

# Technicity and the Magical Unity

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## Modern technology and decontextualization

Technological modernization has entailed a process of mass homogenization in which a provincial epistemology is continuously asserted as a universal form of humanity; through the imposition of generalized modes of being, thinking and doing, it causes a reduction on the scope of perception and diminishes the possibilities for action. Although this techno-scientific progress is commonly represented as a universal enhancement in the mainstream narrative, it can also be described as the self-closure of a particular kind of ontology. Thus, a multiplicity of forms of being, thinking and doing grounded in the interrelation with the biocultural conditions of the location that a human organism inhabits are neglected (and in some cases even eradicated) through the exacerbated development of —unilateral and decontextualized— problem solving models. Thinking about the technological progress of modernity, Gilbert Simondon mentions that “each new extension of the field of human action is marked by an invention that authorizes a system of compatibility,”<sup>1</sup> thus technological inventions enables systems of compatibility that axiomatizes humans to participate in modern society:

“The axiological formalizations are directed towards the key-points and the key-moments of action, primarily in the form of an axiomatic system of decision making that entail a universal representation of the world...”<sup>2</sup>

1 Gilbert Simondon, *Imaginación e invención*, (Buenos Aires: Cactus, 2015), 79.

2 Ibid. 179.

Invention within modernity has a tendency towards a decontextualized and normative universalization. The modern social, cultural and political axioms, which underlie contemporary technical invention, have rendered a world that is commonly understood as universal; this is taught and propagated through a system of symbolic conversion that attempts to homogenize concretely diverse subjective experiences. In each epoch, normative inventions have constituted a “discovery of compatibility for modes of existence that had no meaning or point of insertion in the previous normative structures.”<sup>3</sup> A moral is invented as a system of fundamental units that is simple and close enough to the subject to be prior to any complex case of decision making. Gilbert Simondon recalls that when the ancient people in power discovered that slaves were humans and not goods or instruments that speak, they gave a normative structure to the relationship of the master with the slaves.<sup>4</sup> In the modern world, the smallest endogenous society attempts to organize a wider reality which is exogenous to it; a homogenizing moral is constantly reinvented to execute such organization:

“...the morals of each of the classes or castes, in the ancient cities, had no common point, they were not compatible with each other; the invention of a morality of compatibility [...] consists in installing as a source of normativity a fundamental, primordial image, simpler than that of any activity already codified, and therefore capable of modulating said activities: that of the role, of the person...who has an intrinsic normativity as a role.”<sup>5</sup>

Simondon defines invention as the appearance of “the extrinsic compatibility between the medium and the organism, and the intrinsic compatibility between the subsets of action.”<sup>6</sup> Modernity’s unilateral approaches towards problem solving have unchained the most challenging crises of the present. For example, the climate crisis affects all inhabitants of the Earth, but it emerged as a feedback response to the extractivist techniques that were invented to solve the necessities of a small and specific social group. Rather than building a value judgment, perhaps we can follow Simondon when he argues that “it is partially false to say that invention is

3 Ibid. 178.

4 Ibid. 181-182.

5 Ibid. 181-182.

6 Ibid. 157-158.

made to reach an end, or carry out an entirely foreseeable effect,"<sup>7</sup> and thus consider that such inventions out-performed the resolution of their original goals, since their amplification emerged on top of an axiomatic system that allowed their propagation.

The modern-classical Western paradigm (MCWP), as coined by Augustin Berque, refers to a series of axioms which have abstracted humans from their direct locality: ontologically through dualism and logically with the law of the excluded middle, both of them entailing the reign of binarity.<sup>8</sup> The MCWP "has decosmized human existence," meaning that humans have been neurologically disabled to directly interact with their local natural environment through the constitution of a set of generalized assumptions about nature. According to Johanna Broda the concept that a society forms of nature depends "on the productive forces that it manages, of the production relations that it has generated, and of its political-religious superstructure,"<sup>9</sup> meaning that the attitude towards nature and its conceptualization are socially elaborated by a recursive *invention of culture*. Within the MCWP, this has happened through the cybernetic processes of convergent media such as film, music, advertising, and so on. Roy Wagner described that inventors and designers arrange cultural controls (e.g. technological devices, experimental situations) to consciously interpret nature, objectifying a culture which enables a way of "using," "experiencing," or "inventing" nature; the outcomes of these cultural controls can be used again and again to re-create an experience of nature.<sup>10</sup>

"Machines are Culture, they are concrete conventional controls that simultaneously objectify the impinging phenomenal events as "Culturalized nature" (electricity, horsepower, "energy," performance), and are in turn objectified as "naturalized Culture" (machines as having capabilities, being "powerful," "intelligent," and so forth)."<sup>11</sup>

7 Simondon, *Imaginación e invención*, 193.

8 Augustin Berque, "An Enquiry into the Ontological and Logical Foundations of Sustainability: Toward a Conceptual Integration of the Interface 'Nature/Humanity'," *Global Sustainability* 2, (2019): e13, 1.

9 Johanna Broda, "Cosmovisión y observación de la naturaleza: El ejemplo del culto de los cerros en Mesoamérica" in Johanna Broda, Stanislaw Iwaniszewski and Lucrecia Maupomé (eds.): *Arqueoastronomía y Etnoastronomía en Mesoamérica*: 461-500, Instituto de Investigaciones Históricas, UNAM, México, 1991.

10 Roy Wagner, *The Invention of Culture*, (University of Chicago Press, 1975), 100.

11 Wagner, *The Invention of Culture*, 56.

Heidegger argues that the rise of this techno-scientific paradigm is “cloaked in the increasing authority of *calculation, speed, and the claim of the massive.*”<sup>12</sup> Although not all scientists nor technologists would argue that their disciplines have grasped the world as a totality, the dissemination of scientific data through mass-culture recursively in-forms the “masses” with the totalizing episteme of a supposedly completed world-picture. For Heidegger, *calculation, speed, and the claim of the massive,* are the enablers of the machination that has enframed human and non-human beings in a standing reserve of resources. *Calculation,* which is “epistemologically grounded in mathematics” avoids the question of the essence of truth since it prioritizes a mode of organization that implies a “renunciation of a freely developing change from the ground up.”<sup>13</sup> According to the logic of calculation, that which remains “incalculable” is merely what has not yet been mastered, but will also be incorporated some day.<sup>14</sup> *Speed* refers to the mechanical increase in technical velocities of any sort, which is self-conditioned by speed itself. The increase of speed is purely quantitative, and therefore calculable. It affects perception as a “blindness to the truly momentary.”<sup>15</sup> And the *claim of the massive* as a model of dissemination and decision making that is rendered as “accessible to everyone in the same way,” but simultaneously unables human-scale action, by implying that issues should solely be solved from a perspective that considers the human masses from statistical analysis. These elements condition the activities of labor and leisure alike, turning the *conditions* of modernity into apparently *unconditional* axioms which define the continuum of the inner and outer experience of the modern subject.

