Gilbert Simondon. Ruyer vehemently opposed the logic of mechanicism without regressing to (active) vitalism. He concurred with Alfred North Whitehead who famously dismissed the concept of 'simple location' as a bias in favour of the tangible and self-presence [3]. Ruyer's masterpiece *Neofinalism*, yet to be fully appreciated in architectural circles, is an ode to multiplicity or 'absolute form' [4]. The title is to be read as a challenge to the hegemony of the step-by-step causation and partes-extra-partes mereology. According to Ruyer, non-locality is the key, not only to the question of subjectivity, but to the problem of life itself [5]. Simondon too shies away from the metaphysics of presence. For him, the process of individuation cannot be grasped on the basis of the fully formed individual. In other words, the knowledge of individuation *is* the individuation of knowledge [6]. Simondon's highest ambition in *On the Mode of Existence of Technical Objects* was to integrate culture and technics (*tekhne*). The conviction that culture need not be antagonistic to technology is particularly pertinent to the ecologies of architecture. To paraphrase Marshall McLuhan, ecology starts where nature ends [7]. Simondon opposed structuralism with the theory of operations that he named *allagmatics* [8]. The transition from operation to structure is machinic rather than structural insofar as it is system making rather than systematic. The 'machinic' conception of consistency is thus determined neither by the naïve 'organic' autonomy of the vitalist whole, nor by the crude reductionist expression of the whole in the sum of its mechanical parts. While structures are by definition balanced, the thought must venture beyond the given – far from the equilibrium. The term 'plane of consistency' is in itself a sufficient clue to what is primarily at stake in the thought, namely the reality of abstraction. Tessellation (*planification*) of the Planomenon is an abstraction without being an achievement of reason. Consequently, (machine) intelligence may be defined by the (unconscious and impersonal) capacity to insert an interval between the cause and effect – a margin of indetermination related to the non-entailment of open systems.

Let us draw an ethological diagram consisting of two diverging lines (resembling an image of a rail track in central linear perspective) (Fig. 1). The top part **S-R** (close to the vanishing point) draws the stimulus (**S**) and response (**R**) close together as in the deterministic, i.e. mechanical mode of operation. The 'conceptual persona' dwelling in this range is a simple organism that cannot afford to break away from linear causality, such as a tick [10]. The further apart the two lines the more severed the causal chain. Before we reach the bottom of the diagram where the stimulus transforms into perception (**P**) and the response into action (**A**), the gap is sufficiently wide to be occupied by a more complex organism capable of play, like a cat. As Gregory Bateson rightly insists, a cat's nip is very different from its bite [11]. It does not conform to the (functional) if-then logic: *if* a tick smells a warm-blooded animal *then* it latches onto it. Rather, the nip is pretense or acting *as-if*, i.e. doing what it doesn't have to do. According to the second epigraph, play may qualify as (proto)culture, a style. Finally, at the base of the diagram (**P—A**), a more complex non-mechanical (recurrent) causality pushes perception and action further apart. Its 'telos' is not subject merely to the material-energetic constraints but also to the informational or epistemic semiosis. In other words, ends and means may
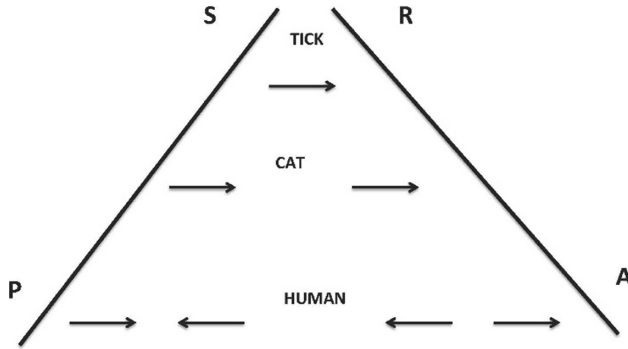
Fig. 1. Inserting the interval between stimulus (**S**) and response (**R**). The degree of mnemonic detachability is measured by the width between the two poles and the 'direction' of causality. The recursive causality designates the cause (**P**) coming into being with the effect (**A**). In the words of Simondon, this is "a [neofinalist] conditioning of the present by the future, or by what up to now does not exist [9]."

