

# Neurophenomenology of Surprise

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In : N. Depraz & A. Celle, *Surprise at the intersection of phenomenology and linguistics*, John Benjamins, 2019

**Abstract :** A theory of the central nervous system was formulated recently, in general thermodynamical terms. According to it, the function of a central nervous system, and more generally of living autopoietic units, is to minimize « surprise ». The nervous system fulfills its task, and the animal maintains its viability, by changing their inner organization or their ecological niche so as to maximize the predictability of what happens to them, and to minimize the correlative production of entropy. But what is the first-person correlate of this third-person description of the adaptation of living beings ? What is the phenomenological counterpart of this sought state of minimal surprise ? A plausible answer is that it amounts to a state of « *déjà vu* », or to the monotony of habit. By contrast, says Henri Maldiney, surprise is lived as a sudden encounter with true reality, a reality that is recognized as such because it is radically unexpected. Surprise is a concussion for the brain, it is a risk for a living being, but it can be lived in the first person as an awakening to what there is.

Anticipating the chain of events of the environment is a condition of life ; but the breaking of its continuity, the disturbing surprise, opens the doors of existence. This can be taken as a short statement of an apparent gap between biology and phenomenology. Biology concentrates its studies on the adaptive routines of the living beings, whereas phenomenology is primarily concerned by the universal singularity of moments of experience, and recommends to see the banality of one's being-in-the-world as if it were for the first time<sup>1</sup>.

The documented divergence between biology and phenomenology however seems to pertain to values, rather than factual differences. Both disciplines are able to deal with singularity and regularities as well, but with two different priority scales.

Phenomenology represents a decision to cultivate systematically the state of maximal loss of landmarks called the “*epochè*”, and then to bring out the transcendental genesis of perception of objects, ordinary judgments, and scientific theories by reversing the direction of this loss.

By contrast, biology favors collective states of equilibrium that are easy to categorize, and accepts only marginally the isolated breakaway of organic structure. True, biology includes some correlates of astonishment or disruption ;

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<sup>1</sup> The project of phenomenology is to bring out : “ the exceptional character of any phenomenon when it is seen as it presents in itself beyond concepts, and not as constituted and reduced to the status of an object”. J.-L. Marion, *La rigueur des choses*, Flammarion, 2012, p. 151

but it tends to underrate them and to insist on accommodative power instead. The biological correlates of disruption are genetic or behavioral variations, together with increased distance from the optimal domain of viability of species. Such deviations invite individuals to take the risk of exploring the vast adaptive landscapes instead of sticking to the habits of their ecological niche. Thus, spontaneous variations are the indispensable conditions of natural selection and expanding fitness. But biology handles them reluctantly, as random, wild, and unruly events capable at most of pushing living beings towards this edge of chaos that has become their specific mark<sup>2</sup>.

A connection between biology and phenomenology can be envisaged at this point, and a mutual teaching of these two disciplines about the novelty of an event can be obtained. For instance, the reason why taking momentary distance with respect to the constraints of adaptation is often experienced as a welcome leap into the open space of existence, despite the threats heralded by the surprise of uncharted environments, may well be that this feeling of liberation is the lived counterpart of the capacity of phenotypic variations to promote the emergence of new forms in living organisms.

It is precisely in this spirit of mutual clarification of biology and phenomenology that I will now examine some neurobiological theories of cognition. I will not be satisfied with their insistence on the quest for recognition and repetition by the organism endowed with a nervous system, but rather analyze the rare references they make to the aftermath of major *deviations* with respect to stereotypes, and connect them with their most likely phenomenological correlate.

Since the most relevant theories of neurobiological function are indirectly derived from Von Uexküll's theory of "own-worlds" (*umwelt*), this will be the natural starting point of our inquiry. According to Von Uexküll, the own-world of each animal species is defined as a set of targets for coordinated actions that aim at fulfilling the needs of its members. Von Uexküll points out that an animal is able to "distinguish as many objects in its environment as there are actions it can perform"<sup>3</sup>. Actions are shaped by motor anticipations, and these motor anticipations in turn are presumptive shapings of a world into a collection of bio-behaviorally significant objects. The final sensation confirms or disconfirms the anticipation, and it either satisfies or disappoints the quest of a pre-determined meaning. In this framework of thought, surprise is the name of a disconfirmed anticipation, of a disappointed quest for meaning, of a brutal expulsion of the organism out of its own-world.

