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LEIB AND TECHNOLOGIES: RELATIONS AND CO-FOUNDATION

LEIB Y TECNOLOGÍAS: RELACIONES Y CO-FUNDACIÓN

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Abstract: The aim of this paper is to study the relation and the co-foundation between the living body [*Leib*] and technology in a Husserlian approach.

I want to assert the necessity of abandoning the classical concept of the *Leib* as a naked and natural being, constituting itself by its biological features.

Studying the action of technology, firstly as mere extension and secondly as incorporation, the co-foundational relation between technology and *Leib* will be evident. However, even if there is a cultural and historical foundation, there remains the necessity of a natural *Leib* being the base of the subject's practical level. *Leib* appears to be natural and cultural at the same time, it depends on what you are looking for.

Key Words: Living body | Technology | Post-phenomenology | Husserl

Resumen: El objetivo de este trabajo es estudiar la relación y la co-fundación entre el cuerpo viviente [*Leib*] y la tecnología desde una perspectiva Husserliana.

Quisiera afirmar la necesidad de abandonar el concepto clásico del *Leib* como un ser desnudo y natural, constituyéndose a sí mismo por sus características biológicas.

Estudiando la acción de la tecnología, en primer lugar como una mera extensión y después como una incorporación, la relación co-fundacional entre la tecnología y el *Leib* se hará evidente. Sin embargo, aunque exista una fundación cultural e histórica, permanece la necesidad de un *Leib* natural que sea la base del nivel práctico del sujeto. *Leib* resulta ser natural y cultural al mismo tiempo, depende de lo que se esté buscando.

Palabras clave: Cuerpo vivo | Tecnología | Post-fenomenología | Husserl

INTRODUCTION

Husserl's phenomenology takes into account the constitution of the object and of the subject through technology only marginally. Even if it studies the perception of an object very deeply, it leaves out the technological apparatus used to obtain such a perception. The things give themselves, accordingly not to the subject's natural living body [*Leib*] only, but even in accordance with the

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technology the subject is using or can use in order to "reach" a better richness of the given. The object is constituted by technology and thus the subject's *Leib* has to be modified in some way by this usage. This paper focus the attention exactly on studying this effect.

THE CONCEPT OF *LEIB* IN HUSSERL

The concept of *Leib* in Husserl's phenomenology is one of the key elements on which his philosophy focusses on the second part of his life. His works *Ideas II*[1] and *Ideas III*[2] can be seen as an attempt to study the *Leib* in its relations among world, materiality, psyche and subject.

In order to study how technologies interact with our *Leib*, we need to introduce it in the way Husserl used such a term.

The *Leib* is always opposed to *Körper* and it has an inner duplicity.

It is the connecting point between the world and the subject in the sense of the "Cartesian" subject. The subject has a body to live and act in the world and this body is the *Leib*.

The *Leib* can be seen as physical and "alive". "Hance the Body is originally constituted in a double way: first, it is a physical thing, *matter*; […] Secondly, find on it, and I *sense* "on" it and "in" it"[3].

That is the reason why Husserl identified the matter as opposed to the union between *Leib* and psyche and not between the matter and one of these two elements taken singularly. If he had opposed the matter to the psyche, he would have induced to suppose that the *Leib* was "mere" matter. Otherwise, if he had made the opposition between the matter and the *Leib*, it would have signified that the *Leib* is something purely psychic detached from the world.

> what we have to oppose to material nature as a second kind of reality is not the "soul" but the concrete unity of Body and soul, the human (or animal) subject.[4]

1 Edmund Husserl (1989). *Ideas pertaining to pure phenomenology and to a phenomenological Philosophy. Second book: Studies in the phenomenology of constitution*. Kluwer Academic Publisher.
2 Edmund Husserl (1980). *Phenomenology and the Foundations of Science: Third Book, Ideas Pertaining to a Pure Phenomenology and to a Phenomenological Philosophy.* Martinus Nijhoff.
3 Husserl (1989), *Ideas. Second book*, op. cit., p. 153.
4 *Ibidem*, p. 146.

This duplicity yields the possibility of having a *Leib* with physical aspects. Our body has a colour just as every other object around us and so the *Leib* has the same physical characteristic of any other *Körper*.

The *Leib* can be seen as a "mere" object among other objects and it can be touched as in the case the subject who "touches" a part of their body. This part becomes the touched part and it acquires physical qualities such as "smooth" or "rough", or such as "cold" or "hot".

However, it is only a surrogate of what the *Leib* is. The *Leib* can be perceived as an object with its physical qualities, but at the same time it is perceiving and it cannot be reduced to such physical qualities because it is something which receives the tactual stimuli of the other touching hand. It is not a physical body, a *Körper*, which is touched by the hand of the subject, but it is a part of their *Leib* which has sensations. "If I speak of the physical thing "left hand," then I am abstracting from these sensations [touch-sensations] […] If I include them […] it becomes Body, it senses."[5]

Thus, as we can see, the concept of *Leib* since the first introduction implies a duplicity which allows it to be something in between. Something which connects the psyche and the matter. The distinction between *Körper* and *Leib* is this duplicity.