Perceptual experience is directed by inner patterns which correspond to the catchment of meaning from situations according to primary behaviours such as danger, nourishment, mating, etc. These patterns, altered through the lifespan of individuals, are environmentally-induced and developmentally-regulated variations that, according to epigenetics, can be transmitted to subsequent generations.<sup>16</sup> In the contemporary world-structure, invention is framed *as if* it can only happen through the NBIC framework which

12 Martin Heidegger, *Contributions to Philosophy (Of the Event)*, (Indiana University Press, 2012), 95.

13 Ibid. 95.

14 Ibid. 95.

15 Heidegger, *Contributions to Philosophy (Of the Event)*, 96.

16 Eva Jablonka and Marion J. Lamb, “Soft inheritance: challenging the modern synthesis,” *Genetics and Molecular Biology*, vol. 31, n.o 2, 2008, pp. 389-395.

means: the convergence of nanotechnology, biotechnology, information technology, and cognitive science. Scientists and technologists working within such a framework possess a vast knowledge of specific and complex issues, but fail to develop ideas and projects that are innovative beyond the aforementioned modern axiomatics. Instead of conducting processes of immeasurable technical creativity, projects happening within the NBIC framework are subsumed to corporate interests, and their outcomes, mainly applied towards capitalist accumulation, are massively spread without any sort of bottom-up consent. Although we could blame specific human individuals, we should consider that modern practitioners and their disciplines have been logically and ontologically decontextualized (and thus decosmized)—meaning that they are unable to find a place in any natural order—<sup>17</sup> and therefore ignore the possibility of exceeding the MCWP. Roy Wagner argues that inventors use complex and businesslike methodologies to investigate, determine, and therefore invent nature as it is culturally perceived and interpreted;<sup>18</sup> rendering the dogma of arbitrary analogies, divisions and distinctions that the MCWP has imposed upon the phenomenal world as an innate and basic article of faith. Lynn Margulis mentioned that several “science practitioners widely believe and teach—explicitly and by inference—that life is a mechanical system fully describable by physics and chemistry.”<sup>19</sup> A relevant example would be that of the modern synthesis (or neo-darwinism), an evolutionary theory that became hegemonic since the beginning of the 20th century, as a body of work that “claims to unite the early twentieth-century discoveries of heredity (transmission, or Mendelian, genetics) with concepts of Darwinian evolution.”<sup>20</sup>

While neo-darwinists proffer formal mathematical explanations for the ways in which organisms evolve, Margulis argues that “biologists who actually live among and observe metabolizing animals, plants, and microbes have difficulty measuring the quantities or even understanding general concepts labelled and taken as directly observable by the aforementioned mechanistic practitioners.”<sup>21</sup> Wagner considers that those who have

17 Augustin Berque. “Offspring of Watsuji’s Theory of Milieu (F^udo).” *GeoJournal*, vol. 60, n.o 4, 2004, pp. 389-96.

18 Wagner, *The Invention of Culture*, 103.

19 Lynn Margulis, “Big Trouble in Biology”. in Margulis and Sagan, *Slanted Truths*, (New York; Springer, 1997), 266.

20 Margulis, “Big Trouble in Biology.” 270.

21I bid. 271.

the job of interpreting nature, natural force, impulse or event have an enormous power or advantage, since they possess, or at least claim, "the authority to determine what nature is like in all its "innate" forms, and they therefore become the arbiters of Culture."<sup>22</sup> Culture attains its importance and value through the tempering and application of nature, and therefore an assertion of what the facts of nature are becomes an evaluation of culture through the claim of the "innate."

"Scientists and medical men (who interpret the nature within us and around us), entertainers (who interpret emotion and "innate" reaction), advertisers (who interpret impulse and need), and journalists (who interpret events and their importance) stand in a power relation to culture."<sup>23</sup>

Vincent Blok mentions that "these dominant affordances constitute a metastable niche of human-technology relations that suits the "fittest to survive" and makes one reluctant to engage in the unfamiliarity of new human-technology creation."<sup>24</sup> But, what is this "new" human-technology creation that appears as unfamiliar? Perhaps it is not necessarily "new," but quite the opposite. Wagner warns us that "the attempt to invent society as man's rational and scientific relation to nature is merely another way of mediating the dialectic through the conventional."<sup>25</sup> However, within modernity, acts of differentiation are scarce in comparison to the vast quantity of conventionalizations that are recursively implemented. Wagner mentions that "when people subscribe collectively to a certain distinction between the innate and the artificial, and yet employ relativized controls that obviate the distinction, they precipitate a collective crisis."<sup>26</sup> On the other hand Simondon argues that in its decline, instead of inciting to action, a culture produces "a universe of images that dresses and masks the world without adhering to it,"<sup>27</sup> creating an aesthetic, that is, not a way of perceiving, but a way of treating the world as a reservoir of images. Although the technological progress of the MCWP is commonly understood as a linear and universal movement in which all humanity is benefited,

22 Wagner, *The Invention of Culture*, 103.

23 Ibid. 100.

24 Vincent Blok, "The Role of Human Creativity in Human-Technology Relations", *Philosophy & Technology* 35, n.o 3 (2022): 13.

25 Ibid. 89.

26 Wagner, *The Invention of Culture*, 77.

27 Simondon, *Imaginación e invención*, 35.

we understand it as a linear movement that progressively closes its trajectory towards decline; and in this process, invention is only enacted towards conventionalization to maintain modern conditions and render them as unconditional (Figure 1).

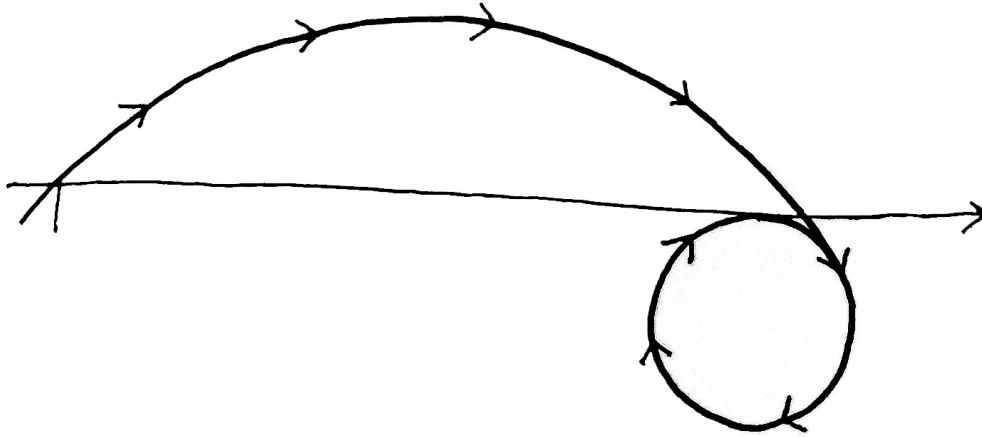


Figure 1. *The self-closure of a culture.* (Drawn by Diego García).