The existential tonality that corresponds to that, namely the genuinely *lived* surprise, is well described by Ludwig Binswanger<sup>4</sup>. His description starts with

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<sup>2</sup> S. Kauffman, *At Home in the Universe*, Oxford University Press, 1996

<sup>3</sup> J. Von Uexküll, *Mondes animaux et monde humain*, Gonthier, 1958, p. 55

<sup>4</sup> L. Binswanger, *Rêve et existence*, Vrin, 2012, p. 35-40

an extatic and blind expectation that abandons itself with trust to its embodied convictions. When the radically unexpected occurs, the ground gives way under the feet of the being who is moving forward ; its own-world is so to speak missing. What replaces that feeling-of-a-world after it has been lost, has the flavor of a vertiginous free fall that can be stopped only by a global reorganization of the *umwelt*, in such a way that the trauma is retrospectively categorized as an intelligible fact. However, another strategy can be used in order to react to the loss of categories ; a strategy that is diametrically opposed to the demand of new benchmarks. Indeed, the radical *epochè* of committed phenomenologists, and the enlightenment of contemplative practitioners, are tantamount to learning how to remain constantly in a state of lived free fall without fearing the disappearance of a firm practical world. The method for this alternative strategy is to universalize the state of surprise, to let oneself be surprised even by what was until now considered prosaic or commonplace.

Current neurocognitive theories add an important ingredient to Von Uexküll's sensori-motor definition of "own-worlds", namely the idea that the organism elaborates a kind of *intracerebral representation* of what it expects. These theories also supplement Von Uexküll's conception with a mathematical model of the varying distance between what is anticipated and what is met, and with a process of optimization by which the conditions for reducing this distance can be specified. Several mathematical formalisms have been used to this end, but I'll only retain one of them which is inspired from thermodynamics and information theory. The concept borrowed from thermodynamics is "free energy", that usually represents the fraction of ordered energy available for subsequent transformations into mechanical work. Free energy is obtained by subtracting, from total energy, its orderless and useless part, the latter being measured by way of another function called *entropy*. This traditional definition is then worked out by statistical physics, that replaces macroscopic quantities like energy and entropy with microscopic molecular variables with a probabilistic distribution. At the end of the day, probabilities themselves become central variables of the theory, and serve as a substitute of those variables of which they predict the frequency ; this shift then allows one to translate statistical physics in terms of information theory<sup>5</sup>.

A substitution of this kind is highly significant for the problem of surprise, and it can be better understood by relying on the "subjective" or "rational" conceptions of probabilities. According to the "subjective" conception, formulated by Bruno de Finetti<sup>6</sup>, a probability is a sort of intuitive valuation by which an individual who is immersed in a situation of uncertainty tries to

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<sup>5</sup> E.T. Jaynes, *Papers on Probability, Statistics, and Statistical Physics*, Reidel, 1983. Here, entropy is defined as negative Shannon information :  $S = -\sum_i P_i \ln P_i$ , where  $P_i$  represents the probability of a state of the system under consideration.

<sup>6</sup> B. De Finetti, *Theory of Probability 1*, Wiley, 1974, p. 69 suiv.

anticipate as precisely as she can what will happen next. According to the “rational” conception of probabilities, upheld by John Maynard Keynes<sup>7</sup>, probabilities are the degrees of belief that former knowledge would force *any rational subject* to evaluate about what will happen next. In other terms, one enters into a game of convergence/divergence between what is expected and what occurs by the mere fact of using the concept of probability.