There is another distinction we should highlight. We can move our *Leib* and we can act with it. Therefore, the *Leib* concerns two more important aspects:

1. It is active because the subject acts with it.

2. It is passive because it is a material object like the others and it is sensitive to the stimulation of other objects around it.

Thus, introducing the movement of the subject as a mere movement or as an element which shows an underlying volition, we have three ways of having sensations.

Firstly, we can have sensations because our *Leib* "touches" a *Körper*. That is an action of the subject toward an external object.

Secondly, we can have sensations because our *Leib* touches a *Körper* because the object hits us. In this case there is not an action of the subject toward the object, but it is a passive stimulation of our *Leib*.

5 *Ibidem*, p. 152.

These two kinds of sensations are related to the fact that we are *Leibs* among *Körpers*. However, there is one more kind of sensation.

We have sensations related to our *Leib*'s movement. When we move, we feel a kinaesthetic sensation related to our movement. We feel sensations when our body moves.[6]

Having introduced the main differences between *Leib* and *Körper* we can start to think about how the technology relates to the subject.

RELATIONS BETWEEN BODY AND TECHNOLOGY

Considering the instruments first as being part of the whole system which allows the subject to live in the world, we can analyse the kinds of relations that connect the subject to the world through a technological mediation.

There are two different types of bodily enlargements which enable us to enlight contrasts[7] in the world: the embodiment and the hermeneutic enlargements[8].

> People can *incorporate* technologies, as when wearing a pair of glasses which one does not look *at* but looks *through*. Other technologies we have to read, in the way that a thermometer gives information regarding temperature or an ultrasound machine gives a picture of an unborn child.[9]

In Ihde's opinion there are two additional types of relations, the alterity and the background relations. However, we will consider the embodiment relations only because they are the ones more related to the "natural" *Leib*.

6 On the Kinaesthetic Sensations see Edmund Husserl (1997). *Thing and Space.* Kluwer Academic Publishers, § 49; Berry Smith and David Woodruff Smith (1995). *The Cambridge Companion to Husserl.* Cambridge University Press, p.198; John J. Drummond (1975). *Presenting and Kinaesthetic Sensations in Husserl's Phenomenology of Perception.* Georgetown University; John J. Drummond (1979). "On seeing a material thing in space: The role of kinaesthesis in visual perception", in *Philosophy and Phenomenological Research*, 40.

7 We consider the contrast as a fundamental element according the Husserlian analyses carried out in Edmund Husserl (2001). *Analyses Concerning Passive and Active Synthesis: Lectures on Transcendental Logic*. Kluwer Academic Publisher, §§ 27-31.

8 We use the classical distinction between embodiment and hermeneutic relations made by postphenomenology. See Don Ihde (1990). *Technology and the lifeworld. From garden to earth*, Bloomington, Indiana University, p. 87.

9 Verbeek, P. P. (2009). *Philosophy of man and technology*, url: http://www.utwente.nl/gw/wijsb/organization/verbeek/oratie_eng.pdf .

EMBODIMENT RELATIONS

This kind of relation includes any possible bodily enlargement, as it is generally understood. Every tool, that allows an object to perceive without becoming a perceived object itself, is considered a body's enlargement. The tool "withdraws", allowing the perception to flow through it and to point at the "external" object without any interposing hindrance that would produce the stagnation of this flow in the technological device itself.

The perception of the tool causes the instantaneous loss of the "external" object, as it occurs in Husserl's example of the hand that turns from "touching" into "being touched". The tool is "touching", when the focus is directed outwards to the object; the tool is "touched" when the focus is on the "perceiving body".

Ihde schematises this connection as an intimate relation arising in a nucleus including subject and technology and directed to the world. This nucleus points at the world as a whole, as though there were only the subject and not the binomial subject-technology[10].

(Human-Technology)→ World

The subject lives in such a "symbiosis" with the technological instrument that he is directed to the world as if there were not any mediation.

> My glasses become part of the way I ordinarily experience my surroundings; they "withdraw" and are barely noticed, if at all. I have then actively embodied the technics of vision. Technics is the *symbiosis* [my emphasis added] of artifact and user within a human action.[11]

We can use the glasses-example as elucidation on the focal points of this kind of relation[12], the subject, wearing glasses on his nose, sees the tree in front of him and at the same time perceives the background. Glasses are a

10 Don Ihde (1990). *Technology and the lifeworld*, op. cit., p. 86.
11 *Ibidem.*, p. 73.
12 We use this example not because it represents a clear case, but only because it is an example used by both, by Ihde (*ibidem.*, p. 73) and Husserl (1989), *Ideas. Second book*, op. cit. p. 69, and it represents a touching point between these two authors.

transparent medium[13]. They are transparent not because of their transparent lenses, but because their level of intrusivity into perception is minimal and they allow an almost perfect penetration. Glasses do not stop perception but let it flow on towards the object, so that the subject's intentionality is directed to the object and not to the tool[14].

Transparent though it may be, the tool is still a medium and, as such, it necessarily modifies perception.