“The automatism and the aspects of closure are ordered according to this unique movement that deposits them in the course of their march: closed instincts and societies are like the waters that run in a circle while the water of the river continues its course”<sup>28</sup>

If the society that has been ontogenetically bred in modernity is like “water that runs in a circle,” what type of society would be analogous to “the water of the river”? What would it mean to invent within its “continuous course”?

### **Inventing a niche**

A type of nature that is continuously asserted as innate is invented through the cultural controls of the MCWP, but the failure of this invented nature and its symbolic makeup “is manifested in pathological modalities when invention, as a shift of phase, cannot produce and develop a new cycle.”<sup>29</sup> Catherine Malabou mentions

28 Ibid. 35.

29 Ibid. 71.

that the neuronal revolution in the sciences “has revolutionized nothing for us, if it is true that our new brains serve only to displace ourselves better, work better, feel better, or obey better.”<sup>30</sup> Even if there exists an enormous advancement in the understanding of the functioning of our neurological system, the axioms of modernity sterilize its possible evolutionary or emancipatory applications. Malabou argues that we are lacking life, which here is equal to a lack of resistance towards “a reductionist discourse that models and naturalizes the neuronal process in order to legitimate a certain social and political functioning.”<sup>31</sup> Using the figure and ground relation of gestalt psychology we can say that this failure is the product of a ground that has become apparently immovable. So to think beyond the axiomatics of modernity, we need to clarify that figure and ground affect each other recursively; grounds inform and support figures, and simultaneously, figures can fragment and diversify grounds, or on the other hand, stabilize and maintain them. Gilbert Simondon mentions that this recursive causality between figure and ground is not symmetric: “the niche (or milieu) plays the informational role as the seat for self-regulations, it is the vehicle of information or of energy that is already governed by information; while structures (or figures) are animated by a non-recurrent causality, and each goes in its own direction.”<sup>32</sup>

Roy Wagner considers that the ideology that spans from the United States is based on the existence of an innate order called *nature* as distinct from the artificial *culture*: “instead of inventing nature, we are said to understand it, harness it, apply it, let it take its course.”<sup>33</sup> But this conception of “innate nature” becomes dubious when we realize that there is no such thing as a pristine ecosystem: biological diversity is contingent on human and non-human technicity. And this has been clarified by the historical ecological studies concerning the Mayan region: “The traditional Maya milpa, like any agricultural system, disturbs the natural environment, but this system works with the forest and is integral to its creation and sustainability.”<sup>34</sup> It has been well documented

30 Catherine Malabou, *What Should We Do with Our Brain?* (Fordham University Press, 2008), 68.

31 Ibid. 68.

32 Gilbert Simondon, *On the Mode of Existence of Technical Objects*, (Minnesota: Univocal, 2016), 61.

33 Roy Wagner, *The Invention of Culture*, 99.

34 Anabel Ford and Ronald Nigh, *The Maya Forest Garden: Eight Millennia of Sustainable Cultivation of the Tropical Woodlands*. New frontiers in historical ecology, Vol. 6. (Walnut Creek, California: Left Coast Press, Inc, 2015), 13.

that the Mayan landscape management enhances the soil and propels biodiversity.

“Food produced by the milpa is of high quality, as it is based on the natural fertility maintained in the forest garden cycle, where regenerated woodlands continually restore minerals and organic matter. High biodiversity assures that pesticides are unnecessary and all wastes are recycled in the field. Water is managed by the conservation of vegetation and by the infiltration of rainwater stored in the soil. A healthy and natural relationship is fostered for animals that are attracted to the secondary vegetation of the milpa forest garden, resulting in a kind of semi-domestication based on the landscape.”<sup>35</sup>

William Balée has extensively written on how the human modulation of inorganic and organic components of the environment brings about a net environmental diversity greater than that of so-called pristine conditions with no human presence.<sup>36</sup> When we take into consideration that environments such as the Mayan forests are continuously modified by humans into niches that enable the flourishing of multi-species diversity, we become aware of the naivety of the mainstream ecological conservation theories and practices which postulate that nature needs to be protected from disturbance, change, and people. As Clark L. Erickson mentions, natural disturbances are not only common, but integral to ecosystem health and biodiversity; and therefore “the instability, non-equilibrium, and at times chaos created by disturbance encourage environmental heterogeneity through the creation of patches, mosaics, and edges of distinct habitats.”<sup>37</sup> Although the contemporary conservation practices for tropical forests have relied upon the approach of attempting to remove the human element from the equation, the ecological and botanical research on the Mayan forest have revealed a variegated garden composed of valuable plants that are highly dependent on human interaction.<sup>38</sup>

35 Ibid. 167.

36 William Balée, “Indigenous Transformation of Amazonian Forests: An Example from Maranhão, Brazil,” *L'Homme*, “La remontée de l'Amazone” 33, no. 126-128 (1993): 231-254.

37 Clark L. Erickson, “Amazonia: The Historical Ecology of a Domesticated Landscape,” in *The Handbook of South American Archaeology*, eds. Silverman H., Isbell W.H. (New York: Springer, 2008), 157-183.

38 Ford and Nigh, *The Maya Forest Garden: Eight Millennia of Sustainable Cultivation of the Tropical Woodlands*, 174.

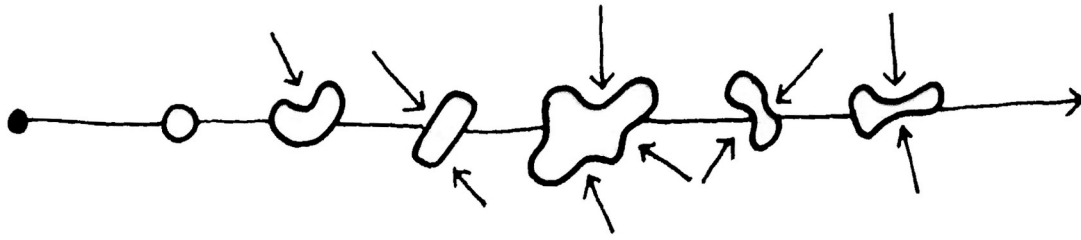


Figure 2. *Ecosystemic plasticity allows ecological succession.* (Drawn by Diego García).

