Broken Technologies

The Angel of Machines: from Buch der Erfindungen Gewerbe und Industrien,or Book of Inventions,Vol.6,1887, F.Reuleaux, Editor. From Moon, Francis C. The Machines of Leonardo da Vinci and Franz Reuleaux. Kinematics of Machines from the Renaissance to the 20th Century. Springer, 2007.

Broken Technologies

The Humanist as Engineer

Fernando Flores Morador

Lund University   2011- revised 2015

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Foreword

First Edition (Ver. 1.0)

This book is the consequence of a long period of research during which many colleagues and students have contributed with invaluable comments. Because of that I want to thank all the members of the Postgraduate Seminar of History of Science and Ideas at Lund. However I want to especially thank Maria Flores, my daughter and *technologian* colleague whom have had an enormous influence in the development of best ideas of the resulting material.

Lund, December 2008.

Second edition (Ver. 1.1)

I printed 50 exemplars of version 1.0 and distributed it between colleagues and friends around the world. This second version (1.1) includes some few changes and consists also on 50 exemplars. I will specially thanks Dr. Luis de Marcos from the Department of Computer Science Alcalá-Madrid for his useful comments. I will also thanks professor Jan Bengtsson from the Life-world seminar at the University of Gothenburg and professor Claus Emmeche at the History of Science Seminar at the Niels Bohr Archive in Copenhagen for their hospitality and critical viewpoints.

Lund, September 2009.

Third Edition (Ver. 2.0)

I will print a limited amount of copies of this third edition which includes my case studies about failures and accidents and about the metaphysics of sexual technologies. Since the previous edition I have been discussing this text with Professor Don Ihde of Stony Brook University at New York who kindly wrote some words about my work.

Lund, October 2011

Forth Edition (Ver. 3.0)

This new version will be published only digitally; it includes adjustments of the text based on my research after 2011. The main change is that in earlier versions the concept of "order" was understood as "very high information". Today I see order as the opposite of information.

Lund, October 2015

STONY
BROOK

STATE UNIVERSITY OF NEW YORK
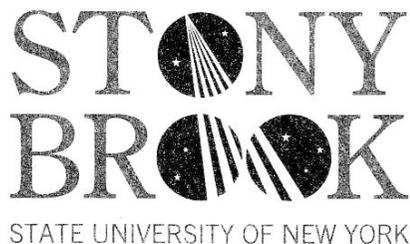
7 October 2010

Fernando's book sees broken technologies in a quite wide sense and in a very thorough examination through history and cultures, traces a wide swath of brokenness. It might be noted that some years ago, Carl Mitcham did a most thorough history of the philosophy of technology, *Thinking Through Technology (1994)* in which he differentiates between an 'engineering' and a 'humanities' philosophy of technology. Fernando's 'humanist as engineer' echoes this distinction but makes the varieties of brokenness pervasive through both levels-first, second and third-and through a phenomenological analysis which is deeply penetrating.

Fernando's own experience helps make this approach insightful and relevant both an engineer and later a philosopher and historian of ideas by background, he ranges over both historic and contemporary technologies. His use of illustrations, visuals and examples enriches his approach as well.

Sincerely,

Don Ihde, Distinguished Professor of Philosophy
Director: Technoscience Research Group

The "antiquities" preserved in museums (for example, household things) belong to a "time past," and are yet still objectively present in the "present." How are these useful things historical when they are, after all, not yet past?

Martin Heidegger[1]

Introduction

About the benefit of humanity studies

The question "Which is the benefit of humanity studies?" is of course rhetorical because, how could this question be answered if the benefit was not obvious? Any answer supposes that we understand what we are asking for and the study of "what we mean" is one of the axes of the epistemology of the humanities. Anyway, we can also put the rhetorical character of the question between brackets and try to answer it. It has to be done beginning with a historical recount of the development of the empirical sciences from the womb of theology and philosophy. This "independence process" started first with the natural sciences, which were "natural philosophy" to become positive empirical sciences of nature; next step was the independence process of the social sciences, which being "moral sciences" become "positive sciences" inspired in the epistemological model of the "empirical sciences of nature". The study and knowledge of the world then, changed from a speculative to an empirical paradigm and the study in humanities loosed the traditional central place in the education of the youth to become a more or less "magnificence of culture", that only rich people and rich societies could cultivate. Human studies are understood today as the development of the "individual" against the demands of the development of "society". The situation is that most of the people in our days have very little training in human studies. The people of our century are trained to use language only for communication. The employment of language to understand the human mind is lost. Our time's people have some schematic knowledge about some crucial historical events, but these "historical" facts are only riddles and chro-

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[1] Heidegger, Martin. *Being and time.* State University of New York, 1996; p. 348.

nologies. We can ask ourselves, which are the consequences of this for the future of society? The referred process of epistemological independence that many new sciences followed since Galileo's time was in fact possible because new objects of study emerged from new praxis. New social problems demanded new solutions and a new corpus of knowledge was the consequence. However, this explanation is tautological. We have to move further and deeper. We say that during this time, humanity studies survived as studies of language, history and philosophy occupying an increasingly small part of the time of study of the youth because this process followed a kind of *cosificación* (that is, the process which make something thing–like) of knowledge. The more things-like the object of study is, the less "human" it become. "Human" here means "phenomenal" or belonging to the Everyday world. Making science in positively terms, means to isolate some part of the Everyday world and make it abstract and independent of human intentions. That is the process behind the "experiment" and the development of the laboratory-milieu. In this sense, human studies have been deprived during Modern history of larger parts of its traditional sphere of study, those parts that easily could be isolated from the common sense of the Everyday world 's experience. The development of mechanical methods to the study language during the 20th Century, make language studies the next sphere of the human studies that shall disconnect their activities from traditional human studies.

We live in a world that is increasingly materialized and in which *cosificación* is inevitable. A feeling of benefit is obviously attached to this process in that sense that the more materialized everything becomes, the more *sanctioned* it is. It is good for society that the world became materialized because immateriality cannot be measured and weighed. In this sense, art is more materialized than philosophy or history because art works through modelling matter, as the artisan produce artefacts. However, what is the future of the remaining parts of traditional human studies, of history, literature and philosophy? Will these studies also experience the process of *cosificación*? We think that this process has already begun and the time of isolation of human studies is ending. With the last developments in informatics, the mind has arrived to the state in which an important part of their immaterial corpus of intentions, feelings, and knowledge will become materialized as "virtual realities". Ideas and images, structures and their rhythms will become *noematized* in computer programs that more or less analogically will reproduce their mechanisms and reduce their secrets to "procedures". Philosophy, history, and literature will become "languages". In other words, the epistemological process since the beginning of Modern times consists in the transformation of the dimensionalities of the object of study increasing their dignity (power). The goal is to work with realities that "can be touched and manipulated". The more manipulated, the more beneficial they are. However, there are irreducible differences between the human science and the others. Human studies differ from natural and social studies in the *grade* of *focalisation* in the object of study. Human studies focalize in the *interconnections, in the borders, bound-*

aries or frontiers of the objects of study. Human studies focalize in the *differences* and therefore have "ambiguity" as their natural object of study; this makes the humanities a science of *coherence*. The humanities create coherence because only knowing about differences can give us the whole picture. That is why the humanistic engineer will be an "engineer of brokenness".

How we understand "technology"

There are many possible definitions of "technology" and I will discuss some of these in this book. However, in this introduction let me use a definition of Svante Lindqvist[2] who defines technology very intuitively as "those activities, directed towards the satisficing of human wants, which produce change in the material world." He says also "the distinction between human "wants" and more limited human "needs" is crucial, for we do not use technology only to satisfy our essential material requirements." Consequently, from this perspective, a technology that is "broken" could be defined as those activities, directed towards the satisficing of human wants that are intended to produce changes in the material world that *either do not manage to satisfy these wants or do not produce changes in the material world, or both.* Any definition of technology implies the use of terms as "activity" and expressions as "directed towards" that are very difficult to define without coming into deep philosophical considerations. We are going to see that to avoid a philosophical discussion it will become more and more impossible as we go through the different aspects of broken technologies.

We can assume that the *intentionality* embedded in tools and machines is the same as the "effective procedures" that work beyond human capabilities. However, a tool or a machine can do worse than the human body or than another tool or machine. When tools or machines do worse than the human body does, or when they do better than the human body but worse than other tools or machines, they became *broken technologies;* otherwise they are *whole technologies.*

We can use this principle to define operationally what a "whole technology" is and what distinguish it from a "broken" one.

> Suppose that any two technologies can be compared in reference to a task. That which works better is a whole technology the others are broken. The "market" decides this almost instantaneously because the market is the place in which docking (the "coupling" between the artefact and the world) is automatically tested. Obviously, no technology works forever and ultimately all whole technologies become "broken".

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[2] Lindqvist, Svante. *Technology on Trial. The Introduction of Steam Power Technology into Sweden 1715-1736.* Uppsala Studies in History of Science I, Uppsala 1984; p. 14.

Another approach to a definition of brokenness is the term "usability" which improves studying the interacting between the artefact and its user. In engineering, the usefulness of an artefact is determined by two qualities: its *utility* and its *usability*. From our perspective there is *utility* when the artefact is efficiently designed to dock with another artefact or with the world; at the other side, *usability* describes the artefact's qualities from the point of view of the user. The three goals of the engineering of usability are directed to produce artefacts that fulfil the following conditions: a) the artefact should be "more efficient to use (it takes less time to accomplish a particular task); b) it should be "easier to learn (the operation can be learned only by observing the object)" and the artefact should be "more satisfying to be used."[3] Usability then, is measured through: "*Learnability*: How easy is it for users to accomplish basic tasks the first time they encounter the design; *Efficiency*: Once users have learned the design, how quickly can they perform tasks; *Memorability*: When users return to the design after a period of not using it, how easily can they re-establish proficiency; *Errors*: How many errors do users make, how severe are these errors, and how easily can they recover from the errors; and *Satisfaction*: How pleasant is it to use the design."[4] In the case of broken technologies and broken artefacts their usability is broken in all or some of these aspects. Because of that, they are not more efficient to use; they are not easier to learn and they are not more satisfying to use.

As broken technological examples, we can name some that are very easy to grasp and to understand intuitively. Let us consider first the case of *old* technologies, as the steam locomotive. This technology still "works" today and it could be used in the same way that it was used hundred years ago. Why should it be called "broken"? The answer is "because of its age", we would say that it belongs to a world that does not exist anymore. Then, it could be described as "time-broken". But, what about the technologies of Leonardo's machines that are artefacts from the 16th Century? They are in some sense *old technologies too,* but we notice that they are *different* from cases like that of the steam locomotive. Which are the differences between these two cases? We know that many of Leonardo's machines were only sketches and never were constructed. We also believe that if they had been constructed, they would not have worked "properly". The differences between these two cases of brokenness can say something about the world as such. We notice that an important aspect of these two technologies is how their constitutive parts work with each other. A steam motor is an old technology but it still works properly because its constituent parts are "adequate to each other" and "adequate to the surrounding world". We name this adequacy as "congruency". We say that the steam engine and

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[3] Nielsen, Jakob. *Usability Engineering*. Academic Press, 1993; p. 10.
[4] Ibid.

the world still "dock congruently". In the case of Leonardo's artefacts, that does not occur, because they were designed ignoring many physical laws. The fact that "old" technologies should be included in the family of broken technologies actualizes the importance of time and especially of "history" in this study. We know that the steam engine is a historic vestige of another time. That means that "with time", full working technologies of today will be converted into broken technologies too. Obviously, is not "time" itself that changes them, but what changes is the way humans wants and needs develops in history. We notice now that Lindqvist's definition above contemplated the changes that technology makes on the world but did not say anything about the changes occurring between the world of artefacts and the "human world" and how these changes affected technology. To avoid this problem we will try to ground the phenomena of technology in *praxis* with historical connotations. We will call this approach "phenomenological" and present technological artefacts as the consequence of *human intentionality* embedded in tools and machines. "Technology" for us means the development of "intentional effective procedures" that work *within and beyond the human capabilities*. In this sense, broken technologies can also be seen as the result of the situation in which intentional effective procedures of any kind, do worse than the human body does, or when they do better than the human body, they do worse than other intentional effective procedures. At the other side "technology" for us can also mean "knowing how" and in this case technology is the name of some cognitive (not intentional) act.

First-level brokenness

Let us now consider another example, the "technologies of poverty" which for us are broken technologies too. Any materials that society discards as garbage are suitable for being reprocessed using technologies of this category. What is broken here is the *amount of forms* (noemata) that are available to be used as artefacts and tools. Using a "knife" as a "screwdriver" could be a good example of how this technology *redirects intentionality*. The immediate question is the following: what *screwdriverhood*-qualities does the "knife" have? Moreover, what is it that is *not working here*: is the *knowledge* of the possibilities of the knife respectively the screwdriver's possibilities to "dock properly" with the world that which is wrong? Is this case, as in the case of Leonardo, a case of lack of knowledge, which causes this brokenness? Alternatively, is it the *system of beliefs*, which is not congruent with the tools? Can it be so that deprived people *believe that* a knife is the same tool as a screwdriver? The answer is simpler, deprived environments do not offer the full range of tools that match the everyday world of "regular" environments. There are no problems with the system of beliefs or with the implied knowledge, what happens is that the technical means that are for disposal are incomplete to match the world of garbage. But this insufficiency is noematic; an initial lack of "forms" demands the recourse of a redirection of intentionality. Because of this case of brokenness, it necessary to distinguish be-

tween that which *depends on knowledge* and that which *depends on praxis*; Knowledge can be manifested as a *clear idea or form* about how the laws of the world work. I call this clear idea a "noema". To e.g. "tele-transport" a material object to a new place by decomposing its molecular structure, is a technological idea that belongs to the *fantastic*. The idea or *noema* of this technological procedure exists but not their "pragma". As *pragma*, we understand the technological procedure *itself* that permits the idea or noema to be pragmatically real. We say that fantastic technologies are pragma-broken because "they know what they want" but they do not know "how to manage" to produce these outcomes. Magical technologies at the other side are the opposite case. They have a pragmatic solution (that is the "ritual") but they have not a clear noema or cognitive base to produce this. The acting of cutting a surrogate person to "cure" the disease of a third sick person, is a magical procedure that shows a "precise procedure" for the expected outcomes of this praxis, but "we" (the referent which makes the classification) know that this procedure is not congruent with the world. We say that the magician "knows how to do" but he does not know "what he wants," and that magical technology is *noema-broken*. Of course, not every case is transparent and each case is different from the others. We can certainly find cases of magical technologies that "really work". Nevertheless, in those cases the connection between pragma and noema will be *accidental* because "working" magic is always an exception. Other cases are more complex than this because both the noema and the pragma *are* in some degree congruent with the world. That is the situation of the technologies of Leonardo's machines, which show the presence of both noema and pragma. In any case, we can say that this presence is *weak* even if we cannot precisely indicate in *what sense* they "are weak". We deduce that their weakness affects their wholeness but *more* in respect to their pragmatic aspects than to their noematic aspects.

Then one can say then that Leonardo's artefacts are *ontological-broken* because they do not work properly in spite of having a *nearly clear* idea about how they *should* work. Ontological-brokenness is a higher level of the pragma-brokenness. It is a matter of degrees that makes the one different from the other. Leonardo's machines are *a little more* pragmatic-open than fantastic machines. Following the same path, we say that the technologies of poverty are *ontical-broken* because they are more weak in respect to their noematic aspects that to their pragmatic aspects. Noema-brokenness, pragma-brokenness, ontical-brokenness and ontological-brokenness constitute for us the first-level of brokenness.

Second-level brokenness

In the case of outdated technologies as the steam locomotive; the problem deserves a deeper analysis because there is nothing wrong with their noematic and their pragmatic aspects. These levels work "properly" notwithstanding that these

technologies, are *useless*. Time- or historical-brokenness cannot be explained in terms of noematic and pragmatic aspects nor with reference to their onticality or ontologicity. We identify this *second-level of brokenness* as the level in which what is broken is *dimensional*. It is a kind of brokenness that affects the dimensions of time and space, of duration and extension. Explaining that steam technology is "old" is to say nothing new; to solve this problem we need to introduce the idea of *enigma* or "historical riddle". We mean that outdated technologies are enigmatic in the sense that they work "properly" but only in a *reconstructed scenario*. In some cases the reconstruction needs to be significant and in some cases will be impossible. For instance if the technological procedures used during the classical time of the Incas in Peru to construct their ships are forgotten, it might be impossible to reconstruct a ship in exact the same way as they did. Another example could be that if some primitive plant used in the preparation of food become extinct, the situation makes the preparation of this kind of food impossible. We can reconstruct the ship and the meal, but we will never manage to *restore* the authentic phenomena into our own reality. Of course, our analysis is historical as well, and what we classify and organize depends on our perspective of the historical facts. That which for us is broken today was certainly not broken for a man in another time-scenario.

Third-level brokenness

The idea of "praxis" is very central to our study of technologies, and we need to devote some time to secure this idea. Praxis for us is an *act* and it is always some kind of *acting*. Furthermore, acting is spontaneously related to technology and *labour*. That is obvious for the case of any study of machines and tools. We are not trying to develop a theory of acting here, but it is important to be acquainted with what "to act" means to us. We accept that the mind is split in an *intentional* sphere and a *cognitive* sphere. These two divisions of the mind are not always separable from each other but some criteria can be used to recognize them. The intentional sphere is the place of *belief* and *acting* because as we understand the divided mind's behaviour, to act supposes the recourse of some extraordinary charge of motivated energy moved into the world of ideas. This surplus of energy is what *integrates* the human body into the world of everyday life. Without the human body's engagement in the world of ideas, no acting can be possible. For us acting *are directed throughout* an object and we call this the act of *animation*. For us *to think pragmatically is to act right through something* making the noema of thought a *pragma*. On the other hand, knowledge is not demanding this engagement and the connection to the human body can remain static. The sphere of knowledge for us is the sphere of *information* too.

Another interpretation could be that the sphere of knowledge and information has the form of *fractured* intentionality, the combination of the fragments of earlier acting. In any way, this division of the mind that requires the absence of acting is a state of *contemplation*. Therefore, "technology" as knowledge, is *never an act*

but a cognitive state of the mind that makes acting possible. Human labour uses technological means as patterns of movement, as structures of acting that secures some expected results. To implement a technology is then always a special kind of acting that we give the name of "labour". There may be acting that may not be implementations of technologies but if they do implement technologies, they *are labour-acts.*
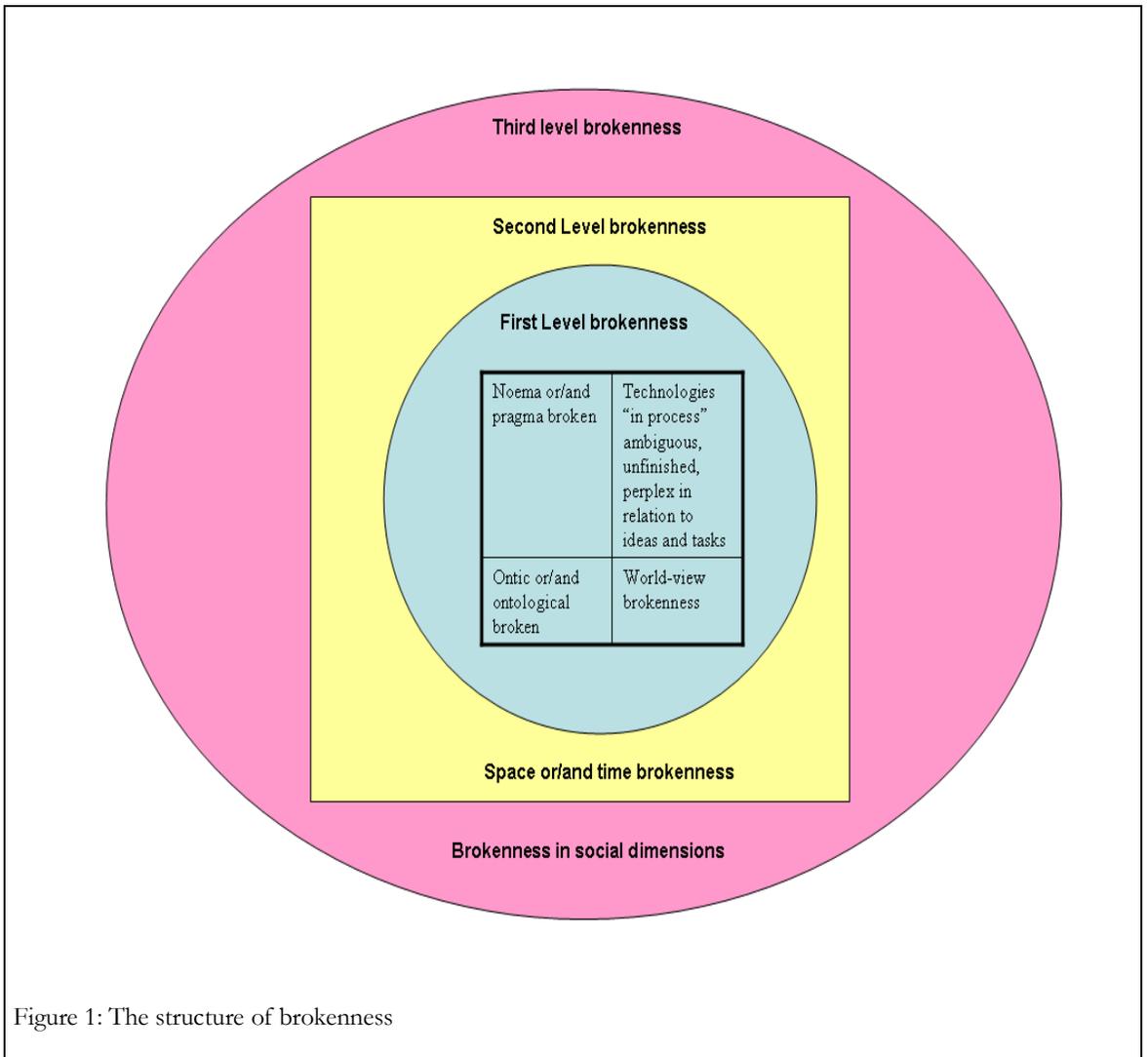
Figure 1: The structure of brokenness

In the highest level of brokenness, we find the *value-broken* technologies. This is the third-level of brokenness, in which everything happens in the social and cul-

tural level of the "now". We say that broken technologies can be listed as performances of brokenness of the higher level if they also are *socio-cultural--broken*. We are thinking of a special kind of brokenness, which involve socio-cultural categories as e.g. "labour" connected to the problematic of technology. That is the case of *family labour*, which employs technologies that are home-adjusted, and are in some sense different from their professional correlatives. We say that these family-technologies produce a form of labour that is value-broken. "Value" in this case refers to the exchange value of an artefact on the market. Value-broken means that this artefact has not a "price". Technologies of poverty can be a case of the third level if the product of their work is not remunerated. Outdated technologies can also show third-level brokenness if they are worthless.