But theoretical neuroscientists want to go beyond assessing the conjectures of a subject left in the background as if it were a *transcendental* subject. In agreement with their naturalistic tendencies, they wish to offer a detailed description of the anticipations that can be made by an *empirical* subject endowed with a manipulable brain. Accordingly, they consider two kinds of probabilistic functions and elaborate another function out of them in order to represent the *free energy* of brain states<sup>8</sup>. The first function depends on the probability that some given sensation occurs jointly with some given environmental circumstance that may cause it. Theoretical neuroscientists call it the probability of *perception* of this cause in the environment. The second function depends on the *a priori* probability, fixed by an inner representation of the brain, of this alleged causes of the sensation. And the difference of these two functions is a third function called the “free energy”. This being granted, the condition which is supposedly fulfilled by the organism and its brain, is the minimization of the free energy function. Now, what does such minimization mean exactly ? This is quite easy to understand, provided one notices that the former probabilities represent respectively : (1) the uncertain power of perceptive inference out of some sense data, and (2) the equally uncertain ability to mentally anticipate what is perceived. When the free energy function reaches its minimum, this means that one has reduced as much as possible the distance between the most probable cause of the sensation, and the cause that the model of the world elaborated by the brain predicts *a priori* with a given probability. In other terms, this means that the perceived configuration is not too different from what was anticipated by the brain. The authors of this theory consider in this case that the organism has minimized its *surprise* with respect to the environment ; and they point out that the said organism can survive, namely maintain itself within a homeostatic range, only this way. In their own terms “if agents minimize free energy, they implicitly minimize surprise”<sup>9</sup>. Along with this conception, the brain is considered as nothing else than a machine that purports to minimize surprise.

The former reflections however suffice to introduce an important limitation to

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<sup>7</sup> J.M. Keynes, *A Treatise on Probability*, Mac Millan, 1929

<sup>8</sup> K. Friston, « The free-energy principle : a unified brain theory ? », *Nature Reviews Neurosciences*, doi:10.1038/nrn2787, 2010 ; K. Friston, J. Kilner, L. Harrison, « A free energy principle for the brain », *Journal of Physiology (Paris)*, 100, 70-87, 2006

<sup>9</sup> K. Friston, « The free-energy principle : a unified brain theory ? », loc. cit.

the ideal of a mere *suppression* of surprise. The algorithmic surprise, as modeled by the functions that enter into free energy, never disappears. The task ascribed to the brain then does not consist in eliminating it completely, but, once again, to *minimize* it. Moreover, the process of minimizing surprise never comes to an end because surprise usually diverges from its smallest possible value. Surprise, including when it is theorized in a neuroscientific framework, is a massive and ineliminable fact. Life should be construed as an unended dialectic of divergence and normativity, of speechless surprise and efforts to overcome it by further categorization ; there is no real rest for life. How can the theory of neural free energy accommodate this permanent surplus of surprise<sup>10</sup> ?

According to this theory, a true environmental novelty, introduced by a geological accident, or by some unexpected competition, increases the neural free energy of the individuals of the species that happen to meet it. Hence, the first step towards minimizing the neural free energy of these individuals consists in actions aimed at changing their own environment by way of a migration to some new ecological niche. The individuals thus manage to substitute sensations suggesting perceptive inferences that do not fit with the brain's *a priori* anticipations, with new sensations that decrease this discrepancy. But a second step can be taken in order to minimize surprise, or brain's free energy, in members of the disturbed species. This further step consists in altering the field of *a priori* expectations of the brain, in order for it to assimilate new sensorial inputs that remain permanently remote from its former predictions. For that purpose, living organisms can either use the resources of their presently available neural plasticity, or they can adopt the path of genetic mutations that will increase the range of this neural plasticity. By the way, the latter strategy is likely to be the mark of hominization in the history of apes. However, one should not lose sight of the fact that the second step that has just been described depends on the first one, since the sensory inputs to be anticipated by the organism depend on the ecological niche. Adaptation, that consists in elaborating a structure of anticipation that nearly fits with what occurs, is guided and determined by the affordances of an environment that is partly imposed and partly chosen<sup>11</sup>.

Now, what about the phenomenological correlates of this process ? To begin with, the evolutionary and genetic aspects of the minimization of algorithmic surprise are likely to have no phenomenological correlate, because it is a collective and low-level process. But things are quite different when other components of the situation of surprise are considered. Taking refuge in a protective environment, or adopting a new pattern of behavior in order to avoid the damaging consequences of an excessive distance between events and expectations, is an individual move that is likely to have a lived counterpart. But

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<sup>10</sup> K. Friston, J. Kilner, L. Harrison, « A free energy principle for the brain », loc. cit.