The modifications due to using glasses are not intrusive and quite barely observable. Such a mediated perception may be considered as providing just a richer definition of the object. Only by analysing more "opaque" tools we can have a clue of the possible modification of perception, i.e. we can understand how using tools can modify perception.

Considering then a more opaque tool, such as the telescope used by Galileo for his discoveries, we notice that it "withdraws" at a lesser degree. In fact, watching through telescope cannot be related to naked perception, since seeing through this kind of instrument does not provide only a magnification of the object, but also a loss of depth, which does not make it possible for the observer to repeat this kind of perception in "normal" conditions, i.e. from a closer point of view. Nevertheless, we cannot consider the magnification as a mere dislocation of the eye in another position closer to the object. As Ihde highlights, every "magnification" produces also a "reduction" which in this case affects the depth of field[15].

In conclusion, the focal point is the tool's act of "withdrawing" and the possibility of the perception to flow through it, pointing directly at the object. Perception is mediated, but can still be considered direct.

EFFECTS OF MEDIATION

13 The body can become "opaque" in the same manner of an instrument. See Richard Zaner, M. (1981). *The Context of Self: A Phenomenological Inquiry Using Medicine as a Cure,* Ohio University Press, p. 48.
14 Obviously coloured or broken lenses reduce the tool's transparency, because – for instance – in the first case the perceived object assumes a hue due to the mediation of the lens colour. Ihde takes into consideration even the presence of dust on the lens as a phenomenon completely on the background.
15 There is a wide anecdotage about Galileo's difficulties in convincing his contemporaries that the stain of colour perceived through the telescope were exactly the same stain of colour perceived by the naked eye. For this reason Ihde points out how Galileo invented a new way of seeing.

The use of technology as perceptual medium implies a modification of the intentionality. Ihde frequently points out that technology expresses its own intentionality. But how is it possible? Of course we cannot consider intentionality as arising out of technology, but we have to take account of the possibility of a change in the direction of the subject's intentionality. Technologies, becoming perceptual media, produce modifications in the surrounding world.

> Technologies are *relativistically* transformational and whatever knowledge we gain through them *reflexively* transforms the world which we discover through them and the embodied beings which we are in using them.[16]

The concept of intentionality used by Ihde requires a closer analysis on account of two important aspects that it entails[17].

The first aspect is related to the need of having a kind of directionality towards some aspects of the world. Using an instrument may modify some world's aspects and, consequently, perception as well. For instance an acoustic device could manipulate contrasts, producing a modification to background and foreground sounds[18].

The second aspect concerns the mediation itself, as produced by the use of a particular technology. Instruments shape the way they are used, by suggesting and evoking[19] one particular use[20]. We can notice here that even the use of a tool is mediated by the type of instrument we use. LATEX writing style is not the same as that resulting from using a ball-pen, not only because of the different shape of the written graphemes, but also in the way the subject approaches and structures the writing text. The subject himself is constituted depending on the way he uses a particular technology, which shapes and moulds him. For that reason Verbeek, quoting H. Baudet[21], highlights the pedagogical use of the

16 Ihde, D. (1997). "The structure of technology knowledge", in *International journal of technology and design education*, 7, p. 74.
17 Verbeek identifies three kinds of intentionality, but only two of them are interesting for our analysis. See Peter-Paul Verbeek (2005). *What things do. Philosophical reflections on technology, agency, and design*, Pennsylvania, Penn State University Press, p. 116.
18 See Don Ihde (1990). *Technology and the lifeworld,* op. cit., p. 103.
19 See Peter-Paul Verbeek (2005). *What things do*, op. cit., pp. 114-115
20 Every instruments has its instruction's book (*ibidem*, p. 115) that, in a wide sense, teaches the subject the "right" use.
21 Ernst Baudet, H. P. (1986). *Een vertrouwde wereld: 100 Jaar innovatie in Nederland*, Amsterdam, Bert Bakker.

"old" pen with respect to the "new" ball-pen: the old one represents a "general social discipline"[22].

What turns out be clear is the necessity of considering the use of technology not as neutral, but as structuring perception and even subjectivity[23].

THE BODY SCHEMA

Leib's enlargement through technology entails some modifications of our body as well as, consequently, of the external world. Our surrounding world is modified and moulded by our capacity of action. The concept of "zero point" supplied by the body is not to be considered as a theoretical aspect of the subject. In this context the "zero point"[24] does not represent the origin of geometrical axes determining an objective space, but it rather means the "here" of the subject in a practical sense, i.e. the fulcrum where the subject's actions start from. It is the "zero point" of the "Ich kann", as the point of application of every capacity and every possibility of the subject's action[25].

We could here discuss Husserl's heavy heritage on Merleau-Ponty concept of "body schema", but more importantly we shall focus on how any possible bodily enlargement can radically modify the surrounding world added to the subject. We shall thus employ the term "body schema" to understand this mechanism[26].