Victor Toledo argues that even if “all species of animals, plants and microorganisms that exist are directly or indirectly interconnected through a complex energy network, it is possible to recognize and characterize discrete sets of them.”<sup>39</sup> These discrete sets are commonly known as *ecosystems*: units that are morphologically typified by the species and the physical, chemical and geological elements that conform them. Ecosystems self-regulate and stay in a dynamic equilibrium, meaning that when they are disturbed, they can regenerate through a process known as *ecological succession* in which new conditions are developed (Figure 2). Ecosystems are the product of the symbiotic evolution of the species of organisms that compose them, and of the abiotic factors that each species interact with. Therefore “every ecosystem also constitutes an entity located at a certain “moment” of natural history, that is, they are fundamentally historical entities.”<sup>40</sup> *Ecosystem engineering* refers to the process in which organisms “directly or indirectly modulate the availability of resources to other species by causing state changes in biotic or abiotic materials. In doing so, they modify, maintain and/or create habitats.”<sup>41</sup> Thus *ecological succession* can be described as the continuous emergence of new environmental features which happens as an outcome of the interrelating life processes of multiple species. In recent years, individuals have come to be understood as ecosystems too: the microbiome which composes an individual is an ecological community of commensal, symbiotic, and pathogenic microorganisms. Therefore, the notion of an individual has been constitutively redefined as: “a) an organism

39 Víctor M. Toledo, "Intercambio ecológico e intercambio económico en el proceso productivo primario". in *Biosociología y Articulación de las Ciencias*, ed. Leff E. (México: UNAM, 1981) pp. 121.

40 Ibid.121.

41 Clive G Jones *et al*, "Organisms as Ecosystem Engineers," *Oikos* 69, no. 3 (1994): 373-86.

“composed” of multiple species (a major organism and its symbionts) or as b) different types of “cohabiting Symbionts” for whom the major organism is the habitat.”<sup>42</sup> And from this perspective, any pluricellular organism can be grasped as constituted through the technical activities of multiple species.

Simondon considers that the most simple mode of invention relies on the operational models that are already functioning within a system: “the operational models with their motor content constitute by themselves the most elementary of the axiomatics that do not need to be constructed since they are delivered by the organism itself.”<sup>43</sup> This can be described as a process of invention that appears in consideration of the metabolic coherence of an ecosystem, and of the operational models of the diverse species that constitute it. This physical and psychic relational character of the most simple invention results in very complex innovations and could also be described as “symbiotic.”

Ecosystems are invented through the constitution of the niches which become the ground for the enactment of further inventions. A milieu or *niche* distincts itself from an *environment* to the extent that an environment is a raw and universal datum considered in abstracto by the look from nowhere of modern science, whereas niche is a concrete and singular reality that is dynamically coupled with the constitution of the organism that experiences it.<sup>44</sup> In the same environment, different species (or different cultures) experience different niches through their functional circles: “there is only one environment, although it contains many observers with limitless opportunities for them to live in it.”<sup>45</sup> With *functional circles*, we refer to the sphere of perception-action of an agent in relation to its environment. This concept was coined by Jakob von Uexkull to understand the ways in which animals execute their actions from the perception (or internalization) of their environment. Berque mentions that what the animal encounters is the ‘as’ by which it perceives things: *as* food, *as* obstacles, *as* shelter, *as* housing, etc. “In other words, in a functional circle, this ‘as’ is the medial handle that an object offers

42 Elena Gagliasso, “Individuals as ecosystems: an essential tension” *Paradigmi: rivista di critica filosofica: XXXIII, 2*, (2015), 93.

43 Simondon, *Imaginación e invención*, 170.

44 Augustin Berque, “An Enquiry into the Ontological and Logical Foundations of Sustainability: Toward a Conceptual Integration of the Interface ‘Nature/Humanity’,” 2.

45 James Gibson, *The Ecological Approach to Visual Perception: Classic Edition*. (New York, London: Psychology Press, Taylor & Francis Group, 2015), 129.

the animal.”<sup>46</sup> Niches are “not quite the same as the habitat of the species; a niche refers more to *how* an animal lives than to *where* it lives.”<sup>47</sup> These “as if’s” were described by James Gibson as *affordances*:

“An affordance cuts across the dichotomy of subjective-objective and helps us to understand its inadequacy. It is equally a fact of the environment and a fact of behavior. It is both physical and psychical, yet neither. An affordance points both ways, to the environment and to the observer.”<sup>48</sup>

As a symbiotic invention, the process of constituting a niche happens through the technical disturbance of an environment, but the species that cause those disturbances are simultaneously informed by the affordances that the environment offers to them. As an ecosystem is composed of a multiplicity of organisms interacting with one another, the behavior of one species has an influence on the axiomatization of another species’ behavior: *behavior affords behavior*. Since it relies on multi-species interaction, symbiotic invention happens as a subtle process through time and space; thus the “images that are too accentuated do not allow invention.”<sup>49</sup> As instruments of invention, internal images need to be in a state close to neutrality so their correspondent externalization can be integrated into an ecosystem, producing disturbances which bring forth new ecological conditions in the system’s organization, avoiding the drastic alterations caused by modern technology.<sup>50</sup> Gilbert Simondon mentions that a main quality of imagination is “the capacity of the prediction of qualities that are not practical in

46 Augustin Berque, “The Perception of Space or a Perceptive milieu?”, 168-181.

47 James Gibson. *The Ecological Approach to Visual Perception: Classic Edition*, 120.

48 Ibid. 121.

49 Simondon, *Imaginación e invención*, 172.

50 In Martin Heidegger, “The Question Concerning Technology,” in *The Question Concerning Technology and Other Essays*, trans. William Lovitt (New York and London: Garland Publishing, 1977), 14: Heidegger argues that the essence of modern technology is that of challenging, “which puts to nature the unreasonable demand that it supply energy that can be extracted and stored as such.” On the other hand Alf Hornborg considers that “unequal exchange in the world system is what reproduces machines, and machines are what reproduce unequal exchange.” For Hornborg it would be “impossible to understand accumulation, “development,” or modern technology itself without referring to the way [...] in which market institutions organize the net transfer of energy and materials to world system centers.” See Alf Hornborg, *The Power of the Machine: global inequalities of economy, technology, and environment*, (Walnut Creek, CA: AltaMira Press, 2001), 44, 55.

certain objects, that are neither directly sensorial nor entirely geometric, that relate neither to pure matter nor to pure form, but are at this intermediate level of schemas.”<sup>51</sup>

Augustin Berque postulates the concept of *mediance* in reference to the structural moment between living beings and their environment—that as part of a dynamic coupling—enables the continuous evolution of both; this can be described as the *subjectivation of the environment, and the environmentalization of the subject*<sup>52</sup> that results in the constitution of a niche. A niche is neither subjective nor objective, but *trajective*; meaning that its constitution is the result of the technical activities of the species that experiences it, and in turn, the physical and psychic development of that species is informed by its niche. Berque mentions that reality in general is necessarily trajective and never ceases to evolve. A niche is thus a set of affordances trajectively constituted through the dynamic mediance that continuously happens between subjects and their environment. Figures need grounds since the latter represent the implicit axiomatics that enable the processes of invention and imagination, while grounds need figures to be both maintained and reinvented. Grounds are constituted by technical processes, but those technical processes are axiomatized by grounds that were previously constituted.