<sup>11</sup> J. Piaget, *Le comportement, moteur de l'évolution*, Gallimard, 1976

the lived tonality of the urge to move is well known by the physicians who studied the consequences of cerebral injuries that decrease the capacities of anticipation and adequate reactions of their patients. This tonality is nothing else than anxiety : the anxiety which, according to Kurt Goldstein, “appears when the realization of a task that corresponds to the essence of the organism has become impossible”<sup>12</sup>. Sollicitations that were formerly trivial here become highly surprising and almost impossible to control, after certain cerebral injury have suppressed the rich activity schemes that once served as embodied anticipations. The patients who undergo these untamed sollicitations and who attempt in vain to cope with them by means of simplified schemes, first try to counter their own inability to elaborate an adapted answer by what Goldstein calls a “reaction of catastrophe”. Then, in order to avoid such a trauma, patients actively avoid to meet the unrecognizable situation<sup>13</sup>, or they react to it in an apparently inappropriate way that has no other function than to alleviate the anxiety that is connected to it. These reactions are tantamount to look for a narrower and more protective environment in which the cerebral deficiency have no harmful consequences.

But why should the lived quality of the unpredicted, of the uncategorized, of what eludes pre-conceived schemes, be *always* as negative as suggested by neuroscientists ? We all know, and I have alluded to that earlier, that this is far to be true in every case. In its felt dimension, surprise is often gratifying and exciting, as if it gave us renewed access to the vast reaches of open space, after a long stay in the security of the predictable. We are so shaken by it that we live again intensely, that we gain a panoramic lucidity and an ability to feel wonder, far from the routines that leave our empty mind permeated with the flavor of boredom. Our own-world may well crumble ; but its crack holds the promise of opening us to a new world. Our narrow-minded projects may well break down ; but hosting the unpredicted broadens the perspective of our future.

The capacity to welcome surprise, to redefine ourselves according to what it teaches us, and even to experience happiness in front of the unexpected, might well be definitional of a healthy psychical state. Conversely, an excess of fear in front of the unknown might be one sign of a psychotic state. The eudemonic disposition to accept novelties, to receive serenely the events that break a habit, is called “transpassibility” by Henri Maldiney<sup>14</sup>. According to the etymology of this neologism, transpassibility consists in knowing how to let oneself be infused passively by what is still unspoken and uncategorized : either the transformations of things, or the unfathomable spontaneity of our own actions, or the permanent metamorphosis of our fellow human beings. Let’s examine these three passivities in turn.

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<sup>12</sup> K. Goldstein, *La structure de l’organisme*, Gallimard, 1983, p. 251

<sup>13</sup> K. Goldstein, *La structure de l’organisme*, op. cit. p. 37

<sup>14</sup> H. Maldiney, *Penser l’homme et la folie*, Jérôme Millon, 2007, p. 304

Firstly, the passivity with respect to unanticipated changes of states of affairs feeds our feeling of reality. For the real is phenomenologically indistinguishable from what is merely *given*<sup>15</sup>, yet remains inexhaustible by the forms of our own conceptual framework (despite the possible idealizing *hybris* of scienticism). As Maldiney pointed out, “surprise is the mark of reality ; the real is what is unexpected, what *cannot* be expected, and what has been there for ever as soon as it has appeared”<sup>16</sup>.

Secondly, a sufficient dose of passivity with respect to this opacity to ourselves that we interpret as freedom, is a preliminary condition to recognize ourselves as agents of our own acts. Even if I have not deliberated before I do this gesture, even if I remember so little to have wished it that it looks surprising to myself, I have seen its inexorable development out of my dance of movements in space, I have felt its emergence in me and by me, and I therefore accept it as *mine*. It then becomes mine, it is covered by the dome of my responsibility, and I become the self-recognized subject of this gesture.

Finally, our benevolent passivity towards the incomprehensible aspects of our alter-egos’ behavior is what enables us to establish fruitful personal relations. Emmanuel Levinas helps us to understand this by highlighting a contrast between our relations with others and our thought about scientific objects. “The object of knowledge, he writes, is always done, it is already done and outran”<sup>17</sup>. The theoretical object locked up in its formal definition, endowed with well-identified properties, is a *fact*, in latin *factum* which means “done”. An object is past and fixed even when one considers its future vicissitudes since, according to science, the latter unfold predictably according to laws that were enforced once and for all. The scientific object is (or should be) what no longer interpellates us, what no longer worries us or delights us with surprise, and only presents what we have allowed it to show in the framework of the rules prescribed by our pure understanding. When it no longer fulfills its anticipative function within a theory that presupposes it, a scientific object can disappear during a paradigm shift, and be replaced with another object with a larger amount of predictability.