come to be reversed. Take Hannah Arendt's reference to the profoundly paradoxical Christian concept of 'turning the other cheek', which radically disrupts the cause-and-effect inevitability. In doing so, it steps out of simple determinism towards Ruyerian *neofinalism* by way of Simondonian *technicity* defined as a force of psychosocial invention and cultural transformation [12]. It may be argued that the diagram runs from the Spinozian *natura naturata* at the top towards *natura naturans* at its ever-widening bottom [13]. It brings to mind the apex-base relation from the famous Bergsonian cone of (pure) memory [14]. The divergence of lines effectively measures the (degree of) detachability of virtual wholes from the actual parts, memory from matter (time from space). Yes, there is isomorphism between the two, but without resemblance. This means that we can happily leave behind the skyhook category of the 'imaginary'. Contrary to our deepest prejudice, the visible is no more real than the invisible and memory is not a property of bodies. For Ruyer, bodies may be said to be properties of memory:

> The main difference between physical beings and the most complex organisms does not probably derive from the instantaneity or the absence of memory in the former but from a lack of detachment of this memory, which in physical beings is always inherent to the rhythm of activity, which is only ever 'the form in time' and does not constitute a transspatial 'reserve' clearly detached from the actual [15].

The co-determination of the actual and the virtual has been a life-long occupation of Guattari's. His neologism *ethico-aesthetics* aptly dramatises the entanglement of action (**A**) and perception (**P**). Putting experience first relegates the sciences to the second order of expression. The collective architectural enunciation (wrongly attributed to the will of the architect) renders the full coincidence of the body and its territory (as a simple location) impossible. Guattari went on to develop a schizoanalytic cartography where heterogeneous ontological domains – actuality, virtuality, possibility and reality – had to be thought together [16] (Fig. 2). Metamodelling was his strategy to prevent things

from becoming systemic and thus stratified (closed system). The four 'unconscious-nesses' are: existential territory (**T**), universes of value (**U**), energetic and semiotic flows (**F**), and the machinic phylum (**P**). The purposeless purpose of P is to draw the endo-referential and endo-consistent body ever further away from itself in the direction of exo-referentiality and exo-consistency. The fourfold offered a way out of the deadlock between the ostensible immediacy of the subject (**T**), and the constitutive distance of the system (**P**).
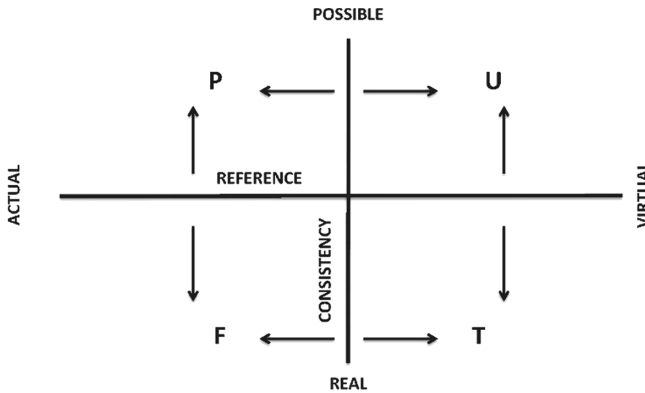

Fig. 2. Any architectural collective enunciation worthy of its ecological attribute can be said to consist of quadruple ontological domains: efficient Territory (**T**) and final Universes of Value (**U**) as non-discursive, and material energetic and semiotic Flows (**F**) and formal machinic Phylum (**P**) as discursive. These are four quasi-causes of the assemblages that are always articulated together.