Part I: The Encyclopaedia of Broken Technologies

An outline of first-level brokenness

       In our classification, the first group consists on *the first-level brokenness*, as we understand it. Phenomenological aspects and epistemological aspects are the fundamental characteristic of this level. We refer to noemata without pragmata, and to pragmata without noemata. We refer to manifestations in which the ontical level dominates over the ontological level and vice versa. A complete typology of broken technologies is certainly impossible and we will not try to give here a definitive one. The one thing we can say about our typology is –following Jorge Luis Borges– that in some sense it will be like his *Chinese Encyclopaedia*."[5] Our typology is as much *rhizomatic* as that of Borges because "brokenness" is a property that includes itself in the set of "broken technologies". Because to make an "encyclopaedia" is to create a "mechanism", a technical device to manage the everyday life efficiently, a "broken encyclopaedia" will be a device to manage to reconstruct or reproduce the *jump into nothingness* that characterizes broken technologies. Nevertheless, a typology, which in itself is not a mechanism has to be a *rhizome* as Deleuze and Guattari described it in *A Thousand Plateaus: Capitalism and Schizophrenia*.[6] Their principles for a classification are:

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1 and 2. Principles of connection and heterogeneity: any point of a rhizome can be connected to anything other, and must be. This is very different from the tree or root, which plots a point, fixes an order. The linguistic tree on the Chomsky model still begins at a point S and proceeds by dichotomy.

3. Principle of multiplicity: it is only when the multiple is effectively treated as a substantive, "multiplicity," that it ceases to have any relation to the One as subject or object, natural or spiritual reality, image and world. Multiplicities are rhizomatic, and expose arborescent pseudomultiplicities for what they are. There is no unity to serve as a pivot in the object, or to divide in the subject.

4. Principle of asignfying rupture: against the oversignifying breaks separating structures or cutting across a single structure. A rhizome may be broken, shattered at a given spot, but it will start up again on one of its old lines, or on new lines.

5 and 6. Principle of cartography and decalcomania: a rhizome is not amenable to any structural or generative model. It is a stranger to any idea of genetic axis or deep structure. A genetic axis is like an objective pivotal unity upon which successive stages are organized; a deep structure is more like a base sequence that can be broken down into immediate constituents, while the unity of the product passes into another, transformational and subjective, dimension.

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[5] http://www.crockford.com/wrrrld/wilkins.html (2008-06-20).
[6] University of Minnesota Press, 1987 and in Spanish: *Mil Mesetas. Capitalismo y Esquizofrenia*. Pre–Textos; 2004.

A rhizome is a "classification" that we could describe as transcriptional because it works between dimensions. In our classification of first-level brokenness, the first group consists of the creations of pure *fantasy*. We refer to noemata without pragmata, technologies resembling art and literature that are meant to describe a fantastic reality without any connectivity to praxis. The noemata of e.g. science fiction belongs to this group. Many of these products of fantasy, later became a technological reality such as Hugo Gernsback's TV–set.[7] We name these *fantastic* technologies.
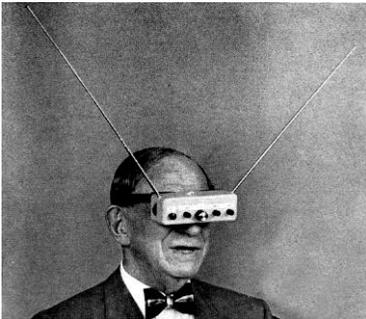
Figure 2: Hugo Gernsback's "teleyeglasses"[8]

Figure 3: Shamanism's technologies

A second group of broken technologies is the group of *magic* pragmata. This is collective of artefacts that archaic societies and traditional narratives and myths developed as fundamental tools of some rituals. Magic artefacts belong to the field of archaic technologies and are a central part of the study of old cultures and of unconscious tendencies in the mind of the modern man. This is the group of

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[7] http://www.davidszondy.com/future/Gernsback/gernsback.htm (2006-02-16).
[8] http://davidszondy.com/future/Gernsback/teleyeglasses.htm

technologies working with pragmata but without noemata.

Figure 4: Hugo Gernsback's
TV–set

A third group consists of the corpus of *sketches* and *drafts* of artefacts of any kind; we name these *tentative* technologies. These are collected in archives and museums because they reveal the origins of some technology. As an example, we could name the *Museum of Sketches and Archive of Public Art* on the University of Lund. The art theorist Ragnar Josephson analysed in his book *Konstverkets födelse* the importance of the sketch for the birth of the work of art. In his classical work, Josephson wrote, "It is the sketch that which awakes the concept. The artist *sees* during the drawing process."[9] Josephson tried a classification of different types of sketches and their importance for different works of art. Sketches and drafts uncover the deep structures of proposed artefacts and are precious in a study of the *act of intending* in the production of artefacts and technologies. The study of *industrial sketches* and their value as broken technologies is an area of specialization for humanists that Modernity has not developed at all. In the age of Postmodernity, it would be necessary to repair this misconception by opening the mind to the development of *culture engineering,* the systematic study of the massive production of tentative technologies.

As a fourth group, we will a closer look at the technologies of poverty. This includes any materials unused and rejected as worthless or unwanted by society which could be reused by deprived people as useful material serving other purposes. For example, discarded metal suitable for reprocessing in houses or in furniture, boxes, wood, textiles, in fact everything that has been destroyed or is broken and cannot work as originally intended, but which can be reused in some other redirected way.

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[9] Ragnar Josephson; Studentlitteratur; Lund 1991; p. 28.

Figure 5**:** Photo by Dionisio González, Favela do Gato II, 2004
http://fiedler.null2.net/index.php?id=329&sel=1377&type=1 (2008-11-25)

A fifth group of broken technologies consists of the artefacts that in spite of being thought of as technological products do not work successfully as such, nor can be used in any other way. We will name these *fruitless* technologies. These quasi–technological products remain *fruitless* artefacts with a historical and artistic value but without any obvious technological value.
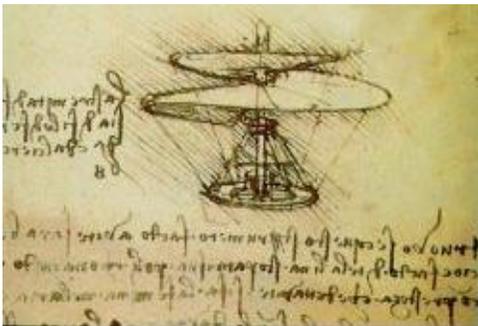
Figure 6: Leonardo's Aerial screw

A sixth group consists of the set of works of art and as an especial part of it, modern art and the ready-mades. Art is always an exploration of the limits of the world, a study of its dimensions, both empirical and phenomenological, an exploration of the *medium* of each art form and of its communicating possibilities.

A TABLE OF FIRST-LEVEL BROKENNESS		
ARTEFACT	TYPE OF CONGRUENCE	EXAMPLE
PRAGMA-BROKEN	FANTASTIC TECHNOLOGY	THE IDEA OF A "SCREWDRIVER" THAT CANNOT EXIST TODAY
NOEMA-BROKEN	MAGIC TECHNOLOGY	THE ACTION OF CUTTING A SURROGATE PERSON TO "CURE" A DISEASE IN A THIRD SICK PERSON
NOEMA- & PRAGMA-BROKEN (PURE NOEMA-NOESIS)	TENTATIVE TECHNOLOGY	A PROTOTYPE OR A SCETCH OF A KNIFE THAT ALSO CAN BE A SCREWDRIVER
ONTICAL-BROKEN	TECHNOLOGIES OF POVERTY	USING A KNIFE AS A SCREWDRIVER
ONTOLOGY-BROKEN	FRUITLESS TECHNOLOGIES	A PROTOTYPE OF A SCREWDRIVER THAT CAN ONLY BE USED AS A KNIFE
ONTOLOGY-BROKEN & ONTICAL-BROKEN	ART-READY MADE	THE PAINTING OF A SCREWDRIVER
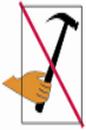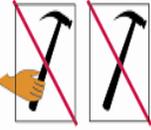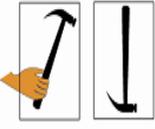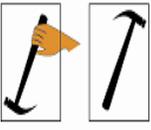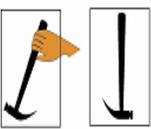
Entry 1: Fantastic Technologies

Pragma–broken		Fantastic technology
Pragma is the usability of a noema revealed through the acting of *using* the artefact. *Noema* is the "perceived as perceived", a pure phenomenological "form".

Some technologies are broken because they fail to produce pragmata. That is the case of *fantastic* technologies. They delimit a field and a possible world with artefacts as noemata, which are only pure entertainment of thought. The group of the creations of pure fantasy, in which the noemata of art and literature are meant to describe a fantastic reality, is very important as an inspiration tool for the development of new technologies. Specific for the process of producing *fantastic* stories is the combination of the dimensional levels of the noemata of the original materials transformed into new specific dimensional coordinates adequate for the new product. In this case, pragmata is absent and the connectivity with the noema takes place on an intellectual level. Ideas as "faster-than-light space travels" or that of "teleportation" have their roots in the pure noematic solution of a technological problem. It is the empirical problem itself, understood from the point of view of perception, which creates the solution without any regards to the means available for the development of some related pragma. In some sense, fantastic technologies put the pragmatics of the real world between parentheses. When noema relates to other noema, it follows "noesis", that is, the perceived as cognition. Maybe this is why every technology has its origins in a fantastic proposition; therefore we think that fantastic technologies are the simplest forms of broken technology. The cognitive sphere of the mind dominates the intentional part of it and the process of work is pure intellectual.

The literary genre of Science Fiction is one of the most important fields for this front of finding new ways to dock things with each other forming new pure intellectual constellations of artefacts. The literary genre of Science Fiction – also known as the "literature of ideas" – characterizes by the use of current develop-

ments on the field of science and technology as the source to future developments. Many different families of topics belong to this field of brokenness. We are going to follow Richard L. McKinney's study from 1976[10] and list these families according to the possible future scientific and technological developments. This unique and already "old" book is especially interesting because some of the presented "future visions" have become real artefacts today.

Figure 7: From the Earth to the Moon Jules Verne

http://commons.wikimedia.org/wiki/Image:From_the_Earth_to_the_Moon_Jules_Verne.jpg
(Wikimedia common: 2008-11-25)

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[10] Richard L. McKinney. *Science Fiction as Futurology*; Lund University 1976.

Possible scientific and Technical developments in the future
I-Primarily Physical and mechanical sciences:
1. Faster than light space drive; 2. Gravity control; 3. New energy source; 4. Matter transmitter; 5. Teleportation; 6 Transmutation; 7. Weather and climate control; 8. Unified field theory; 9. New chemical elements.
II- Primarily Medical and Biological Sciences:
1. Perfected and simple birth control method; 2. Successful suspended adnimation techniques; 3. Control of aging; 4. Organ transplantation; 5. Ability to breath and live underwater; 6. Intelligent animals; 7. Increased human intelligence; 8. Human cloning; 9. Other bio-engineering & genetic manipulation-techniques; 10. Creation of viable biologic life, including human; 11. Virtual immortality through cure of all disease; 12. Cyborgs.
III- Primarily Communications and Computer sciences
1. Personal computers terminals; 2. Translation machines; 3. Perfected spy and surveillance devices; 4. Man–machines symbiosis; 5. Intelligent computers; 6. Robots; 7. Recording of personality on computer tape; 8. World–wide communications network; 9. Multinational data banks.
IV- Primarily sociological and psychological sciences
1. Understanding of the brain and its working; 2. Understanding of the group and group dynamics; 3. Mind–reading devices; 4. Mind–control devices; 5. Controllable and useable extra sensory perception; 6. Understanding and control of human motivation; 7. Knowledge of the role milieu contra genetic make-up plays; 8. New methods of crime prevention or law enforcement; 9. New methods of punishment or imprisonment for law breakers.
V- Developments not specifically classified
1. Weapons and weapon systems; 2. Contact with aliens; 3. Contact with parallel or alternative worlds; 4. Understanding of the nature of time; 5. Time travel; 6. Invisibility 7. New value orientations for individual and society.

Table 1: From Richard L. McKinney. *Science Fiction as Futurology,* Lund University 1976

As we said, we can see in this list that some of the goals of future science and society are now a reality. That is the case of "Personal computer terminals" and "World–wide communications network". Others, which are very old, can be considered a heritage from the time of the magicians. This is the case of "Gravity control" and "Control of aging".

The origins of the literary genre of science fiction have roots in traditional fiction stories of all kinds. However, it is first with the development of modern science that the genre became established properly as a kind of literary *futurology*. They are the broken technologies of the future for us; they *anticipate* the future because their visions do not involve pragmata. Ideals and goals are open for the mind independently of any representation of the necessary involved praxis. Obviously the presence of pragma is the necessary condition that connects the noema to the today's conditions of the world. Paul K. Alkon presented an interesting chronology of

the development of the genre of Science Fiction in his book *Science Fiction Before 1900. Imagination discover technology,* from 1994.[11] Some of his highpoints are Thomas More's *Utopia* from 1516; Cyrano de Bergerac's Comic History of the States and Empires of the Moon from 1657; Daniel Defoe's *Robinson Crusoe* from 1719; Jonathan Swift's *Gulliver's Travels* from 1726; Mary Shelley's Frankenstein from 1818; Jules Verne's Around the World in Eighty Days from 1873 and H. G. Wells' *The Time Machine* from 1895. Obviously the list could be much longer. It is obvious that the genre follows the path of Modern time's issues and is influenced by the technological developments and the achievements of the sciences.

At the beginning of the 20th Century, a new type of actor appeared in the scene of science fiction and fantasy. They were the "amateurs", the non-professional scientists and the autodidact technicians. They revolutionized the process of thinking, designing and producing artefacts for consumption outside the scientific laboratory and outside the industry. This new group of amateurs can be illustrated by the figure of Hugo Gernsback (1884–1967) born in Luxembourg and immigrated to the United States in 1905 who speculated with a future society and its needs both as a entrepreneur and as science fiction writer. At the beginning of the 20th Century, Gernsback started a company in the U.S. with the name *The Electric Import Company.* The catalogue of the company named *Modern Electrics* printed during the year 1908 included genuine products and future developments that were nearly fantastic and the first magazine about electronics. In 1926, Gernsback started a new magazine *Amazing stories,* this with an unmistakeable fantastic character. Gernsback is considered the founder of the modern genre of "science fiction" and the prestigious award "Hugo" is called after Gernsback. Richard L. McKinney's study, tell us that fantastic anticipations of the future foresee even future possible catastrophes:

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[11] Twayne's Studies in Literary Themes and Genres; University of Southern California.

TABLE 1: POSSIBLE FUTURE INSTANCES OF DISASTER AND CATASTROPHE

SOURCE OF CATASTROPHE	Intelligence Involved		Natural	
DEGREE OF SEVERITY OF EFFECTS	Human	Alien	Terran	Non-Terran
Stagnation of progress Possible setback to less advanced civilization	Conventional warfare on world-wide scale/Unrestricted population growth/Continued ecological irresponsibility	Earthmen slaves to technologically superior culture/ Interplanetary warfare	New ice age or other climatic change/Excessive earth quake or volcanic activity /Insect,animal, or plant attacks/Mutations	Meteor impact/Solar flare or otherwise greatly increased radiation
End of all human life	Nuclear war/ Biochemical or other advanced weapon warfare/Unrestricted population growth/Continued ecological irresponsibility/ Carelessness with new weapons & lab discoveries/ Act of individual or group in position to cause disaster	War with alien race/Unilateral decision on part of technologically superior alien culture to eliminate man/	Excessive earthquake or volcanic activity/Insect, animal, or plant attacks/Mutations/ Human sterility	Nova, supernova, etc./ Collision with another planet-sized body
Disruption of entire planet Earth, or even greater distruction	Very extreme nuclear war	War with alien race/Unilateral decision on part of technologically superior alien culture to eliminate man	Unlikely	Nova, supernova, or greater cosmic catastrophe/

Figure 8: Future scenarios according to the visions of the fantastic

Entry 2: Magic technologies

Noema –broken		Magic technology
Noema is the "perceived as perceived", a pure phenomenological "form".		

The broken technologies of *magic* pragmata concern the collection of artefacts that archaic societies and traditional narratives and myths developed as tools of some rituals. Magic artefacts remind especially of the technologies of poverty, but also to the technologies of art. Specific for the process of producing *magic* solutions is that it is the opposite case of fantastic technologies. In the case of magic technologies, the solutions follow the combination of the dimensional levels of some pragmata and are not related to noemata at all. The noema of magic technology does exist, but it is *originated in* pragma, which in this example works as "ritual". Magic technologies as e.g. the rituals of "enchantment", are not related to any consistent perceptive sphere and therefore have not any connectivity with the world. That does not mean that magic rituals should not work, but if they do, they work within the ritual itself. Here lies the problem in itself; the magic ritual that creates the solution is now subordinating the empirical sphere to praxis. In this case, the unconscious mechanism of intentionality dominates the sphere of empirical knowledge. In this form magical technologies are the consequence of bricolage, in the sense that Lévi-Strauss gave the term:

> The "bricoleur" has no precise equivalent in English. He is a man who undertakes odd jobs and is a Jack of all trades or a kind of professional do-it-yourself man, but, as the text makes clear, he is of a different standing from, for instance, the English `odd job man' or handyman.[12]

Archaic onticality is not congruent with today's "modern" onticality because it ignores the dimensions provided by modern science and modern technology. In the modern world, archaic onticality survive in a new shape, as the spontaneous

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[12] Claude Lévi-Strauss. *The Savage Mind*, London 1962; p. 16-17.

thought of everyday life. We can see that the characteristics of archaic thought are congruent with the onticality of modern mind when it is embedded in everyday praxis and in immediate knowledge. We are speaking of a common sense onticality in which e.g. music is still "music" and not sounds, vibrations, frequencies etc. Sigfridus Aronus Forsius born in Helsinki in the year 1550, professor of astronomy of Uppsala, worked during a transition time with cosmology. His presentation of an archaic onticality is representative of any old onticality but it has developed at the same time in which the old cosmology became "broken" and therefore *obsolete*. Forsius was contemporary with Copernicus, Tycho Brahe and Galileo, the principal developers of the new cosmology that modernized the world definitively.