In deep contrast with the object of science, the alter-ego is constantly present, not past, because she is “called to the word”<sup>18</sup> : she must be *here* in order to produce herself in the discourse she is voicing presently and in the acts she is sketching now. Indeed, being a person, she is not restricted to what can be recorded of her behavior, she does not reduce to her body and to its past

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<sup>15</sup> “What should mobilize philosophy are the areas of lawlessness, where one can no longer impose a process of pacification by way of objectification, where unpredictable things or ‘events’ occur”. J.-L. Marion, *La rigueur des choses*, op. cit. p. 139

<sup>16</sup> H. Maldiney, *Penser l’homme et la folie*, op. cit. p. 257

<sup>17</sup> E. Lévinas, *Totalité et infini*, op. cit. p. 65

<sup>18</sup> *ibid.*

activities, but she extends towards what she can now *decide to be*. Her present creativity breaks the solid box in which one wished to enclose what happens, and melts the walls erected by our classification of things. She forces us to pay renewed attention to what is still undecided and inventive, beyond our attempt to set limits on it and to render it predictable.

According to Henri Maldiney, the schizophren lacks these three transpassibilities, she lacks these three modalities of our ability to welcome surprise. The schizophren is forever immune to events, since her power of acceptance of novelties seems to have been annihilated in her past by a unique unacceptable event<sup>19</sup>, by a confusion between her own movements and the movements of things<sup>20</sup>, or may be simply by the immensity of the event of *Being*. The events of the world, the renewed event of the gush of oneself, and the event of meeting the other, are no longer acceptable to her. Being closed to the surprise of what comes to her from the world, the schizophren suffers from a feeling of derealization, that sometimes takes a demiurgic tinge, according to which reality is in fact only her production. Being closed to the surprise of her own spontaneity, the schizophren objectifies herself into several hallucinated characters that dictate her behavior. According to Maldiney, the psychotic tends to freeze any project into an object<sup>21</sup>. The project of being and doing has been stripped of its creativity, and ossified into stereotyped voices that demand obedience from the schizophren, thus imposing her a depersonalization. Being also immune to the surprise of her confrontation with the others, the schizophren often suffers from a progressive withdrawal from social life<sup>22</sup>.

The healthy ability to welcome surprise, the openness to the unknown, can also be associated to neural correlates. In the theory of cerebral function that has just been stated, we have seen that one of the factors that allow us to come back to a region of low free energy after some environmental factor has increased this variable, is neural plasticity. More generally, the living being does not content itself with trying to incorporate environmental anomalies to its preestablished schemes. It transforms its anticipatory schemes in order to perceive these anomalies as meaningful, or it broadens them enough to be able to react efficiently to increasing changes in the environment. Accommodating surprise here means being capable of a kind of self-transformation that offers better opportunities. The delight of surprise is understood in this case as expressing a promise of amplification of one's own-world, a perspective of proliferation of meaning off the beaten tracks, or even, why not, a vision that announces the generalized meaningfulness of the raw presence of being.

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<sup>19</sup> H. Maldiney, *Penser l'homme et la folie*, op. cit. p. 230

<sup>20</sup> P.-H. Castel, *L'esprit malade*, Ithaque, 2009, p. 125-126

<sup>21</sup> H. Maldiney, *Penser l'homme et la folie*, op. cit. p. 227

<sup>22</sup> S.R. Hirsch & D.R. Weinberger, *Schizophrenia*, Wiley, 2003, p. 481

We can also remember that, according to one of the most widespread neuroscientific theories of consciousness (the global neuronal workspace theory<sup>23</sup>), routine mental or motor activities are determined by more or less autonomous localized areas of the cerebral cortex. The motor schemes of *habit* have no access to the associative areas and extended synchronized neural activities that unify the information coming from specialized areas. Now, the activation of this crossroad called the “global neuronal workspace” is associated with the possibility for a subject to provide a verbal report of what she has experienced during a certain episode, as well as with her ability to reflect on it. This explains why an activated global neuronal workspace is usually taken as a neural correlate of *consciousness*. Even though considering the neural global workspace as a spatio-temporal locus of phenomenal consciousness is disputable, its connection with the possibility of reflection, binding of information, verbalization, and episodic memory (which partake of the function of access consciousness) is well established. From a phenomenological standpoint, one easily sees what is at stake here. The usual activities, the beaten tracks, the repetition of identical actions, do not mobilize attention ; they are done in distraction, in forgetfulness of what is only an indifferent token in a long series, and consciousness then evades towards *imagination* that feeds it better by its fantasies. Only the surprising circumstances, the meetings that catch us unexpectedly, are striking enough to wake up our interest, to become objects of a reflection, and to be retained as something that really *happened* to us. Surprise arouses the feeling of existing, of being challenged, of having to answer creatively with all our resources rather than automatically.