In contrast to the evolutionary mechanism of passive adaptation, the quasi-Lamarckian machinism is 'accelerationist' [17]. It is as cultural as it is natural given the ideality and materiality of its flows that reach far beyond the anthropic. We may have too easily dismissed an early naturalist who anticipated modern epigenetics and whom Darwinists have long disparaged. Jean-Baptiste Lamarck (1744–1829) argued that evolution could occur within a generation or two. According to Philip Steadman, the theory of Darwin is an 'elective' theory of evolution, where the environment chooses appropriate changes in organism from the range offered by variation. By contrast, Lamarckism is an 'instructive' theory where the environment is imagined to be able to exercise a direct effect on organisms and 'teach' them to change themselves in appropriate ways [18]. This revelation is paramount for the 'niche constructionists' or those in the business of associating milieus: architects and urbanists.

T is an ethological concept that designates vital familiar space, the ground, an individual or collective body. **U** are nascent quasi-subjective ideas before they are objectified or expressed. **T** and **U** belong to the *virtual* (giving) half of the fourfold diagram. **T-U** may be said to be quasi-subjective and *pathic* in comparison to their ontic counterpart of **F-P**. The former *non-discursive* and the latter *representational*. From the point of view of psychopathologies, neurosis is associated with the actual and psychosis with the virtual pole of the horizontal axis of reference [19]. The vertical axis of consistency stretches from the *real* (**F** and **T**) to the *possible* (**P** and **U**). Guattari's urge to substitute

schizoanalysis for psychoanalysis originates from the necessity to expand the operation beyond the real to the realm of the possible. It is important to underscore that Guattari's 'possible' is not to be mistaken for the retroactive hypostatisation of the real. It simply designates that which is further from the equilibria (the real) where genuine modulation of territorialisation occurs. Ethological plasticity would not be possible without the *ritornello.* Paradoxically, while **U** provides for the rhythm (repetition and difference), **F** is segmented. As already stated, the ever-proliferating rhizome **P** (quasi-objective ideas) opens up the possibility of resingularisation of desire and values. Qua Deleuze's ventriloquism, Michel Foucault offers a helpful architectural example: the (machine) prison, as an endo-referential and exo-consistent form of *content* (**U**), is inconceivable without the prisoner as its substance (**T**). On the side of *expression*, the exo-referential and endo-consistent concept of 'delinquency' is its substance (**F**) and penal law its form (**P**) [20]. According to Foucault, environments enunciate, just as enunciations determine environments, but they remain heterogeneous with no direct causality, no common totalising form. "The diagram is no longer an […] archive but a map, a cartography that is coextensive with the whole social field. It is an abstract machine [21]". Deleuze continues:

> *[E]very diagram is intersocial and constantly evolving. It never functions in order to represent a persisting world but produces a new kind of reality, a new model of truth. It is neither the subject of history, nor does it survey history. It makes history by unmaking preceding realities and significations, constituting hundreds of points of emergence or creativity, unexpected conjunctions or improbable continuums. It doubles history with a sense of continual evolution* [22].

The focus on singularities in Guattari's *Schizoanalitic Cartographies* should not come as a surprise given their inbuilt resistance to calculation or instrumental use of representation. The shortcoming of binary systems like linguistic semiology is that, like capitalism, they render everything translatable according to the standard of general equivalence [23]. If the asignifying process of decoding **F**>**P** and deterritorialisation **T**>**U** were not possible, the diagram would be reducible to discrete calculable quantities that could be assigned a place in a pre-ordered transcendent structure. Thanks to the non-programmable immanent movement of de-re-stratification, the fourfold remains sufficiently unstable and open to the multiple (multiplicity as a critique of structuralism). The diagram is emancipatory for as long as it sustains the 'rhythm', but it might as well become a map of discipline and control if the movement is arrested and its domains petrified [24]. By the same token, and in conjunction with the first epigraph, there is a way to circumvent the ready made Oedipal structure and instead engage in the cartography of subjectification:

> *I consider that it is the architect who finds he is in the position of having to analyse certain specific functions of subjectification himself. In this way and in the company of numerous other social and cultural operators, he could constitute an essential relay at the heart of multiple-headed Assemblages of enunciation,* able to take analytic and pragmatic responsibility for contemporary productions

of subjectivity. *As a consequence, one really is a long way here from only seeing the architect in the simple position of critical observer!* [25]

This is an account that grants ontological priority to the machinic desire and is of utmost political, social, and existential importance [26]. In the present condition of the digital turn, it has become necessary to resist the self-fulfilling prophecy of reducing the world to the (socially constructed) code. The Simondonian material-discursive concept of technicity taught us that nature did not exist prior to the machine. Evoking the latest discoveries in evolutionary biology – it is better to biologise than to structuralise – Guattari referred to the worlding technicity as the 'machinic phylum'. Crucially, machines speak to machines before they speak to humans [27]. In other words, they are social before they are technical [28].

2 Ducks and Rabbits

We will now turn from the production of production to the production of recording and, finally, production of consummation (larval subject) [29]. The second half of the chapter, where the affordance theory meets contemporary neurosciences, starts from the brain that becomes a subject in the 'absolute survey' [30]. Its near synonym – 'self-enjoyment' – does not designate pleasure but an immediacy without immediate objectification.

> *[It] was a very important discovery that the brain wasn't entirely determined. Some anatomic structures of the brain are, of course, genetically programmed, but a significant part of the neural organization is open to outside influences and develops itself consequently to these influences or interactions. It means an important part in the structure of your brain depends on the way you're living and on your experience. History is inscribed within the biological. That is what 'plastic' means when applied to the brain* [31].

According to the biologist and Nobel Prize laureate Gerald Edelman, the brain is first and foremost a selectionist system [32]. The importance of selectivity as the defining characteristic of knowing cannot be overemphasised [33]. Perception is context-dependent and adaptive. It is not a Turing process, Edelman insists, because the world is a non-labelled place. *Data does not equal information.* The ecological approach to perception knows no such thing as 'sense data'. Ecological, it must be qualified, stands for reciprocity between the life form and its environment. Their mutual relation is not one of computing but of resonance or affective attunement. The reality is not 'chunked' [34]. This premise should fundamentally reconfigure the debate on nature and nurture, and on the (im)possibility of 'carving nature at the joints' [35]. Our categories are retroactively imposed as a result of analytic reflection. Most importantly, our cognition depends utterly on motion, that is, sensori-motor interaction. "Begin in the middle! […] Don't assume to know in advance how the chunking will resolve! [36]".

The famous Hebb rule stipulates that the neurons that *fire* together – *wire* together. As a result, synaptic connections either get strengthened or weakened. Their excitement and inhibition are not 'decided' by the genes but at the epi-genetic level. By this we mean that the whole virtual experience is responsive to the significance of the actual stimulus. When

a new pattern is selected the attractor landscape is rearranged and new basins of attraction are added. There is no ready-made memory storage, no pre-established compartments or clear-cut boundaries. Experience is relational, non-local and perpetually updated. In a word, encephalisation is *machinic*. This is the gist of Edelman's critique of representation. He is not alone in tapping into the resources of topological field theory [37]. Yet the habit to *overcode* is difficult to shake off. In the words of Erin Manning:

> *What we perceive is always first a relational field. […] Still, given the quickness of the morphing from the relational field into the objects and subjects of our perceptions, many of us neurotypicals feel as though the world is 'pre-chunked' into species, into bodies and individuals. This is the shortcoming, as autistics might say, of neurotypical perception* [38].