“Invention establishes a certain type of feedback that goes from the system of the complete result to the organization of the means and of the subsets according to a compatibility model.”<sup>53</sup>

From a modern urban perspective, we ask ourselves how to conduct processes to invent figurations that *differentiate* from the *conventionalized* contexts of the MCWP. Such processes, rather than being conducted through the NBIC framework, need to be enacted from the human scale and informed by the ecosystemic conditions of specific localities. Thus the global crises cannot be solved with generalized and homogeneous solutions, Gustavo Esteva and Madhu Suri Prakash argue that “local thinking should be capable of identifying the nature of these forces existing at the

51 Gilbert Simondon, *On the Mode of Existence of Technical Objects*, (Minnesota: Univocal, 2016), 74.

52 Augustin Berque, “Nature, Culture: Trajecting Beyond Modern Dualism.” *Graduate School of Humanities and Social Sciences*, (University of Tsukuba, 2016), 32.

53 Simondon, *Imaginación e invención*, 162.

local level,”<sup>54</sup> while Vandana Shiva clarifies that: “While using only 30 percent of the world’s resources, small-scale farmers provide 70 percent of the planet’s food.”<sup>55</sup>

## **Epigenetics and the biocultural holon**

Johanna Broda noticed that within mesoamerican pre-columbian societies the systematic and continuous observation of natural phenomena through time allowed predictions for behavioral orientation, considering that such activities can be described as science.<sup>56</sup> The milpa is “a rain-fed multi-species system, in which maize is combined with almost any other local crop or tree or shrub species.”<sup>57</sup> Unlike European agriculture “where mechanization could not reap benefits from micro-environmental variations,”<sup>58</sup> the Mesoamerican milpa takes advantage of the local conditions of each region. Ford and Nigh mention that a “major objective of the milpa forest garden cycle is to increase the beneficial makeup of the managed landscapes and the forest as a whole;”<sup>59</sup> the stages of the cycle are directed strategically through careful attention and knowledge of each species:

“Planting and plant selection in the early reforestation phases favor fast-growing, short-lived woody species to achieve rapid closure of the canopy. These create the conditions that long-lived perennials need to sprout and grow.”<sup>60</sup>

We can frame the milpa system as a biocultural technique that goes through continuous processes of symbiotic invention conducted

54 Gustavo Esteva and Madhu Suri Prakash, *Grassroots Post-Modernism: Remaking the Soil of Cultures*. Critique Influence Change Series. (London: Zed Books, 2014), 32.

55 Vandana Shiva. *Who really feeds the world? the failures of agribusiness and the promise of agroecology*. (Berkeley, California: North Atlantic Books, 2016), 16.

56 Johanna Broda, “Cosmovisión y observación de la naturaleza: El ejemplo del culto de los cerros en Mesoamérica,” 461-500.

57 Víctor M. Toledo, Benjamín F. Ortiz-Espejel, Leni Cortés, Patricia Moguel, and María de Jesús Ordoñez, “The Multiple Use of Tropical Forests by Indigenous Peoples in Mexico: A Case of Adaptive Management” *Conservation Ecology* 7, n.o 3 (2003), 6.

58 Ford and Nigh, *The Maya Forest Garden: Eight Millennia of Sustainable Cultivation of the Tropical Woodlands*,17.

59 Ibid. 55.

60 Ibid. 54.

from constant acts of amplification which take advantage of long previous learning. Meaning that inventing through the modulation of the behaviors of other species is part of a learning process which never ceases, and therefore enables further acts of invention. This mode of invention is axiomatized by a set of conditions that constitute what Victor Toledo described as the *biocultural holon*. Toledo considers that the biocultural holon is evidenced by:

“the geographical overlap between biological richness and linguistic diversity and between indigenous territories and regions of high biological value[...], the recognized importance of indigenous peoples as the main inhabitants and managers of well-preserved habitats, and the certification of a conservation-oriented behavior among indigenous peoples, derived from their pre-modern complex of beliefs-knowledge-practices.”<sup>61</sup>

According to Toledo, organisms establish a threefold intellectual and material link with nature: beliefs, knowledge, and productive practices<sup>62</sup> and these links happen within a complex formed by a culture, a nature, and a territory: a biocultural holon, that in the best of the cases possess heterogeneity, diversity, connectivity and resilience. It seems that except for modern humans, each species invents its niche in the intersection between the individual and the communal, by tapping into the affordances that they trajectoryly encounter in the search to satisfy their own needs. Thus, ecosystems are constituted through the entanglement of the technical activities that the different species *enact*. Instead of avoiding the distinction between the physical and psychic levels of experience, we consider that there is a correspondence between the internal and external experiences of each organism, as has been explained by the enactive approach:

“The enactive approach consists of two points: (1) perception consists in perceptually guided action and (2) cognitive structures emerge from the recurrent sensorimotor patterns that enable action to be perceptually guided.”<sup>63</sup>

61 Victor M. Toledo, *Ecología, espiritualidad y conocimiento*, (Puebla, México: Universidad Iberoamericana, 2003), 80.

62 Victor M. Toledo, “El holón biocultural y su expresión en el espacio,” *Revista Rúbricas, Número 09. Patrimonio Biocultural*, Universidad Iberoamericana (2015): 14.