Whereas in habit and ease, we step forward like hollow passers-by moving through a stereotyped own-world, surprise transforms us into subjects of a world offered to discovery, subjects that gain a true biographical identity, since only true *events* are narrated.

Until now, however, we have restricted ourselves to relatively moderate states of surprise, in a phase of retrospective digestion. What can we say of the generative constraint that unites neural processes and phenomenological description when the surprise is extreme, sudden, unable to be assimilated, or merely too recent to have been recategorized ? To explore the neural correlate of the sudden occurrence of some sensory event, one often uses the “evoked potential” technique<sup>24</sup>, which consists in adding many electroencephalographic patterns after having repeated a constant stimulus, and obtaining an average signal that displays the specific reaction of the brain submitted to such stimulus.

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<sup>23</sup> S. Dehaene, J.-P. Changeux, & L. Naccache, « The global neuronal workspace model : from neuronal architectures to clinical applications » in : S. Dehaene & Y. Christen (eds.), *Characterizing Consciousness: From Cognition to the Clinic?* Springer Verlag, 2011

<sup>24</sup> J. Vion-Dury & F. Blanquet, *Pratique de l'EEG*, Masson, 2008

This highly dynamical technique, that differs from the neurofunctional and neuroanatomic methods such as fMRI, has the interest of capturing neural processes in their development and to have an excellent time resolution. The auditory evoked potential can then be analyzed in three main components that follow each other during an interval of ten to several hundreds of milliseconds after the sound : the short-term, average-term, and long-term components. Each one of these components can be associated (in the normal awoken subject) with the activity of three brain areas. The short-term component corresponds to the nervous conduction of signals along the brainstem ; the average-term component corresponds to the activity of the auditive primary sensory area of the temporal lobe ; and the long-term component corresponds to the activity of the associative area around the frontal lobe. In the early period, when the stimulus has just been imposed, the only activated regions are the brainstem and the primary sensory areas of the cortex. The operations of categorization, and the connection with the personal history of the subject, which both involve the associative areas, have not yet been initiated.

Now, what kind of experience is associated to these early neurological processes following a sudden and intense stimulus ? According to the standard position, there is no such experience at all : the moment of extreme initial surprise (not to say the germinal shock) must be entirely unconscious since it is not yet integrated into the global neural workspace. But some alternative neuroscientific theories of consciousness tend to question this hasty claim. According to them, each cerebral activity, even when it is narrowly localized, even when it is restricted to a primary sensory area of the cortex, is likely to be associated to some sort of elementary experience. If we accept that possibility, what is it like to experience a formless, uninterpreted and unexpected sudden episode, beyond the mere bodily start ? Some classical texts can be read as a tentative answer to the latter question. The impact of the sensory, as described by Hegel in the first chapter of his *Phenomenology of Spirit*, or by Husserl after a reductive unweaving of perceptive experience able to give us contact with its “matter” or “*υλη*”, is a moment of *compulsion*, of *undifferentiation* of an appearance that is both unanticipated and unintegrated into a history ; and also a moment of pure *immediacy*, in the relational and temporal sense of the term. Let me then explain the words that have just been used : dumbfounderment, undifferentiation, and immediacy. Dumbfounderment is used to mean that at the very moment in which a high intensity sensory event occurs, nothing else is left in the field of what appears. Undifferentiation is the analytic translation of dumbfounderment, since it implies that the singularity of the sensitive episode is absolute, that there is no difference or no contrast between it and anything else, that nothing allows one to posit a determination that would be grounded on the negation of what it is not. Immediacy in the relational sense expresses the felt isolation of the sensitive event, the absence of any preparation (of any mediation) of its sudden outbreak, the lack of any connection with a network of