Not only are the neurotypicals too quick to chunk compared with the autistics, they are also incapable of self-tickling [39]. The barrier to self-tickling is akin to the barrier to telling oneself a joke. Unlike schizophrenics, neurotypicals deprive themselves of the ability to self-stimulate in a sufficiently unpredictable fashion by dampening their own sensory responses to the ongoing stimulation. From this perspective it is perhaps true that to see is indeed to forget the name of the thing one sees [40].

Building upon the work of the neuroscientist Walter Freeman, his disciple Michael Spivey studies cognition as a self-organising process (auto-affection) that involves phase transitions, criticality and autocatalysis. In this light, *affordances* appear not as the mapping of external features but as a creative form of enacting significance on the basis of the organism's embodied history [41]. They retain ontogenetic independence from the cognitive schema. Consider Spivey's example of the Necker cube [42]. (Fig. 3) One cannot instantaneously perceive both implicit depictions that the 'axonometric wireframe' of a cube offers – a box from above *and* from below. The same applies to the rabbit/duck illusion: it is either one or the other. In other words, the ecological view maintains that there exists, in any such (two-dimensional) figure, information about a number of (three-dimensional) shapes. The perceiver merely *selects* one; the perceiver's attention is directed to that information. Spivey's explanation is that the transition between perceptual states (two in the cases of the Necker cube and rabbit/duck) is in fact a phase transition (singularity) [43].

Experimental evidence suggests that it takes time for a trajectory across a 'high dimensional phase space' to settle in one or the other attractor, depending on the vicinity to the 'event horizon' – defined as 'the point of no return' – where the actual threshold for overt response is located. The attractor is the box viewed from above *or* from below (rabbit *or* duck). It is important to stress that potentiality is never a fully accrued value. As Francisco Varela explains: "Given the myriad of contending subprocesses in every cognitive act, how are we to understand the moment of negotiation and emergence when one of them takes the lead and constitutes a definitive behavior? [44]" In the field of visual perception, a fraction of a second is a substantial amount of time to spend between two possible perceptual states (as in the case of the Necker cube) afforded by a stimulus:

> *These transitions are not instantaneous, but take at least a couple hundred milliseconds. What this reveals is that on the way toward achieving a stable percept, the*
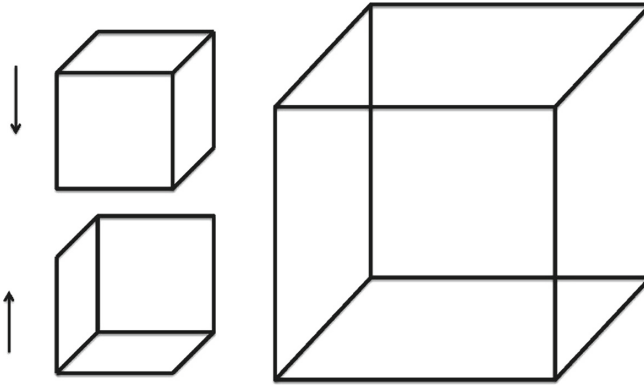
Fig. 3. The Necker cube is not an illusion but a kinematically-motivated perception. Because the image is one-sided (i.e., no tinkering is possible), the optical information about occlusion (i.e., which overlapping lines are nearer and which are farther) is unavoidably ambiguous.

> *brain spends a significant amount of time in regions of phase space that* do not neatly correspond to any of the labelled categories that language, or the experimenter, or society itself, has laid before it [45].

This proves that sharp transitions in behaviour need not be attributed to formally discrete logical processes, but can emerge instead from nonlinear dynamics in continuous modulations of a machinic assemblage. Such a 'fibrous' approach offers a welcome update to the Gibsonian information theory [46]: picking up the invariances to 'select' the most advantageous course of action out of the transspatial 'virtual phase space'. To paraphrase Massumi, which came first – the picker or the picked? Which is the chicken and which is the egg? [47]. The answer is neither. They both come last. To start with an affordance is to start from the middle by endorsing a theoretical model of decision-making and attention-control at the pre-reflective machinic level [48]. To speak of affordance is to break with the stifling notions of culture as representation or as reflection. It is to break with properties for capacities and, finally, to break with signification for the speculative-pragmatist significance. Dare we say, it is to break with the Two Cultures, micro- and macro-reductionism, in favour of an ethics of transversality and experimentation. In the words of Kwinter: "It is a fundamentally bourgeois idea to live the 'critical' life, to assess the value of objects and practices when the processes of production are themselves wild and alive and doing their business semi-independently elsewhere [49]". It amounts to megalomania.