22 Peter-Paul Verbeek (2005). *What things do*, op. cit., p. 115.
23 There are also three further distinctions according to different relations of intentionality, as Verbeek highlights: cyborg intentionality (Verbeek, P. P. (2008). "Cyborg intentionality: Rethinking the phenomenology of human-technology relations", in *Phenomenology and the cognitive sciences*, 7.3, pp. 390-392), composite intentionality (*ibidem*, p. 393) and reflexive intentionality (Verbeek, P. P (2004). "Beyond the Human Eye: Technological mediation and posthuman vision", url: http//doc.utwente.nl/54460/1/peter-paul_verbeek.pdf)
24 Husserl (1989), *Ideas. Second book*, op. cit., p. 158. See Jan Almäng (2007). *Intentionality and intersubjectivity,* Acta Univ. Gothoburgensia, 210 S., p. 141.
25 It becomes clear how this conception makes closer the Husserlian work to the Merleau-Ponty's philosophy, where the bodily spatiality is conceived as a space of situations and not as a space of places. "Et en effet sa spatialité n'est pas comme celle des objects extérieurs ou comme celle des 'sesations spatiales' une *spatialité de position*, mais une *spatialité de situation*" (Maurice Merleau-Ponty (1945). *Phénoménologie de la perception.* Éditions Gallimard, p. 531, p. 116).
26 For an historical analysis of this term see Peoeck, K. / Orgass, B. (1971). "The concept of the body schema: a critical review and some experimental results", in *Cortex,* 7.3. Many mistakes in Meleau-Ponty's translated works have generated a series of interpretative misunderstandings (See Shaun Gallagher (1995). "Body Schema and Intentionality", in *The body and the self,* José Bermudez, L. / Anthony Marcel / Naomi Eilan (eds.), Cambridge / London, MIT Press, pp. 225-244; Carman, T. (1999). "The body in Husserl and Merleau-Ponty", in *Philosophical Topics,* 27.2, p. 205).

The concept of "body schema" should not be confused with the one of "body image", because the latter is referred to the conscious processes by the subject[27]. We can say that, while the first represents the bundle of a series of completely unconscious automatisms that makes the subject's actions possible, the second represents their conscious counterparts[28] including the intentional and conscious directionality of each act as well[29].

When a subject grabs an apple laying on the table in front of him/her, he/she does not pay attention to the hand's movements, but his/her attention rather focuses on the apple. The hand moves unconsciously and fluidly to the apple. Similarly a pianist, while he/she is playing, does not worry about how the fingers are moving on the keyboard, and the "expert" writer, writing a text on the keyboard, does not worry about keys's position, but his/her fingers run automatically. The tool's embodiment inside our body schema makes its use completely unconscious, in the same way of a hand's movement grabbing the apple on the table. The instrument becomes one of our parts in the sense that we use it unconsciously and our intentionality is directed through it, as it is the case for bodily parts[30].

> Importantly, after training in tool use, the receptive fields of these neurons expanded and finally included the entire length of the tool, suggesting that now the neurons represented the space that was accessible with the rake.[31]

It is clear then that the body modifies and influences any "action"[32] in the world[33]. Hence it is also clear that the enlargement of the body schema implies

27 What is reproved to Husserl is to have not considered the unconscious aspects of the action and so to have considered only the body image.
28 See Shaun Gallagher (2005). "Dynamic models of body schematic processes", in *Body Image and Body Schema: Interdisciplinary perspectives on the body*, Helena De Preester / Veroniek Knockaert (eds.), Amsterdam / Philadelphia, John Benjamins Publishing Company, pp. 233-250.
29 On this point is interesting how Gallagher considered the body schema as a "pre-noematic" component (See Shaun Gallagher (1995). "Body Schema and Intentionality", op. cit.), not because it is important to consider it as internal to the Husserlian terminology nomatic/noetic, but because it gives the ideas of something that places itself before any conscious intentionality of the subject.
30 The enlargement of the body schema is also confermed by neurosciences's studies on bimodal neurons' operation. This phenomenon can be seen in the neuroscience as a modification of the peripersonal space according to the technological device used. Our peripersonal space is modified by the usage of some instrument, such as a stick. Experiments demonstrate that we have a space around us where objects are perceived as "reachable" (see Farnè, A. / Serino, A. / Làdavas, E. (2007). "Dynamic size-change of peri-hand space following tool-use: determinants and spatial characteristics revealed through cross-modal extinction", in *Cortex,* 43.3).
31 Don Ihde (1990). *Technology and the lifeworld,* op. cit., p. 30.
32 In addition to the "action" we need to consider also the volitional aspects and their enlargement. "A *tool* is an enlargement of the animate organism, namely, when it is "in use." It is not only an enlargement of the sensing animate organism, but also of the animate organism as *organ of will*"

a modification of the world. As the world organizes itself, from a practical point of view, under the possibility of an "Ich kann"[34], the body schema's enlargement yields a modifications of the world, since the subject's "Ich kann" itself is modified. "The potentialities of the body schema also determine aspects of the external world, as they are experienced"[35].

Exploiting and distorting Aesop's novel about the fox and grapes, Ihde[36] remarks that a man with a rake would have considered the grapes unripe because he could have reached them[37].