63 Francisco Varela, Evan Thompson, and Eleanor Rosch, *The Embodied Mind*, (MIT Press, 1991), 173.

The fluidity between the physical and the psychic levels of experience also implies an interweaving of the biocultural holons pertaining to multiple species, and thus a constant intersubjective interaction in the constitution of their niches; this may be analogous to what Gilbert Simondon refers to with the *magical unity*, meaning: “the relation of the vital connection between man and the world, defining a universe that is at once subjective and objective prior to any distinction between the object and the subject, and consequently prior to any appearance of the separate object.”<sup>64</sup> Within the magical unity, both organisms and abiotic elements are subscribed into an experience of continuity: a complex network of physical and chemical relations. Simondon considers that technicity is the result of a phase shift from this “magical mode” of being in the world. And in the splitting of the magical unity, the emergence of technicity is balanced by the appearance of religion; while aesthetic thought appears as a neutral point between technicity and religion, and as a “permanent reminder of the rupture of unity of the magical mode of being, as well as a reminder of the search for its future unity.”<sup>65</sup> Invention within the NBIC framework has been constrained to the sterilized space of the laboratory, the academy, or the corporation, and therefore modern technology operates in a top-down fashion axiomatized by the MCWP. This results in the isolation of human individuals from each other, and in the isolation of the human species from non-human organisms; as it is exemplarily noticeable in urban settings. In practical terms this was described with the idea of the metabolic rift, meaning...

“...the loss of soil nutrients – such as nitrogen, phosphorus, and potassium – through the transfer of food and fiber to the cities. Rather than being returned to the soil to replenish it, as in traditional agricultural production, these essential nutrients were shipped hundreds, even thousands, of miles and ended up as waste, polluting the cities and waterways.”<sup>66</sup>

Catherine Malabou considers that solitude and isolation signify the

64 Simondon, *On the Mode of Existence of Technical Objects*, 177.

65 Ibid. 174.

66 Brett Clark and John Bellamy Foster, “Guano: The Global Metabolic Rift and the Fertilizer Trade”, in Alf Hornborg, Brett Clark, and Kenneth Hermele, ed., *Ecology and Power* (London: Routledge, 2012), 68-82.

paralysis of the metabolic, the incapacity of transformation.<sup>67</sup> Thus, as agents subjectified within the MCWP, the *symbiotic invention of biocultural techniques* in which the physical and psychic multi-species diversity can flourish, necessarily implies the healing of the metabolism between humans and other species, bringing us closer to the multi-species alterity that surrounds and composes us. Modern subjectivation keeps us away from the possibility of touching each other, and thus we should invent localized techniques to overcome such isolation. Elias Canetti proposes that in order to become free from the fear of being touched, we need to be immersed in a dense crowd, in which body is pressed to body: “as soon as a man has surrendered himself to the crowd, he ceases to fear its touch.”<sup>68</sup> Could we then expand Canetti’s argument and speculate on the possibility of immersing ourselves in a multi-species crowd? A dense micro-, meso- and macrobiotic crowd which enables the enactment of technical inventions that exceed the isolating axiomatics of modernity. Although the process of technological modernization has achieved the homogenization of the biocultural diversification of a vast quantity of human societies, there exist various examples in which modernity has been apprehended and transformed through local cosmogonies. Eytan Avital and Eva Jablonka explain the mode in which cultural inventions and their transmission through social learning and symbolic language lead to biological variations:

“a cultural invention, transmitted by social learning and elaborated by cultural evolution, led to new selection pressures for even more efficient behaviours; these selection pressures also led to the selection of genes affecting features of the nervous system that facilitated the behaviour.”<sup>69</sup>

Some cultural inventions increase plasticity, while others rigidify determinist structurations. For Avital and Jablonka, “reason, imagination and shared narratives give us the only way of popping out of both culture and biology,”<sup>70</sup> meaning that cultural inventions widen the effects and modes of the apparition of reality. Through this plasticity we are able to construct a way out where no exit is apparently possible: “plasticity makes possible the appearance or

67 Catherine Malabou, “The Crowd” *Oxford Literary Review* 37, n.o 1 (2015): 25-44.

68 Elias Canetti, *Crowds and Power*. (New York: Farrar Straus Giroux, 1984), 15.

69 Eytan Avital and Eva Jablonka. *Animal Traditions: Behavioural Inheritance in Evolution*. (Cambridge University Press, 2000), 366.

70 Ibid. 368.

formation of otherness where the other is absolutely lacking.”<sup>71</sup> Therefore, it allows the opening of a world structure that is hegemonically presented as a closed and rigid system. For Catherine Malabou, this use of plasticity “poses a question at the same time psychic, ethical and political, as the possibility of transformation in the absence of a way out.”<sup>72</sup> Symbiotic invention is thus a mode of invention axiomatized by biocultural holons that exist beyond the MCWP and its NBIC framework; it enhances phenotypic plasticity by modulating the behavioral models of an organism that may result in morphological alterations that could subsequently become evolutionary inheritance. Phenotypic plasticity is the ability of a genotype to express different phenotypes in different ecosystems, “there are developmental processes underlying phenotypic plasticity, and some of these will involve epigenetically controlled differentiation processes.”<sup>73</sup> As scientists have largely failed to produce evidence supporting grand theories about genetic determinism and have not been able to conduct gene-editing processes without creating unexpected side-effects,<sup>74</sup> it has been postulated that perhaps “genes are “followers” rather than initiators of evolutionary change, meaning that they stabilize phenotypic changes that are started by epigenetic or developmental processes.”<sup>75</sup> Gilbert Simondon mentions that the behavioral schemes of an organism could be sharply defined in a taxonomic development as much as the size or the shape of their organs:

“These behavioral schemes exist then in the living being as an anticipation of the possible conducts, as partial programs of the behaviors, and can, when virtually used, supply content to the anticipations, in the form of preparation towards situations of encounter.”<sup>76</sup>

Symbiotic invention, the most simple kind, allows the constitution of new anticipations in the behavioral schemes of organisms from which adaptations, that had not been possible with the previous anticipations, will develop alongside a new internal and symbolic

71 Catherine Malabou, *La plasticidad en espera*. (Santiago de Chile: Palinodia, 2010), 8.

72 Ibid. 8.

73 Christina L. Richards et al., “What Role Does Heritable Epigenetic Variation Play in Phenotypic Evolution?” *BioScience* 60, n.o 3 (2010): 232-237.

74 Eben Kirksey, *The Mutant Project: Inside the Global Race to Genetically Modify Humans*, (Australia: La Trobe, 2020), 42.

75 Richards et al., “What Role Does Heritable Epigenetic Variation Play in Phenotypic Evolution?” 232-237.

76 Simondon, *Imaginación e invención*, 40.

system. But anticipation in an individual is not enough; anticipation needs to return to the collective present to modify the structure and the operating conditions. Anticipation, as a differentiating figuration, should then be collectivized in order to modify the individual actions and construct a system of synergy. (Figure 3).