The selectionist approach is fully compatible with evolutionary biology (evo) and developmental systems theory (devo), insofar as the emphasis is on plasticity and adaptation (evo-devo), rather than an already given essence or striving towards some proper form [50]. The Gibsonian theory gives credence to an alternative account of the phenomena of retention and expectation without recourse to memory. Recall how experience 'consults' itself when, for example, anticipating the taste of an expected flavour one is surprised to taste an unexpected one. There is neither logical mediation nor interpretation involved in this foreshadowing. Retention leads into and feeds anticipation.

Anticipation, in turn, rests and draws upon retention. It is not implausible that the emergence of an immune system owes to the incorporated expectation of injury or risk of potential harm. As stated above, the embodied, enactive cognition, may be best described *not* as a sequence of logical computational states, but as a continuous trajectory through virtual state space – absolute or non-dimensional survey – flirting with 'meaningful' attractors but rarely settling into them. "What exist are processes of change, [emergent] constraints exhibited by those processes, and the statistical smoothing and the attractors (dynamical regularities that form due to self-organizing processes) that embody the options left by these constraints [51]".

Constraints channel broad possibilities into narrow probabilities. Consider the following example. When stringing letters together to form a word (a – ar – arch – architecture), we start from an undifferentiated (flat) attractor landscape where a single letter can lead to anything. Yet, as information builds up, as in 'arch', the phase space gets ever more differentiated (constrained) until we end up with a single basin of attraction, that of 'architecture'. Hide and seek works the same way. If an object is always hidden in one specific place instead of several, the attractor landscape gets rearranged to bear a single basin [52]. It is arguably for the same reason that typefaces are recognisable despite there being a great variety of them [53]. The same applies to the invariant facial features in spite of the continuous transformation through the aging process [54].

There is an enormous plasticity in the nervous system, or else it would never be able to handle the complexity and novelty of the ever-changing environment, be it nonorganic, artificial or technological. In any case, *activity is dominated more by experience than by stimuli*. It is for this reason that meta-stable affordances are sought out and detected so as to help coordinate behaviour. This is achieved through the operationally specific variability based on the capacity to vary the means to achieve the ends, i.e. flexibility, prospectivity and retrospectivity [55]. Nevertheless, it would be a fatal mistake to break up the task of action-coordination into purely internal neural circuitry. The ethico-aesthetic affordance theory recognises that organisms use *both* internal and external means of coordinating behaviour:

> *Moving from place to place is supposed to be 'physical' whereas perceiving is supposed to be 'mental', but this dichotomy is misleading. Locomotion is guided by visual perception. Not only does it depend on perception but perception depends on locomotion inasmuch as a moving point of observation is necessary for any adequate acquaintance with the environment. So we must perceive in order to move, but we must also move in order to perceive* [56].

We tend to think of the visual content of an image as a representation of the object's form or, beyond this naïve approach, as an acquired cultural code enabling us to recognise percepts as referencing objective forms. However, neither of these approaches to imagecontent works in terms of (built) environment. According to Massumi, it is precisely movement and not message that is the actual content of architecture [57]. Gibson is explicit:

> *The visual world is a kind of experience that* does not correspond to anything, *not any possible picture, not any motion picture, and not even any 'panoramic' motion picture. The visual world is not a* projection *of the ecological world. How could it be? The visual world is the outcome of the picking up of invariant information in an ambient optic array by an exploring visual system, and the awareness of the observer's own body in the world is a part of the experience* [58].