Figure 9: The world of Sigfridus Aronus Forsius, *Physica*: fol. 16

In Forsius' book *Physica*, written as late as in the year 1600, the primary qualities of matter are still classified as *heat, cold, dry and moist*.13 Further these qualities could be *active* or *passive*. Forsius found fourteen *secundae qualitates* or *qualitates tangibiles*, which also worked in pairs, e.g. thick and thin, heavy and light, difficult and easy, strong and weak, etc. The principles of this classification of the things and events of the world followed the everyday life and their direct experiences and therefore the conclusions are valid for everyone in any culture. We can recognize here the technologies of the bricoleur.[14] Many associations can be intuitively familiar for a modern mind, for example, Forsius says that *thickness* has its origin in *cold* and consists on *dense* parts. This quality can be found in every metal, in glass and in strong wood. *Lightness* instead, belongs to *heat* and can be found in smoke and feathers. Apart from the primary and secondary qualities, Forsius describe *secret* qualities.[15] An example of a secret quality is the *magnetism* of a stone. The magnetic stone has the same primary and secondary qualities of any other stone, but it has in addition, the secret quality of *magnetism*. Another secret quality permits a piece of

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[13] Forsius, Sigfridus Aronus. *Physica*. Utgiven av Johan Nordström. Uppsala Universitets årskrift 1952:10.

[14] Claude Lévi-Strauss. *The Savage Mind*, London 1962; p.22.

[15] Op. cit., p.61-62.

glass set on fire a piece of paper, with the help of the light of the sun. The secret qualities are organized in two groups depending on some natural friendship *Sympathia* or having some kind of hostility towards each other *Antipathia*. *Sympathia* exists between the magnetic stone and iron or between the magnetic stone and the North Star. *Antipathia* exists between humans and the snake, between the wolf and the sheep, and less obviously between the bear and the hedgehog.

The technologies of magic transport the human mind to an original state in which the relation with world was purely mythical. Their *brokenness* is unavoidable and definitive. Archaic thought and archaic technology are not indifferent to effective technological achievement. Their brokenness connect to effectiveness in a complex way, as the technologies of poverty manage to solve practical problems redefining the ontological world, the technologies of magic redefine the onticality of the world subordinating the knowledge of the world to cultural conditions.

Entry 3: Tentative technologies

Noema & pragma– broken		Tentative technology
Pragma is the usability or pragmaticity of a noema reveled through the acting of *using* the artefact. *Noema* is the "perceived as perceived", a pure phenomenological "form".		

Specific for the process of producing *tentative technologies* is that the problem of docking is postponed. A sketch, a drawing, a skis show the shadows of pragma and noema. They are only a trace, something to be, they are part of a very primitive process during which thought is pure intentionality, pure unconsciousness and work almost automatically. Tentative technologies show some standard forms, some of them are easy to list. The *sketch* (from the Greek meaning "to do a thing without preparation") is a freehand drawing that is not intended to be a finished work. The sketch consist of some rapidly thought ideas meant to be used later. Some sketch-books have become art objects as Leonardo's sketches. Another known technique is the *croquis*, (meaning the same as "sketch" in French) which is a sketch involving a live model. The model changes its position constantly and the artist has not time to draw details. The croquis is a good method to draw moving models as animals and children. Another related term is the *doodle:*

> This is a type of unfocused drawing made while a person's attention is otherwise occupied. Doodling can also be made while talking by telephone for a long period if a pen and paper are available. Popular kinds of doodles include cartoon versions of teachers or companions in a school, famous TV or comic characters, invented fictional beings, landscapes, textures, banners with legends, and animations made by drawing a scene sequence in various pages of a book or notebook.[16]

The word *doodle* first appeared in the early seventeenth century to mean a fool

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[16] http://piasdoodling.blogspot.com/

or simpleton, and is thought to derive from the Low German *dudeltopf*, meaning "fool" or "simpleton". This is the meaning appearing in the song "Yankee Doodle", originally sung by British colonial troops prior to the American Revolutionary War. "This is also the origin of the early eighteenth century verb *to doodle*, meaning "to swindle or to make a fool of". The modern meaning emerged in the 1930s either from this meaning or from the verb "to dawdle", which since the seventeenth century has had the meaning of "wasting time or being lazy".[17]

Another typical tentative technology is that of the *prototype*. It is an original sketch but understood as a standard idea of a class of artefacts. The term derives from the Greek and meant "archetype" or primitive model. The term "proto" means "original". Some kind of prototypes as Leonardo's machines can be understood as *fruitless* technologies also.

Tentative technologies are *vague* and *ambiguous* in almost every aspect. According to Svante Lindqvist, *five factors* are decisive to the establishment of a new technology. These five factors are *technical, geographical, economic, social* and *cultural*. He arrived to this conclusion after his study of the introduction of the Newcomen engine in the Dannemora Mines in Sweden in 1726-1736.[18] The Newcomen engine "was the first practical working engine capable of converting thermal energy (heat) into mechanical energy (work)." This engine developed by Thomas Newcomen (1663/4-1729) was the first "prime mover" which could substitute traditional engines that used the energy of wind, water or animal muscle.

> The engine consisted basically of a boiler surmounted by a large cylinder containing a piston. When the cylinder had been heated up and filled with steam from the boiler, cold water was injected into the cylinder. The condensed steam left a partial vacuum, which caused atmospheric pressure to force the piston down the cylinder. Thus, power was produced by the pressure of the atmosphere and not by the pressure of the steam.[19]

Annette Henning studied the establishment of new technologies in our time.[20] She studied the reception in Sweden of the technology of solar collectors between the years of 1992-1995. We notice that the ambiguity connected to the reception of a solar engine producing a new kind of energy met problems that can be compared to those described by Lindqvist. The ambiguity of new technologies depends on their "tentative" character. In the case of solar collectors the culturally ambiguity depended on "representations of sunshine, energy and technology, and the effect of combining these with one artefact – the solar collector."[21]

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[17] Wikipedia: http://en.wikipedia.org/wiki/Doodle.

[18] Svante Lindqvist. *Technology on Trial. The Introduction of Steam Power Technology into Sweden 1715-1736*. Uppsala Studies in History of Science I. Uppsala; 1984.

[19] Svante Lindqvist. *Op. cit.*; p.111.

[20] Annette Henning. *Ambiguous Artefacts Solar Collectors in Swedish Contexts. A Processes of Cultural Modification.* Stockholm studies in Social Anthropology; 2000.

[21] Op. cit.; p. 27.
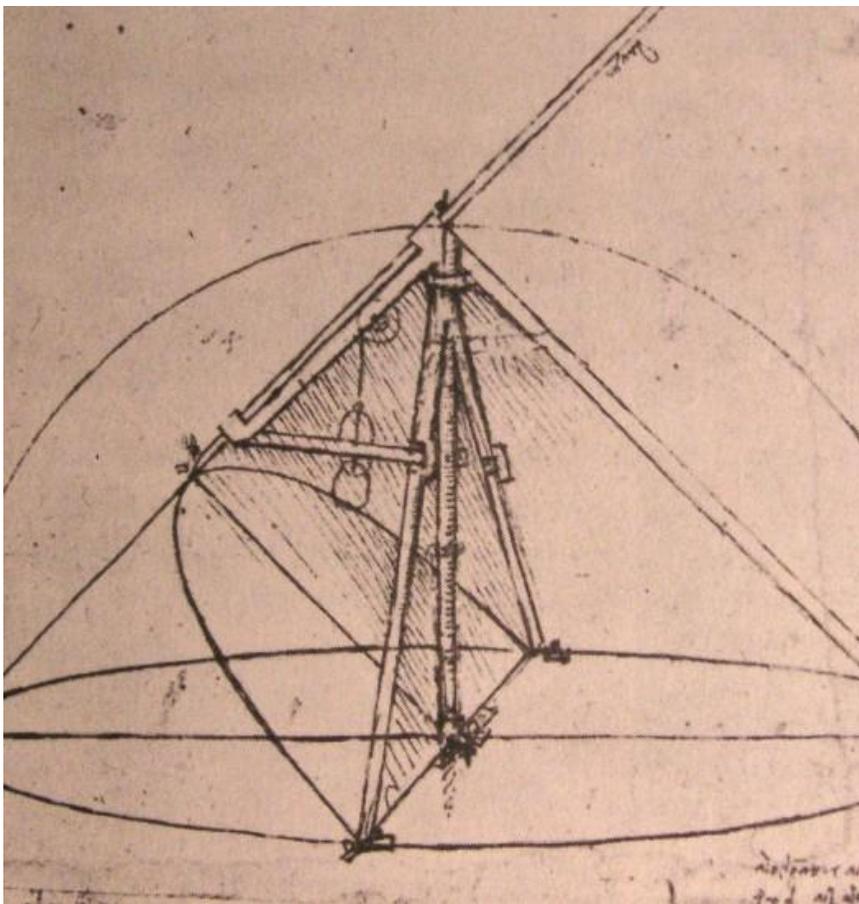
Figure 10: Leonardo da Vinci, design for a parabolic compass
http://commons.wikimedia.org/wiki/Image:Leonardo_parabolic_compass.JPG
(Wikimedia common: 2008-11-25)

Entry 4: Technologies of poverty
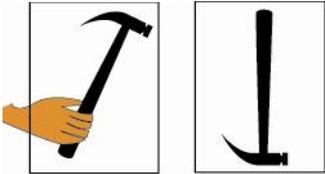
Ontical–broken		Technologies of Poverty
Ontic is the sphere of information and knowledge.		

We notice that the technologies of poverty fulfil the condition of managing to re–dimension and dock materials, muscles, tools and machines in *some* referential dimensional space that is pragmatic but not ontical. If that which converts a noema to a pragma is the "coagulated" intentionality flowing during the acting of working, "acting brokenly" in this case, means that the pragma and the noema are not congruent with each other. The "use" of the pragma *exceeds* its onticality. An immediate consequence of this is that the docking–process becomes equivocate. Using e.g. a bed as a shelf is acting to re–dimension and dock materials in some referential dimensional space, but the pragmatic aspects of the intentional act are subordinated to the *prefixed* properties of a reduced number of available artefacts. Consequently, congruency has to be reached with a number of reduced artefacts often belonging to different historical periods. Technologies of poverty are those that manage to dock any materials unused and rejected as worthless or unwanted by society reusing them as materials serving other purposes. Discarded metal suitable for reprocessing in houses or in furniture, boxes, wood, textiles, in fact anything that has been destroyed or broken and cannot work as originally intended but which can be reused in some other redirected way.

Specific for the process behind the *technologies of poverty or distress* is that both pragma and noema exist, but they are not related with each other in full correspondence. The ontology created in this incongruent relationship is technological but incomplete. The technologies of poverty "work" properly, but in some unnatural manner, producing "poor" consequences. That which we have to use is all that is necessary to the process of work, however the problem is that this world is limited and therefore the solutions are limited. We say that these technologies are ontical–broken because the ontical results are not congruent with the ontological standards. They are not fantastic because they work, and they are not magic because

they are not mere rituals, but they are not whole technologies because of their onti-cal limitations.

Urban acupuncture

The process of reusing materials and artefacts has many levels depending on the economical possibilities and the intentions involved. Many architects have comprehended that the broken character of the technologies of poverty can be understood as a new and "postmodern" way to understand the technologies of dwelling. Seen from this perspective, technologies of poverty are converted into new technological solutions and are no longer typical cases of broken technologies. However, the limits lines are quite fine between broken technologies of dwelling and postmodern technologies of dwelling. In some cases, dwelling is solved with very primitive and circumstantial materials and artefacts but in some other cases, the *bricolage* admits more elaborated forms of congruence. The extraordinary way in which artefacts became pragma in a situation of extreme poverty has inspired today's architects to new urban solutions. To describe this process, the Guatemalan born architect Teddy Cruz, when working on the borders of two very different but deep interwoven societies – San Diego and Tijuana –introduced the term "urban acupuncture".[22]

Figure 11: Broken use of space, as in Tijuana (image Teddy Cruz for the New York Times)

A Tijuana speculator travels to San Diego to buy a little bungalow that have

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[22] Teddy Cruz writes on "Urban acupuncture." Residential Architect Magazine (2005).

been slated for demolition to make space for new condominium projects. The little houses are loaded onto trailers and prepared for the travel to Tijuana, where they will have to clear customs before making the journey south. For days, one can see houses, just like cars and pedestrians, waiting in line to cross the border. Finally the houses enter into Tijuana and are mounted on one-story metal frames that leave an empty space at the street level to accommodate future uses. One city profits from the material that the other one wastes. Tijuana recycles the leftover buildings of San Diego, recombining them in fresh scenarios, creating countless new opportunities.

Figure 12: Project at Iquique, Chile showing to the left the delivered houses and at the right its expanding possibilities

The introduced term "acupuncture" is useful because it shows the *piecemeal change* in the ontology – the "being–in–the–world" – of the urban space. The reusing and remaking of artefacts provoking the collapse of the obvious congruence between noema and pragma, and suppose a technique of inserting and manipulating artefacts into specific points of the urban body with the aim of solving dwelling problems.
Another group of architects working with dwelling solutions associated to shanty-towns and poverty is the group *Elemental* of Chile. In Iquique a city of the Chilean desert, the group developed an integral solution to a hundred families in a shanty town placed at the centre of the city. The solution was to simply follow the natural laws of the development of shantytowns, creating a structure that contemplated the "porosity" of the broken space of a shantytown and making possible the spontaneous developing of new spaces.

The broken character of the use of spaces in shantytowns has inspired artists as the Spaniard Dionisio Gonzáles to piecing together photos of the shantytowns themselves with photos of modern architecture blending the organized and geometric of the modern with the fuzzy and scattered of the spaces of poverty.

Figure 13: Dionisio Gonzáles: Situ-Acciones Cubo Cristal III, 2001

The art of Gonzales, as the architectural solutions of Cruz or these of the *Elemental* group in Iquique, reminds us of the case of the ready-mades. If the readymade becomes art because of the re–dimension of artefacts, the acupuncture of shantytowns became a readymade of the city giving the shantytowns an artistic content. The synapse of the broken technologies of poverty became the synapse of modern art. The spontaneous *transcription* of ontological properties from a communicative dimension to another that is typical for shantytowns dwelling solutions became the artistic synapse of some postmodern architecture.

Entry 5: Fruitless technologies
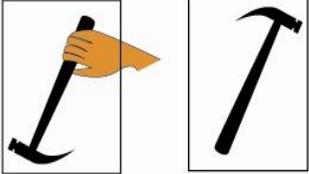
Ontological–broken		Fruitless technologies
Ontologic is the sphere of intentionality and acting. The directness of artefacts when they are used.		

To imitate an existing animal is a typical way to create new pragma. The *technologian*[23] (or "humanistic technologist") as the artist, are influenced by nature and easily imagine new noemata as variations of natural themes. Leonardo's artefacts are *broken* because they manage to re–dimension and dock materials, muscles, tools and machines *but* in a "naive–ontological" way. Specific for the process involved in *fruitless technology* is that it produces an onticality but without ontology. In Leonardo's technological solutions, the artefacts are linked in a cognitive model that is wrong about the laws of physics. The cognitive sphere is present, but produces a broken ontology.

Leonardo's example is very clear to show the necessary connection between ontology and knowledge. In this case, both pragma and noema exists and they are congruent with each other too. The brokenness depends on the strong phenomenalization of the laws of nature they are built on. The *imitative* character of Leonardo's solutions shows the primacy of the everyday world in his understanding of experience and that conduce his solutions to a broken pragmatism as well as to a broken science. The technologies of poverty e.g. may use a table "as a chair", the acting of sitting is fulfilled with sufficiency in spite of the using of a not full congru-

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[23] I found on the Internet that the term was coined in 1990 by Donna J. Fisher from the University of Pittsburgh. The term describes "one who studies the psychological, sociological, spiritual, philosophical and artistic ramifications of technology in human life." http://technologian.com/introduction.html (2008-05-18).

ent artefact; acting fruitlessly in some comparative situation should be to design a chair that only can be used as a table. Through imitating animals, Leonardo produced broken ontologies that obstruct the pragmatically of the technical solutions. When Leonardo designed a machine that flow as a bird, he identified the natural World with the human World.

> There was very little understanding of the laws of flight in Leonardo's designs such as how lift is created or how one controls the stability of a flying machine. There are designs for wings, but one cannot say Leonardo had a systematic design for a glider, say, though modern enthusiasts have reconstructed such a wing and completed the design for such as craft. There is a parachute for controlled decent and one design of a vertical airscrew or Archimedes screw for controlled ascent into the air that led many to claim that Leonardo had invented the helicopter. Gibbs-Smith points out that even had these machines been built, these flapping mechanisms would not have generated sufficient lift to support the weight of gravity of a human even using modern materials.[24]

To develop a flying machine it was necessary to hold back the archaic temptation to imitate nature. It was first when the human mind understood that nature couldn't be copied in every detail, developing analogies became possible.

> Leonardo did not understand the laws of scaling that permits creatures of a certain size to attain lift by flapping such as birds and insects and restricts humans to flight by gliding. What is clear from the sketches of these machines is the playfulness of using different combinations of kinematic machine elements in seeking a solution to the problem of flight; a kind of Renaissance 'brain storming'. [25]

The importance of scaling in the study of mechanics was first noted and systematically studied by Galileo Galilei hundred years after Leonardo's time. Galileo was interested in knowing how proportions affected the form of the living beings. The study of the changes in size of the living beings lead him to the study of the variations of *forms* as such. Galileo wrote:

> It is perfectly clear that if it is desired to conserve the same corporal proportions for a giant that prevail for the average man, it is necessary to find a material as hard to construct the bones of the giant. Otherwise, it will be necessary to accept that the body of the giant will be relatively weak. Because if one increases the length of the giant over a certain limit, this one will collapse and squash because of its own weight. If on the contrary the size of the body

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[24] Moon, Francis C. The Machines of Leonardo da Vinci and Franz Reuleaux. Kinematics of Machines from the Renaissance to the 20th Century. Springer, 2007; p. 256.
[25] Moon, Francis C. 2007; Ibid.

is reduced, its strength in the same proportion will not be reduced; it shows that smaller the body is, the harder it turns out to be.[26]

The Galilean method consists of the systematic and quantitative study of the proportions of the parts of the body of living beings, to the effects to deduce physical laws from conclusions of morphologic character. Although this method does not allow knowing why a certain form has been the chosen one before others, it allows excluding impossible forms. The study of Galileo followed some steps; first two of the dimensions of the living tissue are compared as *dignities* (like Euclidean's exponents). For example, the length of a bone is compared with the flat section or the volume of the same bone. Secondly showed how this relation is influenced by the changes in size of the living organism. It is stated that the changes in its size motivate changes in the morphology and vice versa. This Galilean methodology is known today by the name *allometry*.
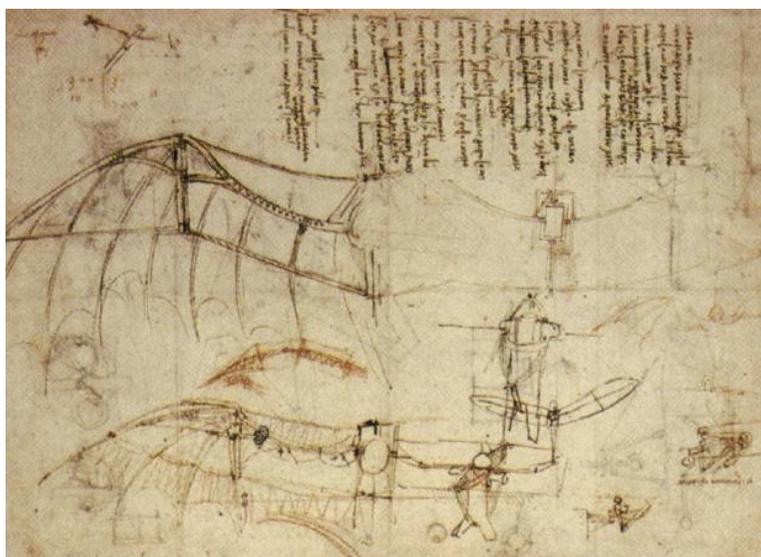
Figure 14: Leonardo's flying machine
http://commons.wikimedia.org/wiki/Image:Leonardo_Design_for_a_Flying_Machine,_c._1488.jpg
(Wikimedia common: 2008-11-25)

Leonardo's visions about flying[27] cannot be identified with the fantastic visions of flying angels appropriated to the mythology of the Christian culture. The ideas of Leonardo were technological in a strict sense in spite of being incomplete.