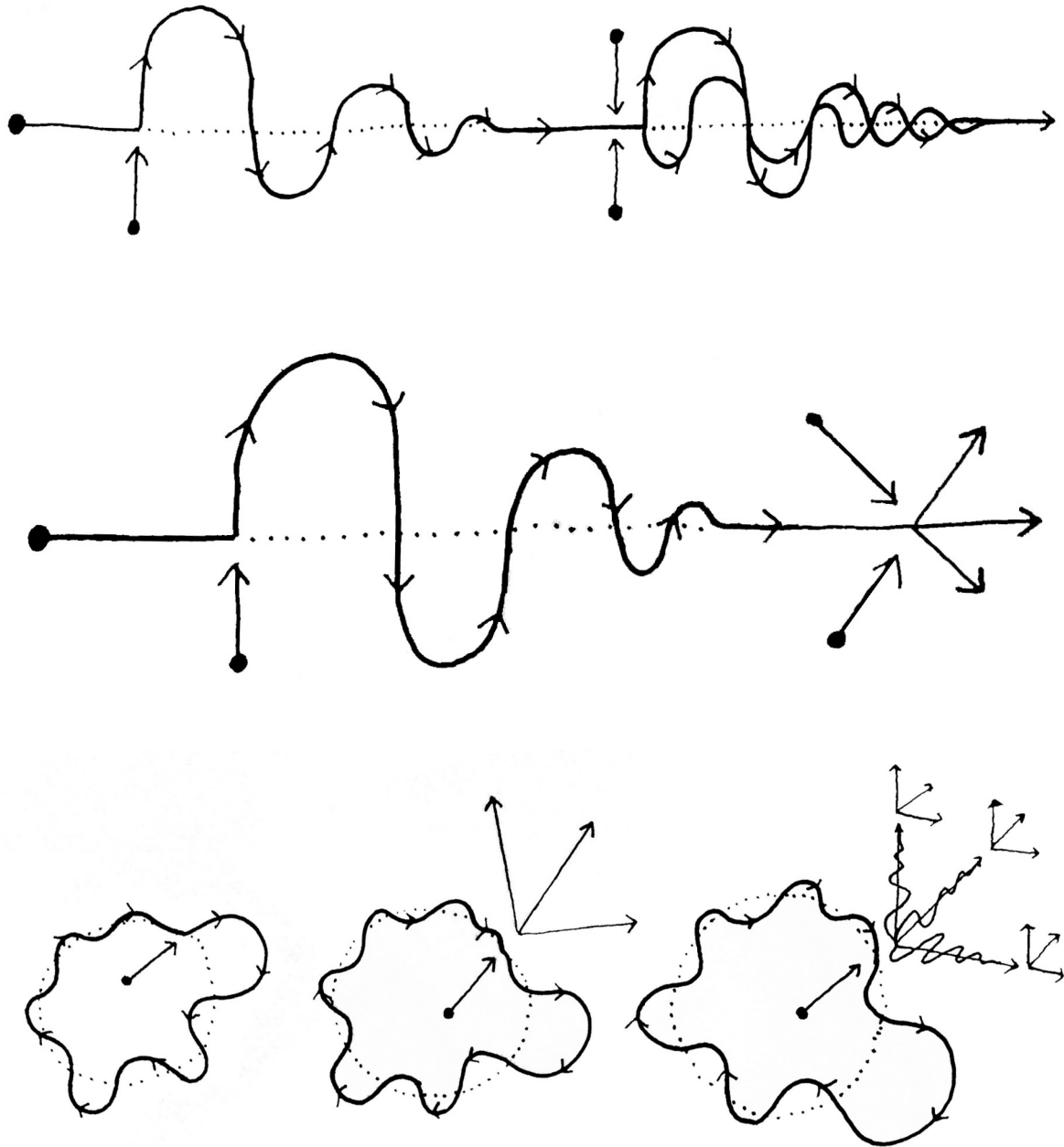


Figure 3. *Differentiation and conventionalization.* (Drawn by Diego García).  
 When a difference emerges, it is amplified until becoming a figuration that is then conventionalized. In the moment in which a difference is conventionalized, it axiomatizes subsequent processes of differentiation.

Although Simondon argues that the appearance of modern technology inherently implies the rupture of the magical unity, he also considers that “theoretical thought and practical thought constitute themselves insofar as they realize a convergence toward the neutral center, finding once more an analog of primitive magical thought.”<sup>77</sup> But even if the convergence between theoretical thought and practical thought could be analogous to magical thought, “the primitive rupture dissociating the magical unity into figure and ground has been replaced by the bimodal character of thought, divided into theoretical and practical.”<sup>78</sup> It is this dualism, so embedded into the MCWP, which seems to disable any possible escape from its structure. However, as it was mentioned above, the exporting of modernity has not managed to absolutely homogenize all the biocultural corners of the planet, and the contemporary Mayan people that inhabit the humid tropics of Mexico could be a clear example.

The Mayan forest has been constituted as a heterogeneous landscape long before the arrival of Europeans, it is a mosaic composed of patches of primary and/or secondary (managed and unmanaged) forests, swidden fallow tracts, vegetation corridors, water bodies, home gardens, and more permanent fields dedicated to cultivated plants, cattle, and forestry plantations.”<sup>79</sup> To some extent, the formation of this heterogeneous mosaic was initiated by humans, but the dynamic equilibrium of its environmental conditions is modulated by the technical activities of other organisms too. For the different species that inhabit a mosaic landscape, the variegated affordances allow the enactment of multiple functional circles which create a synergy that interweaves alimentary and cosmological systems. The Mayan Tseltal thinker Juan López Intzín mentions that:

“Contrary to positivist Western thought, which has classified existence into animate beings and inanimate things, in indigenous Maya thought, everything has life, source, matrix, heart, veins, bones, flesh, feelings, thoughts, language, and *ch’ulel*.”<sup>80</sup>

In the Mayan languages such as the Tseltal, the category of

<sup>77</sup> Simondon, *On the Mode of Existence of Technical Objects*, 221.

<sup>78</sup> Ibid. 221.

<sup>79</sup> Ibid. 4.

<sup>80</sup> Juan López Intzín, “The Ch’ulel-Multiverse and Intersubjectivity in the Maya Tseltal Stalel”, in Steuernagel and Taylor, *Resistant Strategies*, (2015), 13.