Having sensations does not simply amount to perceiving. The useful dimensions of sensitivity are those that specify the environment and the observer's relation to the environment (*umwelt*) [59]. An infant does not have to learn to convert sensations into lawful perception, both extero- and proprio-ception.

The fault lies, according to Tim Ingold, with understanding cultural production as a number of discrete, finite processes, each with a beginning and an ending: "production, and the meaning of production, must therefore be understood *intransitively*, not as a transitive relation of image to object [60]". This is to say that life cannot be understood mechanistically. According to Ruyer, it has to be understood axiologically. The 'axio-logical subject' values (affordances) rather than knows (objects). The lure of the virtual, towards which all our acts are directed, is the world of values. Yet, tending to the future, which is fibrously connected to the past, always comes with the dynamic potential for divergence from the present.

We have yet to shake off the 'bad habit' of representationalism in order to right-fully embrace a unity in multiplicity. A beginner's guide to metamodelling worthy of its machinic reputation rests on the following injunctions: 1) Insert an interval between **A** and **P** (**S** and **R**); 2) Sustain the movement between **T**, **U**, **P** and **F**; 3) Start from the middle! The irreducible triad may be parsed in the three syntheses from *Anti-Oedipus*: the connective – partial objects and flows, the disjunctive – singularities and chains, and the conjunctive – intensities and becomings [61]. It is by activating the transversal operations, each time anew, that we may hope to see the parochial culture of hylomorphism (covert idealism) give way to the life-affirming creative environmental, social and psychic teleodynamics [62].

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19. While language is the neurotic's preferred medium of expression, most psychotics express themselves best using non-linguistic semiotic material. Deleuze stages an encounter between the surface of Lewis Carroll and the depth of Antonin Artaud as a paradigm for the logic of sense, where sense only makes sense in relation to 'non-sense'. See: Deleuze, G.: The Logic of Sense, p. 93. Columbia University Press, New York (1990)

20. Form can have two meanings: it either organises matter (content), or forms functions (expression). See: Deleuze, G.: Foucault, pp. 23–44. Minnesota University Press, Minneapolis (1988)