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[26] Galilei, Galileo. *Dialogues Concerning Two New Sciences*. Dover Publications Inc, New York, 1954. p. 131.
[27] http://www.museoscienza.org/english/leonardo/img/navicellavolante.jpg
(2006-02-15).

The lack of functionality depended specifically in the misunderstanding of the connection between scaling and the laws of gravity. This can be illustrated with Leonardo's own words:

> The bird in its flight without the help of the wind drops half the wing downwards, and thrusts the other half toward the tip backwards; and the part which is moved down prevents the descent of the bird, and that which goes backwards drives the bird forwards. When the bird raises its wings it brings its extremities near together; and while lowering them it spreads them further apart during the first half of the movement, but after this middle stage, as they continue to descend it brings them together again.[28]

Worldly humanism

During a time in which Western Europe began to work intensively with the spatial representation of the New World, Leonardo da Vinci worked with the new spatial representation in general. He drew maps and developed cartography, worked with anatomical studies and used the acquired knowledge in painting and sculpturing. Simultaneously, Leonardo studied the human body in movement and the appropriateness of bodily movement with different human tasks developing machines that worked analogically to the human body. Without doubt, he represents a new kind of humanism, a humanism that is materialistic and engaged in worldly matters. This redirection of the humanist's studies revealed the importance of the usefulness of humanistic knowledge. Renaissance humanism was otherwise characterized by the revival of classical studies and by the accurate recreation of the classical environment. To the mainstream of humanists, Leonardo's redirection of the tasks of humanism was clearly perceived as a threat to the humanistic project in general.

> "The deplorable deviation from the sources of early humanism was blamed at least in part on Leonardo: on his interest in knowing, his experimentalism, his religious scepticism, his lack of interest in the ancient.[29]

The differences between the two kinds of humanism, are discernible in the confrontation between Michelangelo and Leonardo:

> Much earlier his discussion with Botticelli had been one of the motives for which Leonardo left the learned Florence for the more technological Milan: this polemic was at the origin of Michelangelo's anti–Leonardism. Aiming toward the direct and unprejudiced experience of the real, Leonardo denied the authority of history as a teacher. Michelangelo idealized history, prioriting

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[28] Hart, I. B. The Mechanical Investigations of Leonardo Da Vinci. Chicago, 1925.
[29] Argan, G. C. "Michelangelo 1492" i Levenson, J.A. (Editor) 1991 Circa 1492, s. 114

it as the necessary reference for realizing his own modernity but excluding any form of imitation.[30]

To the worldly humanism of Leonardo, the study of the classics was more a source of inspiration than the purpose of its recreation. The study of the classics was an excuse to break with Aristotelianism and the Scholasticism of the Universities and an opportunity to follow a secular and bourgeois path of investigation. Behind Leonardo –as well as behind Machiavelli – the impulses of the Modern entrepreneur were growing on the shoulders of humanism. Consequently, humanism has in fact been the intellectual source of science, technology, capitalism and Modernity. How can it be possible, then, that today both science and technology are so rarely associated with humanism?

[30] Ibid.

Entry 6: Art as broken technology

Ontological & ontical – broken		*Art- Ready made*
Ontological is the sphere of intentionality and acting. The directness of artefacts when they are used. Ontic is the sphere of being and knowledge. The being of artefacts before they are used.		
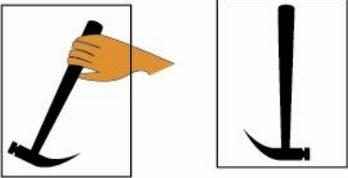
Specific for the process involved in *artistic technologies* is that of the brokenness of ontology. It being the contrary to fruitless technologies, here it is the everyday world that which is questioned. The underlying process is that of using experienced artefacts building new noematic contents. Directly or indirectly, consciously or unconsciously, the artist uses the available materials of the everyday world to create new intellectual contents. This process gives art the character of being unusable, inoperative and non-productive for society. That is why Plato preferred the artisans to the artist. Plato's ideas of "art" were built upon the idea of "craft". Plato distinguished the practical capacity of creating things as some kind of "imitation" of God's acting. The carpenter, creates a table, imitating God, the painter on the other hand, paints a table imitating the carpenter. Therefore, what the artist does is an imitation of an imitation, a subproduct of something that never was original.

According to Greenberg, the effect of modernism on art consists in the exploring process of the limits of the *medium* of each art form. Art as mimetic art or as abstract construction is always an exploration of the *limits of media*. Self–awareness in making art does not mean that the task of exploring the limits of media became art's definitive goal. But it is true that before modernism, the artist was not aware of the task that he/she was performing. In the same sense, Danto has observed that referring to modernism as the "end of art", means the end of a kind or "art narratives" and nothing else. History cannot come to an end, only some historical narratives, according to Danto.

Regardless of Greenberg's dimensional considerations, his art theory insists in

seeing only a few aspects of the dimensionality of art, for instance, the "flatness" of painting and the three–dimensionalities of sculpture and architecture. This theory fails to notice the presence of the *artefact* or *media* behind the work of art. Being a contemporary to McLuhan, *who saw media everywhere*, Greenberg represents the opposite approach, *seeing media only in a few art forms*. In his book *Kant after Duchamp*[31] Thierry de Duve has recorded the question of the complexity of dimensionality in modernist painting. He refers to the problematic standpoint which the new painting created, when the limits between flat representations and three–dimensional artworks disappeared. De Duve cited Greenberg's words:

> Each art, it turned out, had to go effect this demonstration on its own account. What had to be exhibited and made explicit was that which was unique and irreducible not only in art in general but also in each particular art. It quickly emerged that the unique and proper area of competence of each art coincided with all that was unique to the nature of its medium.[32]

It is well known that Greenberg understands that "the unique and proper area of competence of painting" was *flatness* while three–dimensionality was the province of sculpture:

> Three–dimensionality is the province of sculpture, and for the sake of its own autonomy painting has had above all to divest itself of everything it might share with sculpture.[33]

We see that Greenberg defended a theory according to which each art form has to preserve the limits of the medium in which the art–form was embedded, against other art forms and their specific medium. This was according to Greenberg the principal goal of modernism, especially in painting. Of course this theory could not survive the sixties.

> From Manet to Stella, modernist painting has progressively surrendered to the resistance of its medium, to the point where very little was left beside its flatness itself. Accompanying a portion of this history, from Pollock to Morris Louis, the critic's taste has equally surrendered. Yet it stopped short of acknowledging Stella's black and aluminium paintings, judging perhaps that they had turned into arbitrary objects. Battling Greenberg on his own turf, the early minimalists pushed their paintings into the third dimension, where they became objects indeed.[34]

Frank Stella emphasized the picture–as–object, rather than the picture as a

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[31] Thierry de Duve. *Kant after Duchamp*. MIT press, 1996.
[32] Op. Cit. p. 207.
[33] Op. Cit. p. 208.
[34] Op. Cit. p. 217.

representation. He produced a series of paintings in which regular bands of black paint were separated by very thin white pinstripes of unpainted canvas. Starting 1960, Stella began to produce paintings in aluminium and copper. The limits between painting and sculpture disappear during the sixties because of the works of the minimalists as Stella and especially of Donald Judd.

Figure 15: Untitled (1988-1991) by Donald Judd. *Concreta* at the Israel museum Art Garden
http://commons.wikimedia.org/wiki/Image:Donald_Judd_IMJ2.JPG
(Wikimedia common: 2008-11-25)

The work of Donald Clarence Judd counts as one of the most significant *minimalist* artists; he wanted autonomy for the artwork against the space in which it was embedded creating a composition without hierarchies in which synapsing became the centre of the composition.

Art after Duchamp

After Duchamp, it became obvious that art could no longer be associated to aesthetics. Aesthetics has by tradition, been the study of the essence of beauty in both nature and manufactured things. So was it for Plato and Aristotle. Plato relegated art to pure imitation, and understood it as the lowest form of knowledge. In *The Republic* Plato, distinguish between three reality modes, the idea or form, the technological knowledge of making things by an artisan and last the imitating work of the artist. At the beginning of the century Marcel Duchamp and the ready–made art, started a process that put the usability of the platonic categories of knowledge to an end. After Andy Warhol and the outbreak of pop–art during the sixties, it became more problematic to distinguish non–art from art. Plato's intention in *The Republic* was that of the study of the modes of knowledge that would be allowed in

the republic to be constructed. Plato identified art–making with "imitation", a deceiving practice built on the appearances of the secondary qualities of phenomena. In a conversation between with Adeimantus Socrates said:

> In saying this, I intended to imply that we must come to an understanding about the mimetic art, –whether the poets, in narrating their stories, are to be allowed by us to imitate, and if so, whether in whole or in part, and if the latter, in what parts; or should all imitation be prohibited?[35]

The question about reality and simulation, about reproduction and truth, the opposition between artworks and commodities, all these issues are among the preoccupations of Plato defining his aesthetics; in a dialog between Socrates and Glaucon we can read:

> – Now, let me ask you another question: Which is the art of painting designed to be–an imitation of things as they are, or as they appear–of appearance or of reality?

> – Of appearance.

> –Then the imitator, I said, is a long way off the truth, and can do all things because he lightly touches on a small part of them and that part an image. For example: A painter will paint a cobbler, a carpenter, or any other artist, though he knows nothing of their arts; and, if he is a good artist, he may deceive children or simple persons, when he shows them his picture of a carpenter from a distance, and they will fancy that they are looking at a real carpenter. [36]

We could say that for Plato, art is *broken in truthfulness*. Plato is interested in clarifying the differences between representations and reality and in fact, the problematic of dimensionality in representation. The importance of *ideas* in Plato's work, was to make the faculty of thinking or reasoning the principal form of representation and convert "intellectual" knowledge to the most important and useful form.

In the 18th century, Alexander Gottlieb Baumgarten redefined this traditional inquiry about beauty as the science of "emotional or sensitive knowledge" and adopted the Greek word *αισθητική* for *perception* to denote this new discipline. Baumgarten wanted to describe the "criticism of taste" but it is also used as "that which appeals to the senses". Philosophical studies follow hereafter, two paths, the study of things known and the study of things perceived –*aesthetic* entities. Baumgarten then gathered the study of the arts under the aegis of aesthetics. The two were quickly identified and aesthetics became "the philosophy of art" in much the same

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[35] Plato. *The Republic*, Book III..Translated by Benjamin Jowett
(http://classics.mit.edu/Plato/republic.4.iii.html/ (2006-07-30).
[36] Plato. *The Republic*, ibid.

way "ethics" is the philosophy of morality.[37] In our days, philosophers distinguish the philosophy or Art from Aesthetics and accept that if all things in the world can be seen aesthetically, because all things embrace or lack some kind of beauty, not all art needs to be beautiful –and therefore does not need to be object of an aesthetical inquiry. During the sixties, Ian and Elaine Baxter (whom worked behind the common name *The N. E. Thing Company,* 1966–1978 in Vancouver) solve the problem dividing their practice in two categories, ACT–works (*Aesthetic Claimed things*) and ART–works (Aesthetics Rejected things). Thierry de Duve used this nomenclature to analyse some of the artworks of the fifties and the sixties.[38]

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[37] Timothy Binkley. "Piece: Contra Aesthetics" in Margolis, Joseph. (Editor) *Philosophy Looks at The Arts. Contemporary Readings in Aesthetics.* 1987. Sid. 83.
[38] Thierry de Duve. *Kant after Duchamp.* MIT press, 1996; p. 296.

An outline of second-level brokenness

Second-level technologies are broken technologies that are *dimensionally broken*. Their brokenness relies on the fact that they stretch over different dimensions each in some particular way. Second-level technologies are technologies that present a noema-pragma puzzled constitution always stretching in between dimensions. The most obvious forms of puzzled noemata-pragmata are stretching in time and space or both. One of these groups consists of *old technologies*.
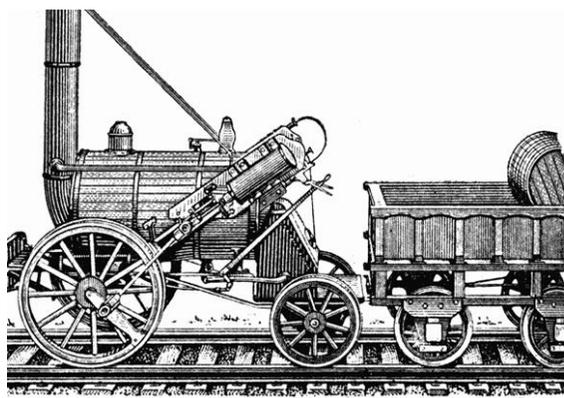
Figure 16: "The Rocket" steam locomotive
http://commons.wikimedia.org/wiki/Image:Steam_locomotive_rocket.png
 (Wikimedia Commons: 2008-11-25)

To this group belong the technologies that worked in the past and fit in a context that has disappeared; we name these *enigmatic* or *outdated* technologies and we can find them in museums, e.g. steam locomotives[39]. Enigmatic technologies are time-broken.

Another group of second-level technologies are *virtual technologies* that puzzle with space in an empirical and/or phenomenological manner. Virtual technologies

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[39] http://www.steamlocomotive.info/vlocomotive.cfm?display=1132 (2006-08-02).

are not simple visual representations of artefacts but representations, which are free from the laws of the dimensional world and can therefore, be pure constructions. They are not only fantastic constructions as the representations of fantasy, because they have an inter-dimensional existence. Nevertheless, virtual technologies can be understood as a subgroup of fantastic technologies or of art technologies.

A ninth group is the group of *media—broken technologies* that consists on technologies of transcription and synapse between media forms. This group can be understood in some cases as a subgroup of art technologies and in other cases also as a subgroup of virtual technologies. However, there are cases in which the brokenness of the representation is not reducible to other cases.

Figure 17: A "virtual" calculator
http://www.anvari.org/cols/Back_to_the_Old_Technologies.html (2008-11-25)

A tenth group is the family of game technologies and toys. It is miniature worlds inhabited by reproductions of whole technologies that are not intended to work. The size-broken dimensions characterize this family of brokenness.

Figure 18: Scale model of the Mercedes-Benz W163
http://commons.wikimedia.org/wiki/Image:Toy_car_735
3_ubt.JPG
(Wikimedia common 2008-11-25)

A TABLE OF SECOND-LEVEL BROKENNESS		
ARTEFACT	TYPE OF CONGRUENCE	EXAMPLE
TIME-BROKEN	ENIGMATIC (OUTDATE) TECHNOLOGIES	AN ARTEFACT THAT WE BELIEVE HAS BEEN USED AS A SCREWDRIVER OR A KNIFE
SPACE-BROKEN (BROKEN IN DIGNITY AND SIZE)	VIRTUAL TECHNOLOGIES	THE ACTION OF CUTTING WITH A KNIFE IN A COMPUTER GAME
MEDIA-BROKEN	INTERMEDIAL NOEMA/PRAGMA	THE EKFRAS OF A PAINTING OF A HAMMERING WORKER
REALITY-BROKEN	GAME TECHNOLOGY TOY TECHNOLOGY	PLAYING WITH ANYTHING ESPECIALLY WITH TOYS
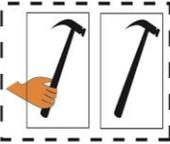
Entry 7: Enigmatic technologies
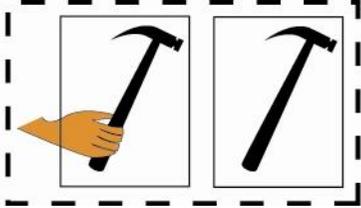
Time broken		Enigmatic (outdate technology)

Specific for the process involved in *enigmatic (outdate) technologies* is that they belong to an older-everyday world, an historical reality that has vanished. Nevertheless knowledge and purpose are congruent in docking. That means that this technologies are successful in producing the adjustment in–between pragmata and noemata originated in different dimensionalities and in managing the adaptation process that the body goes through when it tries to match tools, machines and the raw material during some process of work. The ontical level and the ontological are complementary in the sense that the production of new noemata is followed by the development of new pragmata, new ideas generate new praxis. However, the whole process is *enigmatic*; it demands that the chain of events should be recreated in an *update scenario*. The materials, the tools, the environment, the artisans and workers who knew these techniques have disappeared. If the reconstruction is possible, it can never be anything else but a "possible world", a conjecture.

Working with the history of technology implies working from the first person's perspective with events that demand interpretation. History is intentional never descriptive and the historian is a believer not a sceptic. The word we choose to describe this reality with is the Latin word *aenigma*, from the Greek *ainigma*, "to speak obscurely or speak in riddles". In this sense "outdate technologies" for us are enigmatic. Martin Heidegger discovered the epistemological importance of outdate technologies when he in *Sein und Zeit* wrote:

> The "antiquities" preserved in museums (for example, household things) belong to a "time past," and are yet still objectively present in the "present." How these useful things are historical when they are, alter all, not yet past?

Only because they became an *object* of historiographical interest, of the cultivation of antiquity and national lore? But such useful things can only, after all, be historiographical objects because they are somehow in themselves historical. We repeat the question: With what justification do we call these beings historical when they are not yet past? Or do these "things" "in themselves" yet have "something past" about them although they are still objectively present today? Are these objectively present things then still what they were? Evidently, these "things" have changed. The tools have become fragile and worm–eaten "in the course of time." But yet the specific character of the past that makes them something historical does not lie in this transience that continues even during the objective presence in the museum. But then what is past about the useful thing? What were the "things" that they no longer are today? They are still definite useful things, but out of use. However, if they were still in use, like many heirlooms in the household, would they then not be historical? Whether in use or out of use, they are no longer what they were. What is "past"? Nothing other than the world within which they were encountered as things at hand belonging to a context of useful things and used by heedful Da–sein existing–in–the– world. That world is no longer. But what was previously innerworldly in that world is still objectively present. As useful things belonging to that world, what is now still objectively present can nevertheless belong to the "past." [40]

Heidegger makes a difference between "belonging to the past" and "having–been–there" because the "Da–sein can never be past":

The historical character of extant antiquities is thus grounded in the "past" of Da–sein to whose world that past belongs. According to this, only "past" Da–sein would be historical, but not "present" Da–sein. However, can Da–sein be past at all, if we define "past" as "now no longer objectively present or at hand"? Evidently, Da–sein can never be past, not because it is imperishable, but because it can essentially never be objectively present. Rather, if it *is*, it *exists*. But a Da–sein that no longer exists is not past in the ontologically strict sense; it is rather having–been–there. The antiquities still objectively present have a "past" and a character of history because they belong to useful things and originate from a world that has–been the world of a Da–sein that has–been–there. [41]

That is why outdate technologies of in general every historical event is never objectively lost but recoverable through the hermeneutical interpretation. We can say that a technology is always in some sense "fragile" because it is subordinated to the perpetual change of the World. The improvement of the modern world shows

[40] Heidegger, Martin. *Being and time.* State University of New York, 1996; p. 348.
[41]. Ibid.

that the utility of pragmata is increasingly shorter and therefore, their "lifespan" as "technologies" is even shorter. Comparing the life span of the Stone Age axe to the lifespan of a Steam machine and then to the lifespan of a computer program or further, to the lifespan as ephemera as the label or the ticket. History is "running faster" would Paul Virilio say.

Figure 19: Hindenburg at Naval Lakehurst (1936)

Wikimedia common:
http://commons.wikimedia.org/wiki/Image:Hindenburg_at_lakehurst.jpg

During the last years of the 20th Century, the fragility of the World has become palpable and that has increased the importance of institutions as libraries, archives and museums. To the large amount of pragmata, which these institutions try to save, there are some new worth to mention. One is the group of *abandonware,* the other is the group of *ephemera.* "Abandonware" stands for the computer software that is no longer sold or supported at the market. It is the case of older computer games but could be the case of other products.[42] ˝The name "ephemera" is given to everything that has been made to last only for a short time, such as "labels" or "tickets". However, the term is used to refer especially to printed pragmata.

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[42] Wikipedia (2008-04-17).

advertisements	die-cuts	poster stamps
bank checks	greeting cards	posters
baseball cards	indentures	programs
billheads	invitations	rewards of merit
bonds	labels	seed company ads
bookmarks	letters	Shakers
bookplates	magazines	sheet music
broadsides	maps	songsters
brochures	newspapers	stocks
business cards	packaging	tickets
calendars	pamphlets	timetables
cameo stamps	paper dolls	trade cards
chromos	passes	trade catalogs
cigar box labels & bands	photographs	valentines
clipper ship cards	postcards	watch papers

Figure 20: The Ephemera Society of America includes the following list of categories of ephemera

These artefacts are saved in museums and private collections and they differ from other museum items because they were intended to be technologically usable during a very short period. Their brokenness is palpable in their utility and it could be said that their *pragmaticity* is *very fragile*.