present or retrospective facts that would allow one to formulate a *judgment* about it. Finally, the immediacy in the temporal sense refers to the short-lived actuality of the sensory impression, to its manifestation precisely *now*. But, as Simplicius, the neo-platonician philosopher of the sixth century, pointed out, "... the now, being indivisible, is already in the past while being spoken and apprehended"<sup>25</sup>. Conversely, now can be localized in no moment of time as long as it is neither spoken nor apprehended. Experiencing a sensory flash then excludes any (reflective) realization that it is occurring, since realizing this would require to detach it on the background of what it is not, namely on the background of a later moment from which it appears as having occurred just before. Experiencing without realizing that one experiences, coinciding so well with experience that the distance required by realization is missing : this is the first-person aroma of the isolated and sudden sensory impression.

These features are sufficient to sketch the picture of an extreme and yet quite frequent experience. The experience of sensory surprise, of a lighting of advent, is so powerful that there is no retrospect from which it can be noticed. It breaks former conceptual frameworks, leaving nothing in its wake. It is simultaneous with bewilderment, and the *nothing* of radical disorientation is the very first breach it makes when stupor is just starting to decrease. But according to Maldiney, the said *nothing* is itself an "... event from which all the dimensions and the rays of the world irradiate". From this *nothing* of disarray, "... the existant irrupts to itself in the surprise of being"<sup>26</sup>. The first existential flavor of this nothing hollowed out in the aftermath of the sensory commotion is that of unspecific anxiety, since it looks impossible to find one's bearings after the conceptual form of an own-world has been destroyed by its compulsory presence. Besides, as it has just been suggested, this nothing does not reduce to dumbfounderment : it represents a further phase after the extreme surprise has taken place, because it is openness, dehiscence, unperceptible detachment with respect to what has just occurred, and it therefore clears a boundless space for any future possibility. Maldiney's *nothing* represents the amazed absence of prejudice that has been digged by the storm of the event, and it thus allows world-reorganizations and readiness to new judgments. Just before that, however, the *nothing* drills a short, usually unnoticed, access to the ultimate surprise of *suchness*. Since there is nothing that can be identified and recognized, things manifest pristinely as they are<sup>27</sup>. This given manifestation is

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<sup>25</sup> Simplicius, *Categories*, 352, 24, quoted by S. Sambursky et S. Pines, *The Concept of Time in Late Neoplatonism*, Israel Academy of Science and Humanities, 1971. R. Sorabji, *Time, Creation, and the Continuum*, Duckworth, 1983

<sup>26</sup> H. Maldiney, *Penser l'homme et la folie*, op. cit. p. 232-233

<sup>27</sup> H. Clerc, *Les choses comme elles sont*, Gallimard, 2011 ; Dôgen, *Shôbogenshô 4*, Sully, 2009, p. 81; F. Bertossa, R. Ferrari, & M. Besa, « Matrici senza uscita. Circolarità della conoscenza oggettiva e prospettiva buddhista », in: M. Cappuccio (ed.), *Dentro la Matrice, scienza e filosofia di The Matrix*, Alboversorio, 2004

clearly out of reach of any anticipation, for the obvious reason that anticipating means going beyond what is given.

It is precisely at this point that neurobiology is seen to be no longer relevant. Indeed, neurobiology is itself a conceptual framework that partakes of our civilizational *own-world*. True, it allows us to identify a physiological correlate of the state of shock and disorientation that follows a sudden sensory stimulation. But this apparently empirical status of the precondition of the empirical, this attempt at conceptualizing the aconceptual, this project of gathering the entire space of possibilities in a special location of the system of rational coordinates, is completely foreign to the phenomenological and gnoseological meaning of surprise. From a phenomenological standpoint, surprise is not an object of thought among many others, but a radical challenge to the claim of universality of objectification. Surprise is not something that happens to somebody ; it rather forces this somebody to fuse with what happens at the moment of its occurrence. From a gnoseological standpoint, surprise is not a topic of knowledge among many others ; it replays the drama of the origin of knowledge, it brings us back to the fundamental deficiency and bewilderment that once impulsed the project of knowing. Then, far from being clarified by neuroscientific knowledge, surprise allows us to come back for a short moment to the fertile ground and the existential motivation of our desire of objective knowledge, of which the advances of neurobiology are only one aspect among many others.