21. See: Deleuze, G.: Foucault, p. 34. Minnesota University Press, Minneapolis (1988). [emphasis in the original].
22. See: Deleuze, G.: Foucault, p. 35. Minnesota University Press, Minneapolis (1988)
23. Hauptmann, D., Radman, A. (eds.) Asignifying Semiotics: or How to Paint Pink on Pink, Footprint, 8/1(14). Architecture Theory Chair in partnership with Stichting Footprint and Techne Press, Delft (2014). https://doi.org/10.7480/footprint.8.1. Accessed 13 May 2020
24. There are two basic diagrams […]: that of regulation by negative feedback which suppresses difference and seeks equilibrium, or that of guidance by positive feedback which reinforces difference and escapes equilibrium. See: Land, N.: Machinic desire. Textual Pract. **7**(3), 471–82 (475) (1993)
25. Guattari, Schizoanalytic Cartographies. [emphasis added]
26. As used by Franz Brentano and then Husserl, 'intentionality' means that mental states like perceiving are always about something, that is, directed towards something. By contrast, for Deleuze intentionality does exist but it is always multiple. In other words, there is never a single originator of the intention. Desire itself is a multiplicity of competing drives
27. Guattari, F.: Machinic heterogenesis. In: Conley, V. (ed.) Rethinking Technologies, pp. 13–27 (22). Minnesota University Press, Minneapolis (1993)
28. Deleuze, Foucault., p. 39
29. The connective synthesis of production, the disjunctive synthesis of recording, and the conjunctive synthesis of consummation, i.e. nothing is given, everything is produced. The larval subject is a residuum or spare part that sits alongside the desiring-machine. See: Deleuze, G., Guattari, F.: Anti-Oedipus, p. 338. Penguin, New York (2008)
30. Bains, P.: Subjectless subjectivities. In: Massumi, B. (ed.) A Shock to Thought: Expression after Deleuze and Guattari, pp. 101–116. Routledge, London (2002)
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33. Heft, H.: Ecological Psychology in Context: James Gibson, Roger Barker, and the Legacy of William James's Radical Empiricism, p. 28. L. Erlbaum, Mahwah (2001)
34. Manning, E.: Always More Than One: Individuation's Dance. Duke University Press, Durham and London (2013)
35. Plato employed the carving metaphor as an analogy for the reality of Forms (Phaedrus 265e): like an animal, the world comes to us pre-divided. Ideally, our best theories will be those which "carve nature at its joints"
36. Manning, Always More Than One, p. 220
37. Smith, B.: Topological foundations of cognitive science. In: Eschenbach, C., et al. (eds.) Topological Foundations of Cognitive Science. Graduiertenkolleg Kognitionswissenschaft, Hamburg (1994)
38. Manning, Always More Than One, p. 219
39. Clark, A.: Surfing Uncertainty: Prediction, Action, and the Embodied Mind, pp. 112–115, 213. Oxford University Press, Oxford (2016)
40. Weschler, L.: Seeing is Forgetting the Name of the Thing One Sees: A Life of Contempporary Artist Robert Irwin. University of California Press, Berkley and Los Angeles (1982)
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42. Spivey, M.J., Anderson, S.E., Dale, R.: The phase transition in human cognition. New Math. Nat. Comput. **5**(1), 197–220 (2009)
43. Phase transition in a broad sense, is a transition of a substance from one phase to another (e.g. solid – liquid – gas) upon a change in external conditions, such as temperature, pressure, etc.; in a narrow sense applied here, it is an abrupt change in perceptual states

44. Varela, F.J.: The reenchantment of the concrete. In: Steels, L., Brooks, R. (eds.) The Artificial Life Route to Artificial Intelligence: Building Embodied, Situated Agents, pp. 11–20. Lawrence Erlbaum Assoc., New Haven (1995)
45. Spivey, Anderson and Dale, The Phase Transition in Human Cognition., p. 205. [emphasis added] See also: Spivey, M.J.: The Continuity of Mind. Oxford University Press, New York (2007)
46. Following the lines of continuity is consistent with the Ruyerian fibrous conception of the universe. See: Ruyer, Neofinalism, pp. 140–53
47. Massumi, B.: The political economy of belonging and the logic of relation. In Parables for the Virtual; Movement, Affect, Sensation, pp. 68–88 (68). Duke University Press, Durham (2002)
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54. Kugler, P.N., Shaw, R.: Symmetry and symmetry-breaking in thermodynamic and epistemic engines: a coupling of first and second laws. In: Synergetics of Cognition, pp. 296–331. Springer, Heidelberg (1990)
55. In retrospective control, adjustments are made in respect to what has occurred; in prospective control, in respect to what will occur. See: Turvey, M.T.: Lectures on Perception: An Ecological Perspective, pp. 305, 376–377. Routledge, New York and London (2019)
56. Gibson, J.J.: The Ecological Approach to Visual Perception, p. 223. Lawrence Erlbaum Associates, New Jersey (1986)
57. Massumi, B.: Building Experience; The Architecture of Perception. In: Benjamin, A., Spuybroek, L. (eds.) NOX Machining Architecture, pp. 322–331. Thames & Hudson, London (2004)
58. Gibson, The Ecological Approach to Visual Perception., p. 207. [emphasis added]
59. Uexküll: A Stroll Through the Worlds of Animals and Men

60. Ingold, T.: The architect and the bee: reflections on the work of animals and men. Man New Ser. **18**(1), 1–20 (15) (1983)
61. Deleuze and Guattari, Anti-Oedipus, p. 338
62. Guattari, F.: The Three Ecologies. Continuum, London (2008)