Entry 8: Virtual Technologies
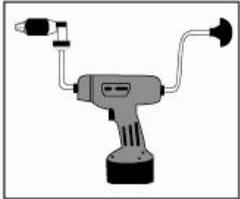
Space-broken		Virtual technologies

No every broken technology can easily be placed in a category of pragmata/noemata respectively ontical/ontological. That is because not every category of artefacts is in an obvious way constituted out of inner-consciousness aspects. On the contrary, some of the artefacts that populated the everyday world make a claim of being "objective". These artefacts of the second-level brokenness are built on the first level and their "objectivity" is in fact a re-elaboration of the subjectivity of the first level inner-consciousness.

One of the emerging groups could be named *virtual technologies* or also *impossible* technologies. They can be grasped as artistic artefacts, as ready-mades that present the docking process as a bricolage, playing with time and space, mixing noema and pragma to produce "hybrid" technologies.[43] As "hybrid" technology, we classify any broken technology that combines with the character of other broken technologies. In the following examples, the genres of broken technologies became humoristic when they combine different properties to produce impossible technologies. In our icon of this entry, the presented virtual tool, a synapse that combines different periods of the history of the drill, the modern "cordless" drill with an old "brace" drill.

What is it that we call *virtual*? Without doubt, virtual realities covers with renewed intensity the classic problem of the relationship between the soul and the body, that of the relationship between the immateriality of the soul and the materiality of the body, the lack of extension of the first and the vast character of the second.

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[43] All the pictures in this chapter are from: Anvari.Org;
http://www.anvari.org/cols/Back_to_the_Old_Technologies.html

Figure 21: A synapse between a flashlight and a candle

To understand what we mean with "virtual" today we believe that it is necessary to introduce further categories of analysis. We need to distinguish spatial dimensions as the *dignity* and the *size* of a representation, without specifying if this *representation* is considered an idea, an image, a concept, a word, etc. The dignity of a representation decides if it is *punctual, linear, plane or three-dimensional*. Pure thought (and the soul) for example, is *punctual* we say, because it lacks *extension*. We say that symbolic communication generally (linguistic expressions) is *one-dimensional*. The flat image can then be understood as *two-dimensional* and a real object as *three-dimensional*. Very different from the dignity of a representation is its size. The size of a thing can make it part of other things.

The dignity and size of a representation decides if it is a *thing* (a real object) or if the object is *virtual.* A test permits us to distinguish between a virtual object and a thing. We verify that things have always *at least one face hidden from sight*. In other words, artefacts which are "things" cannot be encompassed thoroughly only by *the act of sight*. Another form of expressing this idea is that an exhaustive examination of the thing always demands the resource of the sense of *touch*. With these categories of analysis, we can conclude that the images and ideas communicated through computers are not things but representations without the *dimension of touch*. We can also conclude that the dimension of touch is built on more primitive dimensions as those of dignity and size. We say that every-thing that we can touch is three-dimensional and has a size. To "be touched" should be understood directly or indirectly; e.g. atoms cannot be touched "directly", but they can be touched "indirectly" by the mediation of other small particles. Consequently, virtual realities are *less than* three-dimensional realities, and that means a reality that does not belong to the dimension of the real—presential and cannot be touched. Any study of virtuality is then a study of "non– presential" worlds, worlds in which the human body and the sense of touch is not available.

Of course, we can consider pure thought as "virtual", or the scenario of dreams as "virtual", nevertheless, for these expressions there are better terms than

"virtual". Let us here restring the meaning of "virtual" to "digital worlds produced by technological means". In this sense, the image on a mirror, which does not belong to the dimension of the real–presential, is not virtual, because it is not "digital". Virtual realities as we understand them are first, a consequence of science and technology, and especially today, they are "digital", exist in the domain of the electronic communication. Yet, the image on a mirror is the consequence of the technology of mirror construction but we do not consider them as "virtual". We need to introduce one more criteria to differentiate the digital image from that of a mirror. Both the images of the mirror and those of the computer's screen are *emergent* phenomena, consequence of the presence of other producing realities that are material. However, we notice that the digital image and the medium (the computer) that produce it, are the consequence of the human purpose (intentional act) while the image of the mirror is not intentional but *transcendental* and only the medium –the mirror itself– is intentional.

Further, we notice that a virtual representation has a variable degree of fusion with the thing that acts as its support or medium. A book, for example, and in general all printed representations, can be understood as the result of what in Spanish would be called *cosificación*; this is the processes which makes something thing–like. Cosificación makes the virtual representation an intermediate product between "pure thing" and a "pure thought". These printed representations, produced in a computer, show a much smaller degree of *cosificación* and can be considered a product much closer to pure thought. For instance a version of the Windows Operative System can be referred as "virtual" because this computer system is both a technology and it works digitally. In other words, "digital" or "virtual" technologies work in a "virtual world" because these worlds belong to the dimensionality of the untouchable and have been embodied in a computer program. In this sense, virtual technologies are *koto* as Rafael Capurro would call them referring to a Japanese term for "event". According to Capurro the contents of the Internet is never a "thing" (Japanese: *mono*) but an informational event. [44]

Because virtual reality does not reach to the level of everyday materiality, it could be considered as a form of *objectifying thought–representation*, in the same way as the world created by the written word first and the world created by the printer later were new ways to objectify thought contents, reproducing, and saving ideas, images, and intellectual developments. This new level of objectivity is achieved by means of new technologies, which are built on old ones. However, what are the differences? We noticed that virtual representations have a variable degree of *fusion* with the artefact that acts as its support. This evolution, from the first inscription of symbols on a rock to the apparition of the virtual word, is the process of the *vanishing* of the frontiers between *thought–as–internal–phenomena* and *thought–as–public–phenomena*.

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[44] See Tadashi Takenouchi, *International Journal of Information Ethics*, Vol. 1 (06–2004).

Once upon a time, humanity was moving from a collective mind to an individual mind, reaching the higher individual development with the development of the printer. This process of individualization was the necessary consequence of the identification between communication and transport because to write symbols on a rock was functional if the intention was to communicate with people in another time but in the *same place*. If the idea was to communicate with people *far away*, the written rock *had to be moved with the message to the place of the receiver* (in this time or in some another time). The solution to this practical problem was to associate communication to one specific human body, the body of the sender or of the messenger. The idea was that the messenger would reconstruct the message in a new place and time. The immediate consequence of this is that the message becomes extremely personal, and also language developed extremely ambiguously because the influence of personalized variations in syntax and semantics. Because of this the achievement of standardization became a necessity, which was solved with the development of the print. The print, which was the first step into the standardization of communication, was also the first step directed to the limitation of individualism and to the separation between communication and transport. Nowadays, human communication continues to move away from individualism, favouring the development on new standards of communication in a clear development of a *modern collective mind*. "Modernity" in the McLuhan sense of the term, supposes the end of the identification between communication and transport. As McLuhan noticed, "electrical" communication made individualism obsolete as it made communication independent from the human body. Since McLuhan's time, the process has developed further and the early electrical world has become digital.

To
Communicate
= to
transport;

Means
Individualism

**From a
collective
mind to
an
individual
mind**

The message
becomes
extremely
personal and
ambiguous

To
communicate
with people
far away, the
written rock
has to be
moved with
the message

The printer
created
standards of
Communica-
tion

Symbols on a
rock
=communicate
with people in
another time
but in the same
place.

**From an
individual
mind to a
collective
mind**

The frontiers
between
thought–as–
internal–
phenomena
and thought–
as–public–
phenomena
vanished

Figure 22: From thought as internal-phenomena to thought as public-phenomena

Texts as machines

We could say that since the computer revolution and the rise of a digital world, the nature of the text and its place in communication has remarkably change. According to Espen J. Aarseth this new situation, has clarified the existence of a kind of text that does not work "linearly" but as "machines". These ideas were presented in Aarseth book from 1997; *Cybertext. Perspectives on Ergodic Literature.* In his study, Aarseth explain that "mechanical" texts have always existed and they are not a consequence of a digitalised world. However, they became an identifiable group of texts because of the rise of Internet and the video games culture. According to Aarseth "the best-known example of cybertext in antiquity is the Chinese text of oracular wisdom the *I Ching.* Also known as the *Book of Changes*, the existing text is from around the time of the Western Chou dynasty (1122-770 BC)."[45] The essential characteristic of these types of texts –which Aarseth define as "Ergodic literature" is that it is not possible to clearly separate the different dimensions involved in the phenomena. The cybertext's "mechanical" nature makes it work as an indissoluble part of the medium in which the text is embedded. There are many distinct properties of these kinds of texts, each of the characteristics is difficult to define, yet together they contribute to a better comprehension of the cybertext. One of those characteristics is the "non-linearity", that means, that the words in the text are not aligned in space or in time in a linear way. We have said that the written text is obviously one-dimensional. Nevertheless, this is not true for the Cybertext, which as Aarseth shows, is multidimensional. Other important characteristic of these texts are their "interactivity" which is depending on their multidimensional character.

According to Aarseth the classification of text expands to cover any kind of produced script in any form, from a poem to a database:

> Instead of defining text as a chain of signifiers, as linguists and semioticians do, I use the word for a whole range of phenomena, from short poems to complex computer programs and databases. As the cyber prefix indicates, the text is seen as a machine not metaphorically but as a mechanical device for the production and consumption of verbal signs. Just as a film is useless without a projector and a screen, so a text must consist of a material medium as well as a collection of words. The machine, of course, is not complete without a third party, the (human) operator, and it is within this triad that the text takes place.[46]

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[45] Aarseth, Espen J. *Cybertext. Perspectives on Ergodic Literature.* London 1997, p. 9.
[46] Op. Cit. p. 21.
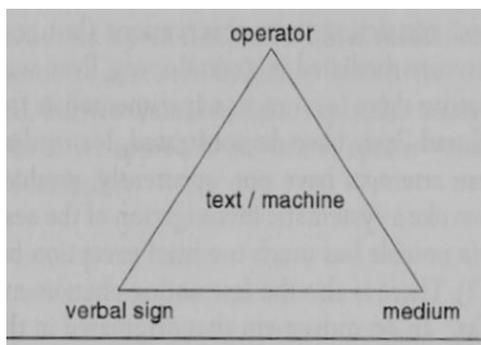
Figure 23: The figure is from Aarseth, Espen J. *Cybertext. Perspectives on Ergodic Literature*. London 1997, p. 21

According to Aarseth, the principal characteristic of a cybertext is that it is *complex*. Complexity makes a traditional reading of the text impossible, because it is impossible to predict its limits, and therefore the amount of acting involved increases in the act of reading.

> When a system is sufficiently complex, it will, by intention, fault, or coincidence, inevitably produce results that could not be predicted even by the system designer. A typical example is a chess program that plays better than its programmer. Even if there is no reason to suspect that anything but meaningless operations of shifting zeroes and ones go on inside the programmed machine, it nevertheless displays a significant behaviour that is not –and in fact could not–be anticipated by its programmer, even if it could be claimed that it was "intended".[47]

To analyse and classify the different types of texts Aarseth introduce some theoretical principles and produce some new analytical terms. Aarseth distinguish between *scriptons* and *textons*. Scriptons and textons are strings of signs and bearer of information and they differ from each other depending on how they *appear to readers* and how *they exist in* the text:

> (1) A text cannot operate independently of some material medium, and this influences its behaviour, and (2) a text is not equal to the information it transmits. Information is here understood as a *string of signs*, which may (but does not have to) make sense to a given observer. It is useful to distinguish between *strings* as they appear to readers and strings, as they exist in the text, since these may not always be the same or want of better terms, I call the

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[47] Aarseth, Espen J. *Cybertext. Perspectives on Ergodic Literature*. London 1997, p. 27.

former *scriptons* and the latter *textons*. Their names are not important, but the difference between them is.[48]

To produce a typology that manages the differences between traditional texts computer programmes, video games and databases, Aarseth created the following categories[49]:

Variable	Possible Value		Scriptons	Textons
Dynamics	Static		Constant	Constant
	Dynamic	IDT (intratextonic dynamics)	Change	Constant
		TDT (textonic dynamics)	Change	Change
Determinability	Determinable		Constant adjacent scripton of every scripton	
	Indeterminable		Variable adjacent scripton of any scripton	
Transiency	Transient (intransient)		The passing of the subjective time of the referring reader makes the scriptons appear. (As in some video games)	
Perspective	Personal (impersonal)		Necessary interactivity between the reader and the text	
Access	Random (controlled)		When all scriptons of the text are readily available to the user at any time	
Linking	Explicit, conditional, none		For hypertexts some links are more or less conditional	
User function	Explorative, configurative, interpretative, textonic.		Functions added to the user of a text	
Table 2: Aarseth's classification of texts				

[48] Aarseth, Espen J. *Op.cit.* p. 62.
[49] Aarseth, Espen J. *Op.cit.,* p. 64–65.

With the results of the typology, Aarseth conclude that the ergodic and the linear texts can be arranged as follow:
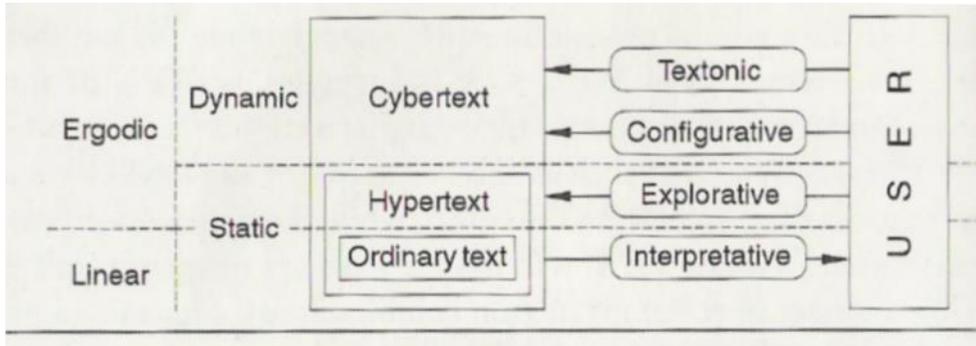
Figure 24: The figure is from Espen J. Aarseth. *Op. cit.*, p. 64.

Entry 9: Media-broken technologies

Media-broken	HAMM⌐	Intermediatic

Intentionality is pure acting and it is grasped as *praxis*. It is pure difference, something to be, never consolidate. Therefore, it is not correct to speak about the "medium" or "media" but instead about *intermediality*. To study intermediality in this sense is the same as the study of the process of directing mental acts, *the praxis of linking dimensions*. These linked dimensions are often connected as ekphrasis, understanding this term as the extension of discourse from one communicative medium into another medium. The dimensionality of e.g. "thought" is not the same as that of the "written word", or that of the "image", or that of the "artefact". In spite of this, synapse violates these frontiers in each intentional act. The world's dimensions show a very large variety of kinds, some can be of empirical character as those we use in geometry. Others are of phenomenological character, for example, the frontiers between *inside and outside* or the borderlines between *static and dynamic*. Dimensionalities can also be understood as those cognitive structures, which produce literary genres or painting schools. In this case, they work as underlines to genre–theory and to interartial studies. However, how are intentionality and knowledge related to the dimensionality of the world? We call the process of mutual dimensional influence a *synapse*, as the transcription of meaning from one dimensionality to another. The aptitude of the mind to *transcribe* ontical and ontological contents, from one dimensionality to any other, makes the development of knowledge and praxis possible. An example of media-broken technology is a ekphrasis, that is, a literary description or a commentary on a visual work of art.

Hans Lund has developed a typology of interartial relations, which we will

study closer.[50] We will notice that for Lund, art–relations and media–relations are connected relations. Following Lund's typology, and using it to illustrate the ideas of synapse, it is possible to deduce four fundamental forms of synapse. The first two involve synapse as *combination* (*inter–reference* and *coexistence*), a third form of synapse involve it as *integration,* and finally the fourth synapse as *transformation.* The differences between these four groups can be explained by the presence of different dimensionalities. We think that in many cases one media is clearly the primary and the other the secondary. The name we give the medium often reveals this aspect of that hierarchy, as in the case of the "illustration" in which the primary media is the image. The Lund–classification leads us to a classification of synapse as follow:

Inter–reference synapse	Coexistence synapse	Integrative synapse	Transformative synapse
The mental act A directed to the object E, is the mental act E' directed to the object A'	The mental act A directed to the object B presents together with the mental act E directed to the object D	The mental act A directed to the object B is the same as the mental act E directed to the object D	The mental act A directed to the object B stands for the mental act E directed to the object D
Table 3: Synapse typology following Hans Lund's model			

The study of the synapse in-between media can be studied decomposing with regard to their dimensionality. It is for example, possible to use the differences between painting, film or TV depending upon the relation between the *messenger* and the *receiver* during communication. The method consists in assigning both the messenger and the receiver some social dimensionalities as follows: public–to–public (TV, radio, newspapers); private–to–private (telephone communication); or mixed (mailing lists or blogs). The language of communication is sometimes natural (telephone, radio) but often artificial (Morse). Each language supposes some standards of communication, e.g. "hello" and "good bye". The time of the act of communication can be "real" as in telephone communication or "virtual" as in e–mail communication. The same is valid for the "scenario" or "space" of the act of communication. It can be in physical presence as in "face to face" communication or

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[50] Lund, Hans. (*Editor*). *Interart poetics : essays on the interrelations of the arts and media* / edited by Ulla-Britta Lagerroth, Hans Lund, Erik Hedling, Amsterdam: Rodopi, 1997.

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"virtual" over distance as in radio or TV. Different discourses uses different physical means to produce the act of communication. Some are sound waves, other video waves, other electric or electronic signals.

The list of media and art–forms gives us a table with many interesting developments. Many of them are not *real* objects –not even *possible* objects– in spite of this, even as pure possibilities, they teach us more about real artefacts.

Dimensions related to the relation emissary/receiver					
Social spheres	Plurality	Type of language used during the communication	Type of Time of the commu-nication (Real/differed)	Space of the communication (Presential /virtual)	Physical grounds of the communication
theatre	public to public	natural	real	Presential	visual/oral
television	public to public	technical and natural	real/differed	virtual	visual, audio
e–mail	private to private	technical and natural	differed	virtual	visual
Internet	public to public	natural	real/ differed	virtual	visual, audio
radio	public to private	natural	real	virtual	audio
newspaper	public to private	natural written	differed	virtual	visual
mobile telephone	private to private	technical and natural	real	virtual	audio
telegraph	private to private	technical/natural (Morse)	real	virtual	audio

Table 4: Representations of communication with regard to the dimensions of media.

The kind of congruence/incongruence between media and art–forms also reflects the congruence/incongruence between dimensions. The task of creating congruent communicative genres as that existing between theatre and TV, is supposed to match their respective dimensions. We can deduce that some media are "homozygote" and others are "heterozygote" in respect to each alternative dimension. According to our conventions, TV–genre is a public–public genre, and then it is a homozygote in respect to the social dimension of plurality. The genre e–mail, can be described as private–private media, also a homozygote in respect to the so-

cial dimension of plurality. Radio and newspapers on the other hand, should be heterozygote because they are public–private genres. Because TV, film, and theatre are homozygote in respect to plurality, they can substitute each other in just this dimension of communication. Which kind of synthesis could be possible between e.g. painting and TV? Because painting is a homozygote private–private media, and TV is a homozygote, public–public media, the synthesis adopt the form of a Russian matryoshka.

Media	painting	music	literature	theatre	film	sculpture	architecture
newspaper							
Television				TV–theatre	TV–film		
e–mail							
Internet							
film							
chat							
mobile telephone							
telegraph							
Table 5– homozygote and heterozygote artefacts							

Figure 25– Russian matryoshka
Wikimedia Commons:
http://commons.wikimedia.org/wiki/Image:Russian-Matroshka_no_bg.jpg

The synapse adopts the form of a TV–production *contenting* a painting or a painting *contenting* a TV–show. This *matryoshka*–synapse differs from the synapse between TV and theatre or film and the synapse between radio and theatre, which is a kind of *grafting*–synapse.

Entry 10: Game technologies

Reality broken		Game technology – Toy technology	Playing with artefacts, especially with "toys"

A tenth group is the family of play technologies and toys. It consists of miniature worlds inhabited by reproductions of full technologies that are not intended to dock with the world of full technologies. To be a toy is to be something without importance, an amusement artefact, or a pastime. It also means to treat something carelessly, without seriousness. Toys are artefacts that "pretend to be" real things and technologies that "pretend" to work properly. The connection to the full artefact can be only of some resemblance, but it can also be a perfect copy of the real thing. In any case, the idea is to create a belief of authenticity; it is a technology that works as a belief-factory. In some sense they are similar to fantastic technologies, but with a more developed sense of pragmaticity. We understand these technologies as reality-broken, understanding "reality" as the level of completeness that the everyday world demands in space and time dimensionality.