In more detail the use of the instruments makes the constitution of the object wider and more open. The contrast in the world is no more perceivable by the sense organs inside the so called body's "common" constitution, but they are liable to a wider range of sensibility. The glasses show the particularities of the object offering an otherwise lost richness of details. Radiotelescopes provide images that are otherwise invisible to the human eye. "Instruments are the means by which unspoken things 'speak', and unseen thing become 'visible'"[38].

TYPES OF BODY SCHEMAS

Our "Ich kann" should not be considered as an undifferentiated whole; few distinctions may be introduced on the basis of the goals of the action. The commonly employed examples by Merleau-Ponty have different features intertwining one into the other. There are two "classical" examples: the cane of a blind man and the feather on a lady's hat.

(Husserl (1980), *Ideas. Third book*, op. cit. p. 6).

33 I.e. the possible enlargement of the Husserlian "Ich kann".

34 See Elizabeth Benke, A. (1996). "Edmund Husserl's contribuition to phenomenolgy of the body in IdeasII", in *Issues in Husserl's Ideas II (Contributions To Phenomenology),* Thomas Nenon / Lester Embree (eds.), Vol. 2, Dordrecht / Boston / London, Kluwer Academic Publishers, Chap. 8, pp. 135-160, pp. 144-145.

35 Philip Bray (2000). "Technology and embodiment in Ihde and Merleau-Ponty", in *Metaphysics, Epistemology, and Technology (Research in Philosophy and Technology),* Carl Mitcham (ed.), Vol. 19. Emerald Group Publishing Limited, 2000, url: http://www.utwente.nl/gw/wijsb/organization/brey/Publicaties_Brey/Brey_2000Embodiment.pdf, p. 7.

36 Don Ihde (1990). *Technology and the lifeworld,* op. cit., p. 30.

37 Obviously the sense of the novel is twisted because what in the novel is focal is not the fox's judgement from the point of view of the knowledge. However we can use it to give the idea of the world's modification linked to the body schema's modification.

38 Ihde, D. "Postphenomenology – Again?", url: http://sts.imv.au.dk/sites/default/files/WP3_Ihde_Postphenomenology_Again.pdf, p. 20.

The first difficulty comes out on the subject's "motor skills" level, that is the skills of movement. The hat's feather is incorporated into the lady's body schema. She does not have to pay attention to her movements "taking the measures", calculating the distance between her feather and the surrounding obstacles, but she moves as if the feather were part of her, although she hasn't got the slightest consideration for it.

This is totally incongruous with the effects of bodily extension produced by the use of the cane in the blind man case. Here the subject moves in the space using the cane as a reference point. The unconscious use of the cane works by its presence: the cane does not disappear from the subject's consciousness, although it remains transparent.

On the level of "motor skills" what emerge is the difference between these two kinds of body schemas based on their "usage". While the first case represents what Brey defines a "navigational skill"[39], that is the capacity to move into physic space, the second case represents the possibility to interact with the world. The action goes through the instrument and stops at the world.

Another problem arises when we take into consideration the perceptual aspect of the usage of the blind's cane, that is the "perceptual skills" conjoined to the body schema. The cane does not provide only a feedback allowing the man to move, but the blind man perceives with the cane touching the soil with the instrument's tip[40].

Thus we have a distinction between:

- Motor skills
    - Navigational
    - Interactive
- Perceptual skills

These distinctions cannot be considered as strict and rigid divisions, but each extension presents features of both of them. Each extension linked to the motor skills also implies a perceptual skill, even if priority goes to one particular usage. Using a pen, for instance, it is possible to perceive the paper running under the sphere, but this is subordinated to the motor skills. "For many arte-

39 See Philip Bray (2000). "Technology and embodiment in Ihde and Merleau-Ponty", op. cit., p. 9.
40 We could say that the perceptive capacities run through all the cane's length without stopping themselves into its tip, but it would make the thing too much complicated.

facts used in motor tasks, their perceptual function is, however, subordinate to their motor function, if it is there at all"[41].

Each bodily extension has to be interpreted as related to a single skill's typology, even if it will trespass into the others.

EMBODIMENT OR EXTENSION?

We have seen how the subject's body can be enlarged and modified by technological devices, but we still have to study the nature of this enlargement: are the technological devices to be considered as *Leib*'s parts or are they something completely alien that works "only" at the level of the body schema? If the first hypothesis were true, since our body would be shaped by the technologies used, it would be possible to fully modify our corporeity according to historical modifications and the primary *Leib* could not be linked to any "biological" and "natural" plane any more.

Up to this point, in order to make our line of thought as fluid as possible and let the attention focus on the possibilities of body's enlargement through the use of technologies, we have taken into account only the idea according to which an instrument is something that we can connect to the body, but does not become part of the primary *Leib*. Also in the cane's case the instrument is something "simply" annexed to the primary *Leib*. The sole withdrawing of the instrument is not sufficient to make it an embodied part of the subject.