“object” does not exist<sup>81</sup> and therefore there is no asymmetrical relationship between “subjects” and “objects” in the social construction of knowledge. López Intzín further explains that: “*ch’ulel* turns everything in existence into a subject and allows us to interact with one another, subject to subject.”<sup>82</sup> The *ch’ulel* concept is specific to the Tseltales, but the linguist Carlos Lenkersdorf identified a similar concept in the Mayan language Tojolabal: *`altzil*. According to Lenkersdorf, *`altzil* gives life to “humans and animals, plants and water springs, clouds and caves, fire and wind, mountains and valleys, rocks and rivers, pots and comales, roads and crossroads.”<sup>83</sup> In the experience of the world proposed by López Intzín and Lenkersdorf, everything is full of life and there is no such thing as a beyond, “the cosmos itself encompasses all the living and links us all in a cosmic community of life”<sup>84</sup> The intersubjectivity of Mayan societies is “characterized by the plurality of subjects and the absence of objects, both direct and indirect;”<sup>85</sup> this can be extrapolated to the milpa and therefore to the agroecological technical activities that constitute the forest, which could also be understood as activities of socialization. Lenkersdorf argues that the pillars of the Mayan cosmivision are intersubjectivity, animism, and communality, which imply a multidirectional relationality,<sup>86</sup> and in this regard we can think of the “magical unity” as a metastable topological constitution, continuously regenerated by the technical activities of multiple species. Pedro Pitarch reminds us that: “In topology, neither distance nor measure is needed since the topology is not dependent on quantities but relationships.”<sup>87</sup>

81 Margara Millán, “En otras palabras, otros mundos: la modernidad occidental puesta en cuestión.” En M. Millán y D. Inclán (eds.) *Lengua, cosmovisión, intersubjetividad. Aproximaciones a la obra de Carlos Lenkersdorf*, (México: Universidad Nacional Autónoma, 2015), 50.

82 López Intzín, “The Ch’ulel-Multiverse and Intersubjectivity in the Maya Tselal Stalel”, 18.

83 Carlos Lenkersdorf, “Relaciones interculturales entre los maya tojolabales”, In: M. Heise (ed.). *Interculturalidad. Creación de un concepto y desarrollo de una actitud* (Lima: Programa FORTE-PE, Ministerio de Educación, 2001,) 10.

84 Ibid. 3.

85 Ibid. 10.

86 Carlos Lenkersdorf, *Cosmovisión Maya*, (México: Centro de Estudios Antropológicos, Científicos, Artísticos, Tradicionales y Lingüísticos "Ce-Acatl", 1999), 70.

87 Pedro Pitarch, “The Folds of the World: An Essay on Mesoamerican Textile Topology”. *HAU: Journal of Ethnographic Theory* 11, n.o 3 (2021), 1196.

## Conclusion

As a paraconsistent process, -meaning that some local contradictions are admitted without the trivialization of the system-, symbiotic invention happens at the intermediary level between the concrete and the abstract, that is, the level of schemes. The possibility of reconfiguring behavioral schemes in anticipation of an event is an activity that pertains to the realm of imagination; these processes require the systemic analysis of the operational model of such an event, and of the organisms that interact within it, as much as an analysis of its symbolic coating. For an invention to expand itself towards the realm of the concrete, a process of amplification should take place. As mentioned above, Simondon tells us that our inventive images need to be as close as possible to a neutral state without being completely neutral, so they can be amplified towards the modulation of concrete dynamics. Images that are too emotionally charged or that are overtly stimulating cannot be easily mobilized towards concrete situations as inventive processes. In an optimal scenario, invention requires weakly polarized images that can be subtly introduced within concrete dynamics without causing aggressive alterations:

“...for invention to have the best chances of existing, an alternation of long durations (exploration, free manipulation) where the activity is weakly motivated, scarcely completed, and short durations (problematic situations) with a strong goal gradient is needed...”<sup>88</sup>

While the cultural controls of the MCWP continuously attempt to rigidify determinist structures, symbiotic invention takes advantage of plasticity and relationality. Even in its so-called ecological and conservation practices, the human technicity axiomatized by the MCWP disables the functioning of ecosystems and reduces biological diversity; meanwhile human technicity axiomatized by a biocultural holon —which constitution exceeds the MCWP— cannot be differentiated from the technical activities of other species. We thus consider that this model of human technicity is a constitutive factor of the magical unity, understood as an ecologically interwoven and intersubjective continuum. In the same way that human scale action constitutes ecosystems, the technical activities of non-humans compose human bodies and enable their functioning. But, taking into consideration this continuous

<sup>88</sup> Simondon, *Imaginación e invención*, 171.

enmeshment within the magical unity, how can new-to-the-world configurations emerge?

“If we consider the conativity of creation in the context of innovation, we can conceive the process of creation as the differentiation of a new-to-the-world identity that emerges from this undifferentiated materiality. We can conceive this process as the creation of an excess or surplus beyond undifferentiated materiality...”<sup>89</sup>

Differentiating symbolism impose radical distinctions upon the flow of construction. Afterwards, conventionalizing symbolism integrates them to such flow. In this interplay, a species' functional circle is structured, and the affordances that allow to apprehend an event, process or situation, are constituted; differentiating symbolizations thus, take a concrete situation drawn from the collective to constitute figurative formations through processes of particularization, while conventionalizing symbolizations re-merge such differentiations; non-conventional figurative constructions are collectivized in the act of conventionalization. The collective viewpoint or orientation of a culture, -meaning the way in which its members learn to experience the world-, is created through the alternation between acts of differentiation and conventionalization; both being simultaneous and reciprocal; the collective is differentiated as the individual is collectivized (Figure 3).

Within the MCWP, invention is enacted in very reductive forms, following the specific goals of accumulation and domination which disable the possibility of conducting innovative technical processes through an immeasurable creativity. Thus we have focused on conceptualizing a mode of invention derived from what Simondon referred to as the most simple invention; meaning that its axiomatics do not need to be constructed since they are delivered by the organism itself. This description has then been extrapolated as a metabolic coherence that results in an interwoven set of multi-species technical activities which constitute an ecosystem. We have referred to the role of the human within this process as a symbiotic inventor which enhances phenotypic plasticity through the modulation of the behavioral schemes of other organisms that may result in morphological alterations that can turn into evolutionary inheritance. As Lenkersdorf concludes: “we humans *are particular with specific functions, but we are not*

89 Vincent Blok, “The Ontology of Creation: Towards a Philosophical Account of the Creation of World in Innovation Processes”, *Foundations of Science*, (2022), 9.

*unique.*"<sup>90</sup>

Cultural inventions and their transmissions through social learning and symbolic language can lead processes of biological diversification. This results in a mosaic of ecosystems, which can neither be conceived as artificial nor pristine. We thus have questioned Simondon's universalizing notion that the emergence of technicity required a split from the magical unity; meaning a vital enmeshment between the human and the world. Simondon considers that human evolution is a linear process, and thus, according to him, the rupture from such a unity would have happened across cultures and societies in order for technicity, religion and aesthetic thinking to emerge. But the global trend towards homogenization has been particularized and diversely apprehended through the biocultural axiomatics of each locality; a result of the threefold intellectual and material link that humans establish with their environment as an inherent effect of building their niches.

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90 Lenkersdorf, "Relaciones interculturales entre los maya tojolabales", 3.

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