We need to distinguish between the artefact (the toy) and the process of playing. "A toy is an artefact made by adults to be used by children to play with. They have a very specific meaning and the form of the toy, their colour, and function is determined according to aesthetical, ethical, functional, or pedagogical principles. The modern toy is a typical European creation which is developed during the 18th Century." [51]

Roger Caillois is considered a major contributor to the field of *ludology*, to which he devoted his book *Les Jeux et les Hommes*. Roger Caillois' work brought together the fields of literary criticism, sociology, and philosophy by focusing on subjects as diverse as 'play' and 'the sacred'. He studied with thinkers such as Alexandre Kojève, and Marcel Mauss. With Georges Bataille he founded the College of Sociology, a group of intellectuals who lectured regularly to one another. Partly

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[51] Lönnqvist, Bo and Silvander, Johan. *Ting för lek och tanke. Leksaker i historien.* Historiska Media, 1999; p. 17.

formed as a reacting to the Surrealist movement, the College moved away from surrealism's focus on the fantasy life of an individual's unconscious and instead focused more on the power of ritual and other aspects of communal life. Caillois made a distinction between *paidia* and *ludus*, which describes the difference between "play" and "game". *Paidia* refers to the form of play present in early children (construction kits, games of make-believe, kinetic play) while *ludus* represents games with social rules (chess, soccer, poker). Caillois describes these categories through examples but he does not provide a strict definition. It is common to think that *paidia* has no rules, but this is not the case: a child who pretends to be a soldier is following the rule of behaving like a soldier and not as a doctor.

According to Gonzalo Frasca[52] the difference between *paidia* and *ludus* is that the latter incorporates rules that define a *winner* and a *loser*, whereas the former does not. Structurally, *ludus* follows the same three-act rule behind Aristotelian stories: First, ludus sessions go through a first act in which the rules are acknowledged; second act in which players perform, and, finally, a third act that concludes the game and draws the line between victors and losers. In both paidia and ludus, *simulation* provides an environment to express the way we see the world. In trying to explain the reach of the concept it is common to contrast *narrative,* as the form of the past of that which cannot be changed. On the other hand, *drama* would be the form that best expresses present time. According to Frasca, to take the analogy further, *simulation* can be seen as the form of the future. Simulation does not deal with what happened or is happening, but with what *might happen*. Unlike narrative and drama, its essence lies on a basic assumption: *change is possible*. Traditional media (literature, drama, film, TV) are representational, not simulational; they produce both descriptions of traits and sequences of events (narrative).

Further Caillois introduced a typology of playing and gaming structures in which he called the games of competition *Agon*; *Alea* was the name for games of chance; *Mimicry*, the name for the games of simulation and *Ilinx* for games of excitement. Caillois considered the cases in which these games structures were informal or institutional and when they were the manifestation of decadence and corruption.

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[52] Gonzalo Frasca, *Ludology meets Narratology: Similitude and differences between (video) games and narrative.* http://www.ludology.org/articles/ludology.htm (2007-11-19).

A classification of *paidia* and *ludus*

according to Roger Caillois

	Cultural forms	Institutional forms integrated to the social and cultural life	Corruption
Agón (Competion)	Sport	Rivalry in business, studies, work, etc..	Violence, cheating
Aiea (Chance)	Casino, lottery, horse race	Speculative stock exchange	Superstition, astrology
Mimicry (simulation)	Theatre, film	Ceremonial representation	Alienation
Ilinx (excitement)	Alpinism, skiing, etc.	Dangerous professions	Alcoholism and drug abuse

Figure 26: Paidia and Ludus

Games and the Pleasure Principle

Johan Huizinga was one of the founders of modern cultural history and who had an aesthetic approach to it. He believed that *art and spectacle* played an important part in history. In the book *Homo Ludens* from 1938 he discusses the influence of playing on the European cultural history. According to Huizinga playing as social activity is as old as humanity itself and has always been a natural activity for children in every culture. He says that this special activity can differentiate from everyday life's activities because to play supposes an activity that is *delimited* in both space and time. The meaning of the act of playing lies in itself, in its own rules. Another important property of playing is that the acting of playing supposes the *repetition* of the

steps of the played activity. In almost every form of play, there are repetitions, refrains, inverted words, and levels. Each play-act has its space and its duration, which are delimited in advance. Excitement according to Huizinga is also a very important part of the activity of playing and is related to the unknown, to chance and "luck". Nevertheless, to play also supposes *organisation*. Order comes to this activity through the rules of each play that in each case are compelling and of an unquestionable social character.

The play was also important for Sigmund Freud who in his book *Beyond the Pleasure Principle* from 1920 presented the archetype of the child game known as "Fort-Da". His interpretation of the game was related to the child's instinctual renunciation to satisficing allowing his mother to go away. The child compensated himself for this loss, staging the disappearance and return of different objects within his reach. This is the structure of the *pleasure principle*; there are procedures that convert that which is unpleasant into pleasant experiences.

Figure 27: Together with Dorothy Burlingham Anna Freud opens the "Jackson Nursery" on the Rudolfsplatz, a kindergarten in which she can begin her study of aspects of infant behaviour.

Sigmund Freud Museum Vienna
http://www.freud-museum.at/freud/chronolg/1937-e.htm

For millenniums, we have relied on "representation" for both understanding and explaining our realities. This is especially true with a particular form of structuring representation: *narrative*. "Representation" is such a powerful formal mode of communication that it has become evident to our civilization. However, "simulation" is not a new form of narrative. It has always been present through such common things as toys and games but also through scientific models or cybertexts like the I-Ching. In the late 1990's, Espen Aarseth revolutionized electronic text studies with the following observation: *electronic texts can be better understood if they are analysed as cybernetic systems*.[53]

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[53] See more about this in "Virtual technologies".

An outline of the third-level of brokenness

Technologies of the third-level brokenness are those that are socio-cultural-broken. This can be the case of value-brokenness in an economic sense or in any other sense of "value". Every form of amateurism belongs to this level of brokenness. This is also the case of the second language and artificial languages, which are broken in e.g. idiomatic aspects. An idiom is a phrase which meaning cannot be learned from definitions, but instead refers to a metaphorical meaning determined by common use. Because an idiom generally is a colloquial collection of metaphors built on knowledge and experience of a particular culture the second languages often show more or less brokenness concerning idiomatic aspects.

A TABLE OF THIRD-LEVEL BROKENNESS		
ARTEFACT	TYPE OF CONGRUENCE	EXAMPLE
VALUE-BROKEN	FAMILY TECHNOLOGY	WORK PERFORMED IN THE HOME OF ANY KIND
IDIOMATIC-BROKEN	SECOND LANGUAGE & ARTIFICIAL LANGUAGE TECHNOLOGIES	ENGLISH AS A GLOBAL COMMUNICATIVE TOOL
QUALITY-BROKEN	THE ACTIVITIES AND LABOUR OF THE HOBBYISTS	AMATEURISM IN ANY FORM
NATURE-BROKEN	DEVICES THAT IMITATE LIFE OR LIFE'S MOVEMENT	THE ROBOT
IDENTITY-BROKEN	CLONING AND ASSISTED REPRODUCTIVE TECHNOLOGIES	'DOLLY' THE CLONED SHEEP

Figure 28: Jan Vermeer. The Kitchen Maid. c. 1658; Oil on canvas, 45.5 x 41 cm;
Rijksmuseum, Amsterdam
http://commons.wikimedia.org/wiki/Image:Jan_Vermeer.The_kitchen_maid.jpg
(Wikimedia common: 2008-11-25)

A third case of third level brokenness is that of the hobbyists and their activities, which are typical of the postmodern era.
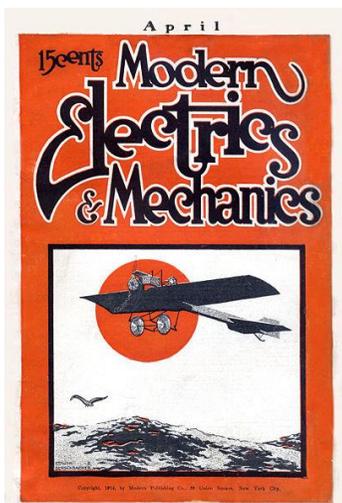
Figure 29: *Modern Electrics and Mechanics* April 1914 Volume 28, Number 4
http://commons.wikimedia.org/wiki/Image:Modern_Electrics_and_Mechanics_Apr_1914.jpg
(Wikimedia common: 2008-11-25).

Entry 11: Value-broken technologies and broken labour

Value-broken		Family technology	Family-work in any form

The substance of value in Marx

It is important to make some specifications about Marx idea of value. In *Das Kapital*, Marx wrote:

A commodity is, in the first place, an object outside of us, a thing that by its properties satisfies human wants of some sort or another. The nature of such wants, whether, for instance, they spring from the stomach or from fancy, makes no difference. Neither are we here concerned to know how the object satisfies these wants, whether directly as means of subsistence, or indirectly as means of production.[54]

The idea of *value* of Marx is closer to the idea of the satisficing of *wants* than to the idea of the satisficing of *needs*. Marx uses the term "menschliche Bedürfnisse" which can be translated as both "wants" and "needs" however, there is an important difference in meaning between those two terms. After this sentence, Marx quoted Nicholas Barbon's words to make his idea of value clearer:

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[54] Section 1, *The two Factors of a Commodity: Use-value and value*. (The substance of value and the magnitude of value). Capital Volume I.
http://www.marxists.org/archive/marx/works/1867-c1/ch01.htm#S1
From the German original: "Die Waare ist zunächst ein äusserer Gegenstand, ein Ding, das durch seine Eigenschaften menschliche Bedürfnisse irgend einer Art befriedigt. Die Natur dieser Bedürfnisse, ob sie z. B. dem Magen oder der Phantasie entspringen, ändert nichts an der Sache. Es handelt sich hier auch nicht darum, wie die Sache das menschliche Bedürfniss befriedigt, ob unmittelbar als Lebensmittel, d. h. als Gegenstand des Genusses, oder auf einem Umweg, als Produktionsmittel."
Das Kapital. Kritik der politischen Oekonomie. Karl Marx. Erster Band.
Buch I: *Der Produktionsprocess des Kapitals*.
http://pagesperso-orange.fr/dumauvaiscote/Das%20Kapital_Kap1_1867.htm#_ftnref2

> *Desire* implies *want*; it is the *appetite of the mind*, and as natural as hunger to the body.... the greatest numbers (of objects) have their value from supplying the wants of the mind. *Nicholas Barbon* : *A Discourse on coining the new money lighter, in answer to Mr. Locke's Considerations* etc. *London 1696*, p. 2-3.[55]

This is important to remark because we need to put some order in the different uses of the underlying idea of "intentionality." Marx belongs to a post–Kantian time and we assume here that even Marx is working within a field already influenced by Kant's phenomenalism. What is new in the work of Marx is the idea of acting as phenomenal, the acting of labour that realises the "intentions" of the worker when the worker is trying to realise his "wants". There is an explicit need in the philosophy of Marxism to make "productive" labour –that is the wage-earning labour the essential form of labour. That was certainly the central form of economic production of the capitalism of that time and maybe still is very important. However, this form of labour is not the same as "labour" in general; labour in all its forms cannot be reduced to a particular form or period. The same is valid for value, if value is only connected with "productive" labour, there is no value in non–productive acting and that is not the case. In general, productive labour is labour that can produce more than is necessary to maintain the producer, but in our own way to see this, some form of surplus value, originates in each "labour–circumstance". Let see some examples of non–productive labour:

> Tendai is a young girl in the Lowveld, Zimbabwe. Her day starts at 4 A.M. when she carries a thirty–litter tin to a borehole about eleven kilometres from her home to fetch water. When she returns about five hours later, she eats a little and then gathers firewood until midday. She does the breakfast dishes and then prepares lunch for the family. After lunch, she again does the dishes, and then wanders in the hot sun until early evening, gathering wild vegetables for supper before making the evening trip for water. Her day ends at 9 P.M., after she has prepared supper and put her younger brothers and sisters to sleep. According to the international economic system, Tendai is considered "non–productive," unoccupied, and economically inactive.[56]

Michelle Yaiser identifies "productive labour" with "active labour" and in this sense, the working day of the young girl from Zimbabwe is indeed very active and therefore "productive". However, Marx definition of "productive" has nothing to do with "activity" but with receiving wages, salaries, or (monetary) benefits for ones activities because in this case this activity generates surplus–value to the capitalist. What we need to do here is to not try to force non–productive labour into the

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[55] *Das Kapital. Kritik der politischen Oekonomie.*
http://pagesperso-orange.fr/dumauvaiscote/Das%20Kapital_Kap1_1867.htm#_ftnref2
[56] Yaiser, Michelle. *Improving Development: Incorporating "Nonproductive" Labour into Economic Analysis.*
http://www.bc.edu/bc_org/avp/cas/soc/SocialMoments/yaiser8.htm

sphere of productive labour but to leave Marx definition of labour and value behind considering it a specific case of labour and value. In another example of Yaiser we find more of the same problematic:

> Cathy, a young, middle–class North American housewife spends her days preparing food, setting the table, serving meals, washing dishes, dressing and diapering her children, disciplining the children, taking the children to school, dusting, doing the laundry, going to the gas station and the supermarket, repairing household items, ironing, keeping an eye on or playing with the children, making beds, paying bills, putting away toys, books, and clothes, sewing or mending or knitting, answering the telephone, vacuuming, sweeping, washing floors, cutting the grass, weeding, shovelling snow, cleaning the bathroom and the kitchen, and putting the children to bed. Just like Tendai, Cathy is considered "non–productive," unoccupied, and economically inactive.

We have to remember that for Marx, exchange-value is not originated in intentionality as such but in intentionality *that is not paid*. The following text confirms this expressly, if nothing extra happens, labour itself does not produce value:

> Let us now consider the total value of the product, the 10 lbs. of yarn. Two and a half days' labour has been embodied in it, of which two days were contained in the cotton and in the substance of the spindle worn away, and half a day was absorbed during the process of spinning. This two and a half days' labour is also represented by a piece of gold of the value of fifteen shillings. Hence, fifteen shillings is an adequate price for the 10 lbs. of yarn, or the price of one pound is eighteen pence. *Our capitalist stares in astonishment. The value of the product is exactly equal to the value of the capital advanced.* The value so advanced has not expanded, no surplus–value has been created, and consequently money has not been converted into capital.[57]

However, the astonishment of the capitalist disappears when he discovers that the exchange–value of the labour–power does not coincide with its use–value:

> Let us examine the matter more closely. The value of a day's labour–power amounts to 3 shillings, because on our assumption half a day's labour is embodied in that quantity of labour–power, i.e., because the means of subsistence that are daily required for the production of labour–power, cost half a day's labour. But the past labour that is embodied in the labour–power, and the living labour that it can call into acting; the daily cost of maintaining it, and its daily expenditure in labour, are two totally different objects. *The for-*

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[57] Marx, K. *Capital I; Section 2; The Production of Surplus-value.*
http://www.marxists.org/archive/marx/works/1867-c1/ch07.htm#S1

mer determines the exchange–value of the labour–power, the latter is its use–value. The fact that half a day's labour is necessary to keep the labourer alive during 24 hours, does not in any way prevent him from working a whole day. Therefore, the value of labour–power, and the value which that labour–power creates in the labour–process, is two entirely different magnitudes; and this difference of the two values was what the capitalist had in view, when he was purchasing the labour–power.[58]

The labour of Tendai and Cathy according to a Marxian perspective has use–value but no exchange–value. As we see this, the Marxian definition of value is of no use in general studies of labour and Marx was not interested in studying value in general but only in connection to political economy. However the narrowness of the Marxian understanding of value affects political economics as well because it do not comprehends the study of value in a non–productive situation. In other words, to develop and study a general theory of labour generated value, supposes to leave the Marxian idea of exchange–value behind and concentrate our study on what Marx called use–value.

Use–value and archaic labour

The question of the so called "non–productive" labour, which more appropriately should be named "none–paid labour" or "archaic" labour, is a key problem for the future of the philosophy of praxis. This has been observed by many feminists who have studied the situation of women's labour at home and in relation to the whole economy of society. Margaret Benston quoted Ernst Mandel when he wrote:

> In capitalist society, commodity production, the production of exchange values, has reached its greatest development. It is the first society in human history where the major part of production consists of commodities. It is not true, however that all production under capitalism is commodity production. Two classes of products still remain simple use–value. The first group of all objects produced by the peasantry for its own consumption [...]. The second group of products in capitalist society which are not commodities but remain simple use–value consists of all objects produced in the home. Despite the fact that considerable human labour goes into this type of household production, it still remains a production of use–values and not of commodities. Every time a soup is made or a button sewn on a garment, it constitutes production, but is not production for the market.[59]

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[58] Marx, K. Ibid.

[59] Mandel, Ernst. *An introdution to Marxist economic theory*; 1967. Quoted by Margaret Benston, "The Political Economy of Women's Liberation", 1969. (*Materialist Feminism. A Reader in Class, Difference*

In a study of the socialist economy Alec Nove wrote that one of the most serious problems of Marx' theory of value is that Marx did not see use–values as comparable realities. According to Marx, a use–value is a "particular", a concrete artefact in some sense unique and with a qualitative essence, which is not quantitative comparable. This becomes an important problem for the economy of socialism because two very similar use–values can differ in their usability. That difference can only be established in an open market in which the consumer could decide the use–value of the qualities of the products to use.[60] The "market" is nothing else than the place and time in which the products of labour shows their correlative congruence; the market is a *docking-place*. Consequently, the use–value, which is qualitatively better, shall be more valued and the production of the less utilizable shall be stopped. The demand of this use–value is going to be stronger and the results of this competition will make possible the improvement of the technologies and the productive methods involved in the production of those use–values. In the early days of humanity, before the development of class societies, the economics of society was built on "non–productive" or "archaic" labour, that is, people worked to satisfy their and their families wants without being "paid" for it. That does not mean that this labour was not "remunerated". This type of labour exists today almost as then but it is an invisible part of the economics of Modern society because it is not rewarded with a salary. At that time, tribes and clans exchanged products with other tribes and clans and the mechanisms of these exchanges were the same as those we see in the modern market. They tested their products, *docking* them with each other and with their wants choosing those they believed were better. These mechanisms granted the improvement of labour, motivating to the development of talent and of skilfulness.

Either Use–value or Change–value

Alfred Sohn–Rethel wrote in 1978 that the use of commodities and the exchange of commodities are in time mutually exclusive processes.[61] That happens because during the exchange process, the establishment of exchange value demands that the material status of the commodity remains unchanged. About this dichotomy, Alfred Sohn–Rethel wrote:

> The point is that use and exchange are not only different and contrasting by description, but are mutually exclusive in time. They must take place separate-

and Women's Life. edited by Rosemary Hennesy and Chrys Ingraham, 1997).

[60] Nove, Alec. *Teori om en möjlig socialism.* (*The Economics of Feasible Socialism.* 1983). Röda Bokförlaget AB, 1985.

[61] Sohn-Rethel, Alfred. *Intellectual and Manual Labour. A Critique of Epistemology*; 1978.

ly at different times. This is because exchange serves only a change of owner-ship, a change, that is, in terms of a purely social status of the commodities an owned property. In order to make this change possible on a basis of negotiated agreement, the physical condition of the commodities, their material status, must remain unchanged, or at any rate must be assumed to remain un-changed. Commodity exchange cannot take place as a recognised social in-institution unless this separation of exchange from use is stringently observed. This is a truth, which need only be uttered to be convincing, and I regard it as a firm basis on which to build far–reaching conclusions.[62]

Consumer   Vendor

Figure 30: The consumer and the vendor

In our visualization–model, Judith Weller's *Garment Worker* from 1984 give form to "use–acting" while Baca Rossi's, *Fish vendor* from 1976 shapes "exchange–acting". According to Sohn–Rethel the separation in time of use and exchange is a fundamental law of civilization, because it is the law which makes society work as a regulated unconscious mechanism. This separation is built on the concept of *property*, which works socially as a law:

> The concept of property is it self only a conceptualisation of the factual ne-cessity of keeping use and exchange separated. The need to exempt from use objects entered for exchange is a simple fact of experience; if it is ignored ex-change must cease.[63]

The use–value of labour power is specific in industry but different in com-merce. A teacher's labour-specificity makes his/her labour power different from the

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[62] Op.cit. p. 24.
[63] Op.cit. p. 40.

labour power of a housekeeper. However, each of these labour powers have use–value. What is then that process which gives them the property of being "valuable"? That they are a part of the chain of congruence-testing and docking of artefacts during which communication is constructed in society. The differences between the different forms of labour are rather ontical than ontological. They may differ in the ontical aspects of labour (their cognitive aspects) but not in their intentional nature and therefore not in the ontology of labour. The product of homework, that is, the fulfilled day work of a "housewife", is the consequence of realized *purpose*. It can happen that this homework contributes to the reproduction of labour power and in this way comes into cycle of capitalism, but this is irrelevant for our study. In respect to the ontology of intentionality, there are no differences between working in a factory and working at home as a housekeeper. The differences are not ontological but of a lower level e.g. economic or sociological. In this sense, the theoretical problem we are confronted with is that historically, the sociology and political economy of Marx once invaded the sphere of ontology and eclipsed the ontological levels of labour and value. This is especially problematic because Marx is the first and beside Heidegger, the most important philosopher of praxis.