> The possibility that the prosthesis becomes a knowing body-part is not excluded, although it remains limited. Moreover, it is not sufficient for something to withdraw into the sensorium of the body (cf. the Merleau-Ponty's example of the blind man's stick) or to share into the bodily knowledge of the body […] in order to become incorporated.[42]

The key point is clear: the enlargement of the body schema is not sufficient to make the instrument incorporated into the subject[43]. The difference, when

41 *Ibidem,* p. 10.
42 De Preester, H. / Tsakiris, M. (2009). "Body extension versus body-incorporation: Is there a need for a body model?", in *Phenomenology and the cognitive science,* 8, p. 310.
43 Even Merleau-Ponty did not notice this difference because he refers to the blind man's cane as it were an incorporation and an extension (See *ibidem*, p. 309).

highlighted, is clearly under everyone's eyes. In the case of a car driver who perceives the granulosity of the highway's concrete through the car's wheels, we are not allowed to conceive these parts of the car as incorporations into the primary *Leib*, while we can easily conceive a plastic prosthesis that "substitutes" the amputated leg of a soldier as incorporated.

Husserl offers a useful example in order to study the distinction between the primary *Leib* and the "extended" *Leib*.

Once limited the reference of localized sensibility to what is tactually sensible[44], Husserl tries to understand the difference between mere bodily extension and what we have named "primary *Leib*". The given example is a device that links the locomotive's firebox to the subject, transmitting heat when the firebox is working and a fresh sensation when it is flooded[45]. Husserl considers the locomotive as a possible bodily extension while, from our perspective, what is of primary importance is the device itself that allows to "feel" the locomotive. However our analysis and the Husserlian example still share the very nodal points.

Distinguishing the "bodily sensations" from the "localised sensation" Husserl manages to consider the locomotive as an extension, because every sensation has to be bodily related, but not everyone of them can be identified as coming from an extended part of the body. The sensations due to the extension are not localisable, being mediated by the instrument. We have two kinds of sensations: the first one that runs from the locomotive to the primary body, and the second one related to the primary body itself. We can therefore infer that the extended *Leib* is qualified by the impossibility to have sensations if the primary *Leib* is missing.

We have to take the subject under this light because founding the distinction on the localisation, as Husserl does, does not conduce to any useful results, as the necessity to have a localisation in the primary *Leib*, that is the *Leib* without any extension, is problematic.

44 Every sensibility founded on spatial diffusion are localisable by essence assuming a body typology that could perceive its spatial diffusion as extended (Husserl (1980), *Ideas. Third book*, op. cit., pp. 6-7). Moreover it is possible the apprehension of localised sensibilities in a metaphoric way. It is possible to have, linked with an alien material body, an extension, linked to the *Leib*, that brings its modifications to the subject's *Leib*. In this case we have a sensibility of the object completely unlinked to the possibility of localisation. What was not localisable, due to the absence of diffusion, turns into localisable thanks to bodily extension that transform its "not diffused" modifications into "diffused" ones.
45 *Ibidem*, pp. 104-105, *§ 4.*

There are senses without localisation, such as the sight and the hearing. What gives them the "localisation" is the possibility to mediate through the mind the not-localised sensation within a bodily part. We have localisation only considering the "creation" of sensible organs by mental mediation[46]. In general every form of sensibility becomes localisable into the *Leib* thanks to mental linking to a body space, such as the retina for the visible and the inside part of the ear for the sound. Thus "sense organs"[47] constitute themselves as "something animate organismic , but not material"[48], granting the possibility to have a direct link with the localisation, as all amplification became inherent to the "*perceived* animate organicity with *perceived* localization"[49].

The creation of a primary *Leib* comes out to be at least problematic, because we cannot understand why some sense organs fall within the primary *Leib*, giving that their localisation is due "only" to mental action. If we considered only the tactual body[50] as primary *Leib*, some sense organ would be cut off and the localisation could not be valid in order to determine the primary *Leib*.

The possibility to have a sensation coming from a bodily part without assuming the existence of another one results to be the only discriminant between a primary *Leib*'s part and one of the extended *Leib*. The locomotive cannot be a part of the primary *Leib* because, if we did not assume the existence of our "classical" primary *Leib*, the transmission would be possible and the subject would not have any sensation. The locomotive is not an "independent" part in the sense that it cannot stimulate the subject by itself, but it needs the primary *Leib*'s help in order to be able to do it.

Such a distinction should not be interpreted as functional to the concept of the primary *Leib* in itself; it should not be considered as a distinction aiming to establish what the "primary" *Leib* and the extended *Leib* are. It should rather be considered under the light of the pre-existence of a primary *Leib*. Only assuming the primary *Leib* we could define the bodily extension's sensations as mediated.

46 *Ibidem*, op. cit., p. 5.
47 *Idem.*
48 *Ibidem*, pp.5-6. This affirmation underlines the *Leib*'s conception as something different from a mere sum of material and sensation.
49 *Ibidem*, p. 6.
50 The *Leib* linked only to the sense providing the localisation.

In order to consider the mediation of the sensation produced by the locomotive, Husserl has to assume that the concept of immediate stimulus pertains to the sense of touch as a double touching-touched stimulus, i.e. a spatially localised stimulus. Unfortunately this position has to be abandoned due to its relation with the distinction founded on the localisation that we previously had to cut off. What is left of the definition of the locomotive's mediation is only that it is mediated.

A stimulus coming from a nail is "mediated" by the finger. Obviously this mediation cannot be accepted as a true mediation, but this impossibility marks the fact that the only true discriminant is a precedent creation of the primary *Leib*. We cannot say that the nail is mediated by the finger exclusively because it is an integral part of the primary *Leib*. The locomotive, on the other hand, is not considered integral part of the primary *Leib* and therefore it is always mediated.

This point can even be more easily grasped, when we consider the opposite point of view. If we assumed that everything is not tactually active, such as something annexed, where something has sense only if linked to the inside of the tactual bodily part, every sense organs' creation would be in a different and secondary plane, because it is mind mediated. The primary *Leib* would be the tactual localised body and only in a second time we would have the production of the mediated sense organs, cutting out the possibility of non tactually sensible *Leib*. The nail could not fall within our *Leib* without the finger's tactual properties.

Another example could be represented by the hairs that surrounds our body. Obviously each hair, as in the case of the nail, cannot be considered a bearer of tactual properties, what makes it a *Leib*'s part is its capacity to transmit sensations to the tactual *Leib*, the skin, thanks to its junction to it. When a body skims the hair, movement is transmitted to the skin producing a tactual sensation. Thus, if we were to follow the tactual property's criterion in order to define what the *Leib* is, even in this case, we would have something completely alien and annexed to the primary *Leib*. The subject, against any common thinking, would end up having a primary *Leib* composed by the skin wrapper and a few more things, while each "protuberance", such as hair, would be excluded. The man would be a "bag of skin".

What results evident is the equality laying in this affirmation. The primary *Leib* is considered equal to the subject's tactual body. As the localisation is closely linked to the tactual faculty, it is obvious that any body's part bearing a localisation would be a tactual part too.

Even if the tactual faculty must have some importance in the *Leib*'s constitution[51], we should not consider it as the unique criterion for its constitution. Without the touch we would not have a *Leib*, but, if we have assumed the touch in one part of the body, touch results needless in the other bodily parts thanks to the mental mediation.

Once the concepts of *Leib* and tactual body are separated, the inclusion of every not tactually sensible "protuberance" into the primary *Leib* becomes obvious, falling again, in this way, within the normal concept of *Leib*[52].

In conclusion the mediation of a sensation is founded on the possibility to have an immediate sensation. This should be conceivable if we considered the localisation as a discriminant in order to constitute the sensibility. In practice it is not, because the organs of the sensible fields that are not localisable fall within the body only because anchored to the sense organs that are constituted by mental mediation. This yields a body's conception that is entirely cultural, as the criterion of distinction between primary *Leib* and bodily extension is related only to what is culturally determined as such. However the subject will always have the necessity to have a immutable primary *Leib* and annexed and mediated extensions, because the normalisation inside the perception determines the necessary existence of a primary *Leib*, even if this actual configuration is only one among infinite possibilities.

PROSTHESES AND EXTENSIONS

51 Husserl clearly affirms the impossibility of the existence of the *Leib* without the tactual faculty (Husserl (1989), *Ideas. Second book*, op. cit., pp. 150-151). See Slatman, J. (2005). "The sense of life: Husserl and Merleau-Ponty on touching and being touched", in *Chiasmi International,* 7, url: http://www.unige.ch/lettres/philo/ics/enseignements_files/Slatman_SenseofLife.pdf and Zahavi, D. (1994). "Husserl's Phenomenology of the Body", in *Études Phénoménologiques,* 19, pp. 70-71.
52 Husserl speaks of extended body even in the case of the hair (Husserl (1980), *Ideas. Third book*, op. cit., p. 6).

What we named "embodiment relations", following Ihde's idea, cannot be properly considered a true embodiment inside the primary *Leib*, as they are not incorporations[53].

Helena De Preester on this matter makes a distinction between prostheses and extensions inside the "bodily capacities", using the previously analysed distinction between "motor capacities" and "perceptual capacities".

- Technologies fit to modify our motor skills named limb prostheses or limb extensions
- Technologies fit to modify our cognitive skills named cognitive prostheses and cognitive extensions

This distinction is not a rigid one since there are links between the two classes, e.g. what can be incorporated at a motor level can be a "mere" extension at the cognitive level.

> The differentiation between these three kinds of prostheses/extensions is not absolute or radical. That means that many, if not all, prostheses and extensions do not alter only one bodily dimension, but many.[54]

De Preester suggests the possibility of an incorporation at a perceptual level. In this case the possibility to relate to the object in different ways plays a crucial role. While the devices providing the possibility to perceive novel aspects of the object are to be considered bodily extensions, the ones opening to a new kind of relation with the object are to be considered as incorporations.

However De Preester and Tsakiris suggest the existence of a pre-constituted bodily model, to which we have to refer in order to know if an enlargement can ever be considered as an extension or not, that is if it can ever be incorporated into the subject's primary *Leib* as a motor part[55]. That is precisely the point we have already rejected.