We assume here that the labour performed in the home of Cathy, the middle–class North American housewife of Michelle Yaiser's example is economically possible because her husband works somewhere and receives a salary. This salary paid the reproduction of the power of labour of Cathy's husband including the family needs. Otherwise should he do not work at all:

> The owner of labour-power is mortal. If then his appearance in the market is to be continuous, and the continuous conversion of money into capital assumes this, the seller of labour-power must perpetuate himself, "in the way that every living individual perpetuates himself, by procreation." The labour-power withdrawn from the market by wear and tear and death, must be continually replaced by, at the very least, an equal amount of fresh labour-power. Hence the sum of the means of subsistence necessary for the production of labour-power must include the means necessary for the labourer's substitutes, i.e., his children, in order that this race of peculiar commodity-owners may perpetuate its appearance in the market. [64]

However, the fact that Cathy's family supplies its family needs by selling Cathy's husband's work at the market, is irrelevant here in connection to the work that Cathy delivers to the family and indirectly to society. Her work is in any case pure surplus value gained by the family and by society and it does not disappear into the pockets of any capitalist as the work of her husband does. The connections of family–work and wage earner–work in modern life is obvious and it is well known

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[64] Karl Marx. *Capital, Volume One. Chapter Six: The Buying and Selling of Labour-Power.*

that long time unemployment adventures the quality and even the existence of family work. Nevertheless, the reproduction of labour–power assure on one hand that the capitalist obtain a renewed labour–power but on the other hand, that society becomes a *congruent society*, a "working whole" that makes sense because of the family-labour. The grade in which individuals work for common values is not given by capitalism and vary from society to society; is not the same e.g. in Japan than in Spain. Is this surplus value of the same type that the surplus value created by wage earner–work? Of course, the total amount of value of the family (and society) has been increased on the basis that some have been working for "nothing". Because women working at home cannot compare their amount of work with any salary, they have to compare their daily work with goods of the kind that they have been produced within the family.

Head and Hand in Labour

In the second part of his work, Sohn–Rethel tries to find some simple principles to understand the involvement of intellectual and manual work in the process of production. He recognizes that "no human labour can take place without a degree of unity of head and hand". However, Sohn–Rethel says, this is not the end of the analysis;

> But for us the essential question is: in whose head is the intended result of the labour process anticipated?[65]

Here Sohn–Rethel is asking who is controlling the whole working process. Being a child of his time (the book is from 1978), the analysis of Sohn–Rethel is carrying some predisposition against intellectual work and the mystification of the work done "by hand". For our own account, the question is important because we do not distinguish between any kind of praxis and the matter of whether praxis has an intellectual character or if it is of a "manual" kind is not important for us. Let us see one of his examples:

> It is important for us to differentiate between personal and social unity, or division, of head and hand. Personal unity attaches only to the labour of the one–man producer. This does not mean that, conversely, all individual one–man production presupposes such a personal unity; for example, the slaves who produced the pottery or textiles by their individual labour were far from being masters of its purpose or form.[66]

As we see it, the slaves who produced the pottery or textiles by their individual labour, made these commodities as any other worker of any time has done and

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[65] Op.cit.; p. 84-85.
[66] Ibid.

are going to do, namely, converting knowledge to intentionality and intentionality into materialized work and value. As we said above, the mind *materializes* through the intentional act and becomes materialized work in an *artefact*. That what Sohn–Rethel has in mind when he tries to find a materialist epistemology is the always–cited opposition between "mental and manual labour – present throughout the whole history of exploitation and assuming the most varied forms." This opposition is in fact a misunderstanding, which identifies exploited–work with manual–work, and exploiting–work with intellectual–work. The correct equation would be that to identify exploited–work with the lack of control of the whole working process. However, this has nothing to do with the involvement of the exploited worker's intentional activity during the working process. Without the workers mental and emotional engagement in the working process, no productive work could be done and then no value could be created.

Family labour and broken value

An immediate consequence of the idea of "broken technologies", is that of the determination of the existence of a different kind of labour that use these broken technologies to produce "broken artefacts". Is it possible that broken work creates "broken values"? We can expect that the use-value of the produced artefacts is also broken. In general, the use-value of broken artefacts is less valuable than the use-value of whole-artefacts. The use-value of e.g. a sketch is less valued than that of the accomplished artefact. Magical cure procedures are less valued than scientific medicine procedures, the solutions of the technologies of poverty are less valued or not valued at all because of their limitations, etc. According to Plato, the carpenters, who create a table, imitate God by doing so, but the artist that paints a table, imitate the carpenter. Therefore, the artist should be understood as an *imitator of an imitator* or in other words, a very poor designer. Outdate technologies are less valued than up-to-date technologies and fantastic artefacts are not understood as real artefacts but rather as daydreams. In other words, we can assert that the use-value of broken artefacts is also "broken".

We can now ask ourselves how much does this reduced use-value in the exchange-value influence on the produced artefacts. Is it possible to conceive broken artefacts as commodities? If Marx was right and the origin of value is the amount of abstract time of labour dedicated to the production of the artefact (commodity), broken artefacts shall have exchange value and shall behave themselves as any other commodity does at the market. The laws of offer and demand should also work too, because the scarcity respectively abundance of broken artefacts should affect their exchange value too. In the submarket of poverty, broken artefacts have exchange value as any whole commodity has and are apparently exchangeable in relation to both the amount of work demanded to be produced and upon their ac-

cessibility at the market. However, the artefacts of poverty have not exchange value on the whole market. In the same way, the work of art, which has a place in the global market, appear to be indifferent to the amount of labour-time dedicated to their production. We must remember here that the majority of all the amount of art works, never achieve the standard of a whole market artefact. That is the case for any definition of art and especially for the conventionalist definition, according to which to be a work of art is to be an artefact of a kind created, by an artist, to be presented to an art world public.[67] The fact that these artefacts are of reduced use-value make them less valuable or not valuable at all as exchange values at the whole market.

That is certainly the case of some of the groups of broken artefacts, those belonging to the group of tentative or fruitless technologies. Belonging to these groups are the family technologies as a subgroup. Every artefact has its beginning at someone "backyard". As an example here could name the case of John Stith Pemberton 1831-1888, an American druggist inventor of Coca-Cola. He began his work with tentative technologies experimenting with an old family recipe belonging to the family of his African American house cleaner.

Figure 31: John Stith Pemberton inventor of the Coca-Cola

During his time, there was a large demand for home remedies and tonics in the United States. Coca-Cola which included kola (a tree from Africa of the same family as the cacao, rich in caffeine) and the coca leaves was originally used as a brain tonic that cures headaches and calm nerves. The receipt of the new product was still tentative until it began to be produced. Even after the receipt leaved the experimental board and got a patent and a social status, it was still a *tentative* prod-

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[67] Dickie, Geroge. *Art and the Aesthetic: An Institutional Analysis*. Cornell University Press, 1974.

uct. It was first when it was confronted with the whole market and became exchanged for other commodities, that the Coca-Cola also became a commodity. To become a commodity the tentative artefact has to fulfil two conditions: first it has to be produced outside the family level of needs in an amount of units that can satisfy a larger group of persons; secondly it has to achieve a level of quality which can be acceptable even by persons that are not members or friends of the own family; these are the conditions demanded to a tentative (familiar) artefact to achieve the commodity status. Before becoming a commodity the artefact need to exist as a broken one, as a tentative and more or less fruitless project. In this sense to cultivate potatoes at the family backyard is family labour as long as the production is consumed by the family and their friends. Nevertheless, if the *amount* of produced potatoes surpasses the needs of the family and the surplus is sold at the market, the family backyard's production becomes business and the potatoes become commodities. Of course the *quality* of the potatoes and their *quantity* is relevant in this process. Another example could be the fallowing: a family member can take care of a sick member of the family without being a health professional. At home it is possible to be a practitioner of folk medicine or magic even if you are a licensed medical doctor. But if this praxis shall be applied at the whole market and it is intended to be sold as a way to earn money, you need a social license according to the standards of up-to-date technologies to practice medicine. In other words, you have to *dock to the social corpus* and to manage this your performance has to achieve some level of social quality standards.

However transcribing home labour to the social level is not as easy as we first think. In fact, these employments have a lesser rang in society and have the lowest salary standard. This situation has an explanation its the fact that to work as e.g. a "house keeper" does not differ so much from a work at home with the same tasks of knowledge and experience. These jobs fit in the category of *non-qualified* jobs and are usually announced, with the label of "no previous experience is needed". As an example we can use the case of the *scullery maid* who was the lowest-ranking of the female servants in the big houses of the 19th Century and acted as assistants to a kitchen maid. It is not difficult to trace these jobs in history; they have almost been the same situation throughout time, from the slaves of Antiquity to the modern house keeper of the 20th Century.

Figure 32: Oil painting of a scullery maid by Jean-Simèon Chardin.

Wikimedia common:
http://en.wikipedia.org/wiki/File:The_Scullery_Maid_(L%27Ecureuse).jpg

"Her duties included the most physical and demanding tasks in the kitchen, such as cleaning the floor, stoves, sinks, pots and dishes. Before the advent of central heating systems, scullery maids were required to light the fires and supply hot water."[68]

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[68] See Wikipedia, "scullery maid".

Entry 12: Second language technologies
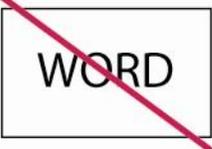
Idiomatic-broken	WORD	Second Language and artificial language Technologies	English as a global communicative tool

Is it possible to understand language as technology? *Understood as performatives or speech acts*, language utterances, can be understood as tools, and its structures and rules can be seen as technologies. There is no doubt that artificial languages are technological devices. All the modern development of computer languages are very good examples of technological languages. We could also say that when these languages exceed their time and nobody uses them anymore they will develop into broken technologies.

A s*econd language* is language learned after the mother tongue, a learning process achieved some time after puberty when the learning is necessarily more conscious than intuitive. To learn a second language is to be seen as a socio-cultural necessity of the global society. The dominant international second language of the world today is the English language. To learn the first language demands only a few years of our early life but to learn a second language is a lifelong learning process. Of course, the learning process of a second language also depends on the similitude and differences between the first and the second languages. Second language learners produce errors of syntax and pronunciation because the influence of the first language. These errors can be listed as "typical" for each original relationship between these two languages.

The user of a second language shows a diminished grammatical competence manifested in the lack of knowledge of lexical matters, of rules of morphology and syntax. The deficiency stretches to some inaccuracy in the ability to connect sentences in discourses to form a meaningful whole. But the principal differences between the first and second language users is *idiomatic*. Idiomatic are semantic contents that cannot be learned from definitions, but refers instead to a metaphorical meaning determined by common use.

Modelling Languages

We have seen that it is specific for tentative technologies to postpone the process of docking. A sketch or a drawing shows the shadows of pragma and noema. We have said that they are only a trace, something to be. However, some methodologies have been developed to work with these "shadows" and some of them have been conceived as languages. Of course there are typical cases of brokenness because of their goals and because of their means. I will introduce these languages with the generic name "modelling languages"; we notice that a common characteristic for them is that they work heuristically.

Heuristics from Greek *heuriskein*; to discover, can also be understood as a didactic method to systematically approach to the solution of a problem. What is characteristic for heuristics is that anything is allowed, encouraging the implementation of the most creative means possible. However heuristics emerged as the self-reflecting process during which the mind tries to understand how problems are solved and how these solutions can contribute to the solutions of other problems. Creating models is then an important and natural part of this heuristic approach, which cannot be developed as a phenomenological methodology without developing rules for depiction and rules of interpretation that can be used to communicate within the community of researchers. These rules and depicting standards convert the modelling activity into a structured semantic field with grammatical rules which make them "languages" used as technologies of communication.

> Whenever you solve a real-world problem, you have to create a model of that problem first. It is critical to make the distinction that the model that you work with isn't the same as the problem. Every model leaves something out. It has to otherwise it would be as complicated and unwieldy as the real-world itself. We always work with simplifications of how things really are. We have to accept that. Every solution we create is, to be precise, a solution only to the model that we postulate as being a useful representation of some real-world setting that we want to capture. The trouble with models is that every one of them has an associated set of assumptions.[69]

The complexity of the task of solving problems of any kind has to do with the fact that any solution belongs to the "future", that is the solution of an actual problem exists in some future dimension that does not yet exists. The vagueness of the model as the vagueness of any tentative technology depends on this particularity. That is why the development of depicting languages can be helpful. Models and modelling languages are simplifications of the phenomenological field. They work only as "interpretations" of the future and are attached to the concrete conditions

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[69] *How to Solve It: Modern Heuristics.* Zbigniew Michalewicz, David B. Fogel. Springer-Verlag Berlin Heidelberg, 2000; p. 30.

valid under the development of the depiction act.

> Every time we solve a problem we must realize that we are in reality only finding the solution to a model of the problem. All models are a simplification of the real world; otherwise they would be as complex and unwieldy as the natural setting itself. The process of problem solving consists of two separate general steps: (1) creating a model of the problem, and (2) using that model to generate a solution: Problem –Model –Solution.[70]

An example of these languages is the *Unified Modelling Language* an artificial language that provides engineers with standardized mechanisms for visualizing, specifying, constructing, and documenting software systems. The standards are collected from the everyday praxis of the field and developed by professionals as it was a computer program available at the market.

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[70] *How to Solve It: Modern Heuristics.* Zbigniew Michalewicz, David B. Fogel. Springer-Verlag Berlin Heidelberg, 2000; p. 15-16.

Entry 13: Amateur-technologies
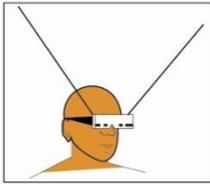
Quality-broken		The activities and labour of the hobbyists	Amateurism in any form

Quality-broken technologies

A hobbyist is a person who engages in any activity as a pastime and not as a "professional". As a "professional", we understand a person who earns a living with these activities. The hobbyist is a social and cultural character of the highest importance for the development of technology during the 20th Century. We can find this social character connected with the development of technologies of low costs, often used at home. The examples of the development of radio and other electric devices can illustrate this situation. Closer in time we can find the development of the first steps of computer technology. The ingress of the hobbyist into the field of computation can be related to the development of the BASIC language because the structure of this programming language is closer to that of natural language. The first version of BASIC was presented in 1964 provoking a revolution radically increasing the number of users of computers and making it possible for a group of hobbyists to participate. With the incorporation of the hobbyists the necessary market for the PC was born and the science of programming entered the postmodern age of *popular science and popular technique.* In January of 1975 the front page of "Popular Electronics", announced a microprocessor named ALTAIR 8800 to the price of 397 dollars, constructed by a small company of New Mexico named "Micro Instrumentation Telemetry Systems". MITS was founded and directed by the hobbyist Ed Roberts. This was the first processor with a price and a technology accessible to the hobbyists and it became the starting point of the PC. Bill Gates and Paul Allen created a primitive operating system using BASIC to this processor. It is important to recall here that neither Gates nor Allen were engineers but young hobbyists with an extraordinary talent for businesses and a very clear vision of the way that the development of the sector would follow in the near future. In the following years, they founded MICROSOFT . Later they made the agreement with IBM for the devel-

opment of an operative system - known as DOS – for their first PC and the agreement with Apple Computers according to which, Apple Computers relinquished the rights of their GUI system to MICROSOFT, making possible the development of the operative system WINDOWS. Other hobbyists of importance were Stephen Wozniak and Steve Jobs developers of Apple Computers and of the first computer with the GUI system. Jobs maintained an open relationship to the "Computer Liberation" movement, which today is still outstanding and which since then, propagate for social release through the use and popularisation of computers. An ideologist of this group is Ted Nelson the creator of the term "hypertext" and the head leader of the group of the hobbyists who worked for a new social order. This ideology then moved over to other individuals of new generations and is today still the political ideology of the "hackers". A very interesting late product of this ideology is the system known as LINUX, a free of charge variant of UNIX, which was distributed through the Internet to anyone who wants to get a copy, one of the first "open source code" initiatives of the age of popular science and popular technology.

Amateurism and professionalism in computer technology

Around the seventies, two groups of users of computers could be distinguished, the *professionals* and the *hobbyists*. The professionals of the branch and the large companies saw this development with hostility; especially when it became obvious that the group of hobbyists would be economically powerful. Since then there are two easily identifiable ideological schemes. The first is that which consider methods and devices that are technical obscure and inaccessible for the majorities as "high qualitative" – and another group that works to simplify the use of devices and see usefulness and pragmaticity as the authentic "high quality". We shall consider here, following the judgment of the professionals, that the technology of the amateurs is "quality-broken". It is important to notice that the technology of the amateurs is broken only with respect to skilfulness in relation to professional technologies. Their brokenness is then, *social*. The development of the computer shows the following developing steps generally valid for the processes from the creation of technology to broken technology: a) A first step in which the social group which is involved is small and highly competent. The product is complex and its results are poor. The discoveries can be maintained secretly with facility. This technology is broken because it is noema-broken or pragmata-broken. b) A growing simplification and a process of amplification of the wrapped social circles happened at the same time that the practical value of the developed technology increase. This is the actual step of the full developed technology. c) The third phase begins when technology reaches new and informal spheres of application. This process is a "democratisation" process of the accesses to technology. Besides that, the entrepre-

neurial culture varies in relationship to this process. The companies that do not achieve to be adapted disappear or lose importance, being substituted by new.
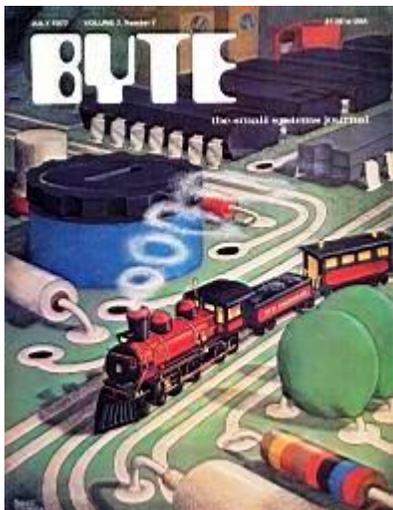
Figure 33: *Byte* from July 1977

DigiBarn Computer Museum:
http://www.digibarn.com/notice/notice.cc.html

Amateurism in technology can exists if the "knowing how" within popular culture is well developed and if it is connected to professionalism creating new standards between home-labour and exchange-labour. The so-called "new economy" born to the light of the data processing revolution, is bound to the wheel of the "knowing how" of the consumers. Today more than ever, industries are developed where there is "knowing how", both within the producer and in the consumer, since the limits between these two sides are very flexible today.

Entry 14: Artificiality as broken technology
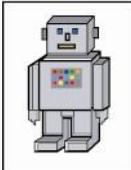
Nature–broken		Devices that imitate life or life's movement

Any automata or robot that works "properly" is a full technology, but in spite of this it is also always *broken in nature*. As a copy or imitation of life and life's movement, it will be considered as life-broken. These technologies of the third level are neither "broken in reality" as game technologies, nor "broken in quality" as the technologies of the amateur. Artificiality depends on the culturalization of natural processes. Franz Reuleaux's (1829–1905) classical work *Kinematics of Machinery* from 1876 introduced a typology and technological "elements" which combined in different ways could turn out to be kinematic chains and machines. According to Franz Reuleaux all machines consist of basic '*constructive elements*' and in turn they build basic '*kinematic chains*'. In the typology of Reuleaux, mechanical parts could be organized in levels of complexity. Some of these have been listed out by Francis C. Moon in his work, completing them with a present-day perspective[71]:

Level 1: Kinematic pairs

Franz Reuleaux called the "unnatural" movement between two neighbouring parts in a machine, a kinematic pair. He mentioned four: *Revolute, Prismatic, Cylindrical and Circular*. A *kinematic chain* is what Reuleaux called a number of linked kinematic pairs form a higher level in a machine.

Level 2: Kinematic chain

As a kinematic chain, (Moon presented the example of a bicycle chain), consists of a connected series of kinematic pairs that form a closed loop or circuit.