The existence of a pre-constituted bodily model is allegedly supported by the existence of the phantom limb in the newborns. The presence of such a phenomenon in a soldier, who has lost his leg in war, would represent a phe-

53 We did not underline this aspect because we want to highlight the possibility of the incorporation rather then its difficulty.
54 De Preester, H. (2010). "Technology and the body: The (im)possibilities of reembodiment", in *Foundations of Science* Online first, p. 3.
55 It has to follow some parameters such as the bodily specificity and the anatomic similarities (See *ibidem*, p. 6).

nomenon which can be easily brought back to a constitution of a primary *Leib* at a cultural level, connected to his flow of experiences. On the contrary the newborns are taken to represent an "empty" subject without any kind of experience and so this kind of phenomenon, the phantom limb, seems to be explicable only with reference to a "natural" and "biologic" level. If this thesis, founded on the mentioned presupposition, was true, it can nevertheless be discarded acknowledging the experiences, and hence the lived experiences, into the maternal womb[56]. Thus the primary *Leib*'s constitution cannot be linked to a merely biologic aspect and naturally given, since it is grounded, even in this case, on the experiences of the subject and so it results dependent on them.

However these studies are very interesting in order to comprehend what we have previously defined as the necessary existence of the primary *Leib*. Each person has in himself a pre-constituted model of a certain primary *Leib* and according to it the subject identifies a sensation as "mediated". The locomotive's examples highlights this point. Its "mediateness" cannot lay in the localisation's principle since there are parts of the primary *Leib* that are not comprehended by this principle, such as hair or nails. The mediation status is derived from the necessity to classify a given sensation as not belonging to the primary *Leib*, when it is not conform to the pre-constituted "model". Also some technologies' resistance to incorporation can be linked to the existence of one kind of pre-constituted "model", but its nature is not of "natural" and "biological" kind. This model is constituted after a possible intrusion at a technological level and thus can be considered as a cultural product.

CONCLUSIONS

At first we demonstrated that technology should be considered as a *Leib*'s extension: the subject perceives through it as through the primary *Leib*.

56 Remaining outside the neuroscientific works about such a subject, see Rosemary Lerner, R. P. (2010), "Thinking of difference and otherness from a Husserlian perspective", in *Advancing phenomenology Essays in honor of Lester Embree,* Thomas Nenon / Philip Blosser (eds.), Vol. 62, Netherlands, Springer, p. 162; Edmund Husserl (1973). *Zur Phänomenologie der Intersubjektivität. Texte aus dem Nachlass. Dritter Teil: 1929-1935*, HuaXV, Den Haag, Martinus Nijhoff, pp. 604-605; Don Ihde (2007). *Listening and voice. Phenomenology of sound. Second Edition,* Albany, State University New York Press, 2007, p. 116.

Subsequently, through the analysis of the deeper links between living body and technology, we managed to introduce technology into the primary *Leib*'s intimacy. Technology gets to be annexed to the *Leib*, eventually as constitutive of the *Leib* itself. The *Leib*'s constitution thus cannot be considered the product of natural foundational links, but rather of the cultural context, establishing what a mediated stimulus consists in and, accordingly, what the primary *Leib* consists in. Moreover, the introduction of technology into the body, first at a very superficial level and after at deeper levels, means the corresponding introduction of history and culture into the most intimal subject's nucleus.

However we may remark that the heavy cultural heritage of the *Leib* is not felt by the subject as such. The studies on the pre-constituted model make clear that the *Leib* is perceived by the subject as fully natural. *Leib* is fixed and it is related to the canon represented by the pre-constituted model. This represent what the subject considers the natural foundation of his starting point for every practical life[57].

The constitution can be traced back to the cultural context and the history of the community where the subject lives in. However each "step" of such an on going constitution is a sedimentation and as such it is not perceived at practical level. Each step, according to the superposition of one layer to the other, composes the context of life of the present community. On the overall, they can be considered as geological substrata that become solid rock under the weight of superior and more recent ones. Sedimentations found the ground for the present, since the subject lives on it without basing his life on them.

For instance, the subject can walk down the road without considering all the "history" that it entails. He/she can know nothing about the pre-existence of an ancient Roman road under what he stands. His/her practical life cannot be modified by this pre-existence in any aspect. Such a pre-existence becomes fundamental only when he/she focus his/her attention on the reason why the road has those "aspects" and characteristics, that is only when he starts to question its "naturality". Without the "cultural approach", the fact that all roads

57 "Die Welt, die für uns ist, ist selbst ein historisches Gebilde von uns, die wir selbst nach unserem Sein ein historisches Gebilde sind" (Edmund Husserl (1976). *Die Krisis der europäischen Wissenschaften und die transzendentale Phänomenologie. Eine Einleitung in die phänomenologische Philosophie*, HuaVI, Den Haag, Martinus Nijhoff, p. 313).

leads to Rome, could make the subject think that Rome is the "natural" fulcrum of the known world.

In our case the subject's *Leib*, according to this kind of approach, allows us to consider the two faces of the pre-constituted model along the lines of the example of the Roman road. Although the model is a cultural being, it appears to the subject as natural.

This kind of study enable us to see our everyday experience as deeply effecting the naturality of tomorrow. Any kind of technological usage bears in itself a possible modification of our *Leib*. Any chosen technology is not neutral and it moulds us by depositing sedimentations.