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[71] Moon, Francis C. *The Machines of Leonardo da Vinci and Franz Reuleaux. Kinematics of Machines from the Renaissance to the 20th Century.* Springer, 2007.

Level 3: Mechanisms

Mechanisms are kinematic chains, which are designed to transform one kind of motion to another. For example, the slider crank kinematic chain in an internal combustion engine, changes the *translation* motion of the pistons into *rotary* motion of the crankshaft.

Level 4: Complex machines

Several mechanisms coupled together, along with a source of motion or energy, form complex machines.

Level five: Prime Movers or Engines

Prime mover machines are machines that produce energy as in gas turbine engines or internal combustion engines. As an example the 14th century's water-power engine can be mentioned or the 13th century wind power engine.

Level six: Automata

The automated machine has a connotation of performing its tasks without human intervention according to an embedded set of instructions. Traditionally *automata* devices were identified with clock-like mechanisms for telling time or driving mechanical musical devices as well as doll or robotic-like devices for entertainment.

The player piano was a popular mechanical form of automata. In the Renaissance, engineers such as Leonardo da Vinci often designed fountains with time changing flows or moving props for stage productions and pageants as part of their duties for their patron. In the late 18th century, Jacquard designed punched cards to control textile machines. James Watt also invented a rotating ball speed controller for his steam engines. In the early 19th century Charles Babbage tried to build a machine with 15000 parts to automatically generate mathematical tables for astronomy and navigation. By the 20th century, the idea of the *controlled-machine* and robotics reached maturity with the development of electronics.[72]

Level seven: Machines Mechatronics

According to Moon machines that combine computers and mechanics to produce "intelligent" machines can be considered "mechatronical". These seven levels of machine constructions are organized following the traditional simple–to–complex correlation. However, the disposition of the types also follows a historical development, from antiquity to our own time. The question we will ask ourselves is if these levels of development correspond to a genetic process in the mind of the inventor. The existence of ideas of automata as early as in Antiquity can be consid-

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[72] Moon, Francis C. 2007; p. 32.

ered a positive answer to our question.
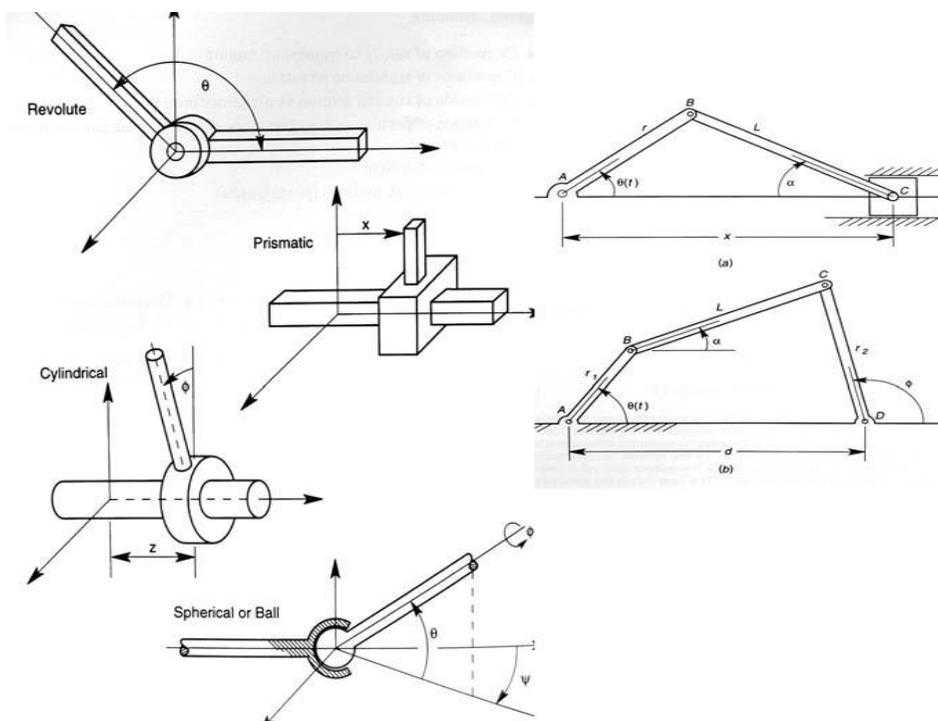
Figure 34: *Revolute, Prismatic, Cylindrical and Circular.* These are the "unnatural" elementary parts of machines. (From Moon, Francis C. 2007)

In this sense it is important to distinguish the events that can be mechanical from other events that cannot be mechanical. It must be noticed that – in spite of the recurrent comparison that the history of thought shows between life's forms and machines– no living form can develop mechanisms as those that characterises machines. For instance, no living form can produce a *wheel* or a *propeller*, because life cannot develop *gear wheels*. The reason behind this is transcendental: live tissues develop linking *continuous parts*. The circular movement of a wheel corresponds to the *torsion* movement of the living tissues. We can use this radical transcendental difference to develop a definition of technology that can be distinguished from the simpler idea of "mechanism". We can call "technology" a process that connects discontinuous parts of the world in a practical way. At the other side, we understand the process of change or movement that is *reversible,* as "mechanical". That means,

processes in which the system can be returned to its original state. A condition for the changes of the resulting artefact is that it can be *obliterated*. To move e.g. a chair from a place to another is e.g. a "mechanical event". These mechanical acts can be described *step by step*. That means that we can understand the movement of the chair as the summa of many small movements. We notice that living beings are not mechanical systems but they can produce mechanical processes. That means that the living body being not "mechanical" can be connected to mechanical processes connecting the body to the World mechanically.

Artificial Life or the Vitalism of Postmodernity

When philosophers in different times tried to define "life", they confronted some archetypical problems. One of the first problems was that of deciding if living and non-living matter showed the same properties. If not, which of the matters was that which was the most primitive? The second problem was that of developing an epistemological model of life. Philosophers worked on two families of models, one model, which we can call a *substance-like model*, and a second that we can call a *scene-like model*. The first model understands life as a *substance* with all the properties that characterizes substances. This is the point of view of a *chemical* metaphysics. On the other hand, a scene-like metaphysics understands life as a "projectile" that is a particle that moves in space and time. The second model reflects the point of view of physics. A third problem was to find a good method to organize the living process in a causal model. Is life a mechanism? Alternatively, shall we understand life as a goal-oriented process (teleological)?

Considering the first problem and acknowledging that non-living matter is not the same matter as the living matter, conduces us to the conclusion that living matter lacks physical and chemical properties, (because non-living matter *shows* physical and chemical properties). Such a conclusion conduced to the requirement of a *non-material substance*. In this sense, life became *animated matter* (*anima* as *spirit* or *soul* that expresses the idea of "breath.") The hypothesis, at the other hand, that non-living matter is the same matter as the living matter, conduced to a new level of problems. It could be possible that the differences between living and non-living matter were the same between *organic* and *inorganic* matter. However, in the year 1828, this possibility showed to be an illusion when Friedrich Wöhler (1800-1882) managed to produce *urea* (NH_2CONH_2) from inorganic matter. Today, the problem of the differences between living and non-living matter, is still actual and there is not any convincing answer to this question. To the history of this study, some other important results should be named, for example the discovery of viruses as large molecules. This discovery was made by Wendell Meredith Stanley (1904-1971) whom received a Nobel Prize in Chemistry in 1946 for his work on the tobacco mosaic virus, which he crystallized in 1935. Stanley demonstrated that a virus has molecular properties and grounded a new approach that studies viruses as large

molecules. However, if it is not possible to decide what the limits between living and non-living matter are, could it be possible to decide which of the two is the more primitive? During Antiquity the dominant Ideas were that life dominated in the universe. With Descartes philosophy, this idea changed to the opposite. Today scientific view coincides with that of Descartes and we understand life as a special state of matter.

Two competing epistemological models

During Antiquity, the dominating idea of the living was the *substance-like* epistemological model. Greek philosophy understood life as the presence of soul in matter (psyche). For Plato, this substance was the underlying cause of the self-motion of the living. Death occurred when the life-giving substance disappeared from matter. However even in Antiquity there are exceptions to this tendency, Atomists understood life as moving particles. The metaphysics that understands life as independent from any other form of matter has been called "Vitalism". This metaphysics often appears associated to substance-like models. In a corresponding way, *Mechanism* is easily associated to scene-like models. The confrontation between vitalists and mechanists reach the highest point during the last years of the 19th century. To the vitalists life is not reducible to any mechanism. "Life" is a category itself, as space, time, substance and movement. With this in mind the metaphysics of Vitalism worked with two different forms of matter. The mechanists, on the other hand, believed that life is nothing but a special combination of physical and chemical properties. That means that life could be produced in the laboratory. While vitalists could explain "what life was", mechanists chose to explain "what life was made of".

Once, in the beginnings of science, the need of systematic classification of life forms was unavoidable. Aristotle and many others after him until Linnaeus worked in this direction. The characteristics of primitive science determined that those systematic studies should be done "in vivo". At that time, life forms where understood as wholes, as they appeared to everybody in the world of common sense. This direction has been followed by evolutionists as Charles Darwin and geneticians as Gregor Mendel and in our days by the ecologists. With the development of scientific technology, with apparatus as the microscope, another form of study of life became possible. Life forms were desiccated and studied "in vitro". The scientific strategy worked with living beings as mechanisms and decomposed them as a jigsaw puzzle. The first step consisted in finding a minimal particle, the minimal piece of the machine. Following the inheritance of atomism, the scientists found the *cell* and studied how it worked.

The foundations of Postmodern philosophy of Life

During the 18th century, a group of scientists that later would be called "vital-

ists" flourished in Europe. Among those vitalists, was Georg Ernst Stahl (1660-1734), the creator of the theory of phlogiston. After Stahl and Bichat, the debate between vitalists and mechanists reached its climax during the last years of the 19th century. Among the vitalists we will name Max Verworn (1863-1921) who had the idea that chemical particles with special chemical acting were "living" and Hans Driesch (1867-1941) an anti-Darwinist that defended the autonomy of life. Driesch believed that there existed a special power, which he called "monads" – a concept he borrowed from the German philosopher Gottfried Wilhelm von Leibniz (1646-1716). Driesch had demonstrated by experiment in 1895 that it was possible to remove large pieces from eggs, such as shuffling the blastomeres at will or taking some away and thus interfering in many ways, yet not affect the resulting embryo. This was taken as proof that any single monad in the original egg cell was capable of forming any part of the completed embryo. The 19th century debate was the last debate between vitalists and mechanists that was centred in trying to find proof about the nature of life in biology and chemistry. The next generation of vitalists, worked in a digital environment and would be one of the typical expressions of the Postmodern era.

What we call Postmodern Vitalism is the position that defended the possibility of creating life forms from the application of intelligent programs in computational environments. The new variants of Leibnitz's monads were robots and androids. The differences from traditional Vitalism are remarkable, when the traditional Vitalism saw in the machines the opposite of life, Postmodern Vitalism see in machines the platform of life forms. The point of departure for Postmodern Vitalism was Alan Mathison Turing's (1912-54) work and his reflexions on the capacity of constructing a thinking machine. Another important contributor to this new branch was Norbert Wiener's (1894-1964) program on *Cybernetics*. After the Second World War the needs of a new ground for a philosophy of life grew in direct proportion to the astonishing scientific discoveries and outstanding technological achievements. There were many different disciplines which contributed to this development and many of them changed decisively in combinations with others to create new interdisciplinary results. Some of those decisive sciences were mathematics, electronics, and neuronal physiology. Some very important results in the field of Cognition were the works of Humberto Maturana (1928) and Francisco Varela (1946-2001).

Maturana's main ideas were introduced in his most important works *Autopoiesis and Cognition* (1980), *The Tree of Knowledge* (1987) and *Science and Daily Life: the Ontology of Scientific Explanations* (1991). Among the works of Varela should be mentioned *The Embodied Mind* (1991–Varela, Rosch and Thompson) which anticipated the ideas of intelligence as "evolutional intelligence". Maturana first worked with studying vision and its phenomenological aspects.

According to Varela, knowledge can only be reached through the body's participation in the process of cognition. He worked with his own ideas, as that of

"neuronal phenomenology" which tried to combine neuronal physiology with Husserl's phenomenology. Varela suffered hepatitis–C and died after a liver–transplantation. During his convalescence, Varela wrote, *"Intimate Distances - Fragments for a Phenomenology of Organ Transplantation."* The central question these authors asked was "in which way are living creatures organized?" Already here, their orientation was clear. Life is not to be explained extracting the properties which living things have in common. The class of living things is not defined by common and essential properties, but by a particular form of organization. An explanation of life would be accomplished if it could prescribe a "generative mechanism" which if "realized", would lead to experiencing the phenomena wanted to be explained. So if there could be specified an organization, which, if realized would behave in a manner indistinguishable from the other phenomena we would call "life", then, we would have an explanation of life. Some questions now surface. If one succeeds to specify a generative mechanism, for example a computer program or a conceptual system, would this, apart from being an explanation of life, also be an example of life, as the phenomenology of the generative mechanism would be indistinguishable from real life? If so, artificial life would also be real life.

Maturana and Varela could be said, be following a tradition started by von Neumann and formed by cybernetic research; an early version of what now is known as cognitive science. The field of cybernetics is now experiencing a revival (Varela, Rosch and Thompson), partly because of the influence of Maturana and Varela. A blossoming underground movement in cognitive science known as Artificial Life (also known as AL) is drawing heavily on the cybernetic tradition. A-life researchers seem to be in accordance with the theoretical stance of Maturana and Varela.

Christopher Langton defines life similarly to them: "a property of the organization of matter, rather than a property of the matter that is so organized". So the phenomena of life, can emerge from simple physical matter and complexity. The important point is that life, though it has to be carried out by a physical structure, is not a property of the matter. It is not a form, not a colour or some kind of life force connected to living tissue. If this way of thinking is right, then to know the organization of the living is to know what life is. A first objection might be raised at this point: what is complexity and how is complexity distinguished from simplicity?

The notion of complexity is a very central one for the Modern theories of automata and artificial life. It is normally used pragmatically. The notion of complexity is accepted without analysis as belonging to some ontological reality. To be able to work with it in spite of this, it is defined in operative terms. An example of this can be found in the book of Håkan J. Holm *Complexity in Economic Theory "An automata theoretical approach".* He defines "complexity" indirectly, through defining a "measurement" of complexity. A measurement of the complexity of any problem could be precise as follows; 1) a description of the computer that can handle it, 2) a description of the algorithm (computer program) which can handle that problem, 3)

the kind of input data, 4) the demands of time and space of data.

Asking about the organization of an entity, is asking how this entity is structured and even how this entity works. Now, one may object that a question about the organization of an entity, would tell us what the entity is, because I cannot explain what life is through a description of its structure or through a description of how life works (or both). The reason for this is the same as the reason of why we are not able to explain what a car is through a description of its structure or an account of how it works. If this explanation is given to a man who never has seen a car, he would not understand what we are talking about. I cannot say for example that a car is "some particular relationship of four wheels with an engine". We cannot answer a question of the type "what is A?" with an answer of the type "the organization of A is so and so". That is why, in spite of the progress of the philosophical Mechanism, it has not been possible to answer the question of what life is.

We must not forget that Mechanism raises upon the development of Nominalism and the question of what life is, is a question about essentials. The organization of matter is not what life is but rather the conditions for life to be. Now, some of the arguments of Maturana and Varela make us think that they are not mechanists. For example, they think that life has a unique place in the world of nature. At this point, they are more close to Vitalism than to Mechanism. As we are going to see, they are not physicalists either. This means that the use of the word "organization" in their 'language' must mean something else. It is rather more appropriate to understand that with "organization", they are referring to life's essential organization. What is essential to the organization of the living is for example, the existence of *neighbourhood's relations*. This idea seems to provide us with a solution of the problem of teleology. The different parts of a living organism act independently. Each part is working with some immediate acting and does not influence the others directly. The results are the combination of each particular, not globally but independently (see also Langton, 1993).

When a materialist model is used to represent life, or some connected process of cognition, usually an identification is made between "a world of matter" (life inclusive) and "the physical world". We may ask ourselves if this is the intended interpretation of Maturana and Varela. That is, are they physicalists? Well, the answer is no. It seems that they are trying to develop an epistemological state that is of a new kind. It is neither a reductive physicalism nor any other kind of physicalism. Living systems may be then the consequence of a state of matter that is emergent as well as it is not physical (the biological state). Thus if you ask Maturana and Varela, they would say that they believe that life can be produced by complexity from simple physical objects and in support of this would show you how emergent proprieties can be produced in a computer. The intended interpretation then is that life is a complication of the physical world that is by definition "simple". As a consequence of this, and because complexity is itself the bearing factor of life, a computer program as a "virus" for example, has to be in some way living (or at least

living in the same way as a non-artificial ("real") virus). What is new in all of this is that the reduction of the living to the non-living, which was the central issue of Mechanism has changed to the opposite. It is not the case that Maturana and Varela try to avoid materialism as the classical vitalists wanted to do, but their strategy as we saw, is not that of Mechanism either. Their project was the continuation of that of the alchemists as well as that of the computer scientists of Artificial Life. Maturana and Varela are neither mechanists nor physicalists; we might call their interpretation as *organizationism*.

Life is complex and circular but we learn that an organization might be complex and circular at the same time without being living. What distinguishes life from other non-living things that might be circular? Maturana and Varela say that life is self-producing and self-organizing. Complexity and circularity without structural coupling and self-production is not life. The idea that the complexity of its organization is the bearing property of life has a very strong intuitive appeal and deserves therefore to be studied in more detail. We may not forget that this idea with more or less influence from physicalism and Mechanism is shared by Maturana and Varela and the researchers of AL. I know that life is embedded in physical and chemical processes and even if I do not believe in a complete reduction of life to physical and chemical processes, I have to accept that somewhere, sometimes, something happens that make non-living matter to a living being. Therefore I may say that life is an emergent quality arising from the complexity of some physical and chemical processes. If the complexity of the organization is the bearing property of life, then nothing more is necessary and we can presume that to introduce complexity into non-living matter may transform it into life.

Getting over to the consequences of those assumptions, we shall assume that nothing could be more practical than to use computational devices to check our ideas. The reason to this choice is that with the help of computers it is very easy to provoke complex behaviour from the mere repetition of simple initial patterns. Computers and computer-technology have provided a new and precise idea of complexity.

The history of AL shows us a very large list of experiments. These experiments depart from the application of some algorithm (computer's program) without knowing the consequences of that acting. We will emphasize that the key of the understanding of those programs, is simply that we cannot know a priori, what the machine is going to do. Instead, we know step by step, what the program will make the machine do, then the acting of the machine will not be considered complex at all. Complexity then, is the name of some degree of ignorance as well as the name of some degree of uncontrolled behaviour. These conclusions seem to be in some sense, paradoxical. Take for example the idea of algorithm. An algorithm is usually understood as a procedure to know and control a process step by step. If this is right, it is in some sense paradoxical to create algorithms that violate this strong claim. Another paradoxical consequence arises from the original assumptions: If we

have sustained that life is a complex organization, and we have gone further and carried out some experiments to show that our assumptions are demonstrable, we have assumed that the secret of life is revealed in the secret of its organization. It is natural then, to demand an account of how all this has gone on. Now, even if we succeed in creating life-similar phenomena with the recourse of a computer, we still do not know if complexity is the bearing factor, as long as we do not show, step by step, how all this has occurred. As we already said, to know about the organization of something is to know how it works. To know how it works is in its turn, to describe systematically the whole process; but this is, by principle, impossible.

We will now draw some general conclusions about the use of computers and other automates to study life and life-depended qualities: 1) computer's programs might succeed in producing life, if life is understood as uncontrolled and unpredicted machine behaviour. At best, it would be a copy of life and at worst it would be an imitation of life. 2) In both cases, it might be a matter of uncertainty if the arising life-similar qualities, are the consequence of the applied algorithm - who knows? 3) Arising complexity cannot explain what life is.

To visualise our conclusions we will present an example: let us say that some researches might find that the combination of some chemicals under some physical conditions produce living beings. They have shown then, that life can be produced if we systematically follow some chemical and physical methods. Now if this is possible, we still do not know what life is. The epistemological situation is the same as that of the computational life-similar device.

Let us now analyze in more detail the roll of uncontrolled acting. The acting of some underlying program has to be demanded if a computer's virus will be understood as having followed the power of rules. Unfortunately the relation between rules and behaviour is not an easy one. There is in fact a kind of distance between rules and behaviour, which may not be the same for computer's and living viruses. To be able to decide if the distance between the rules and the behaviour of a computer virus is the same as the same distance in a real virus, we should need not to copy or imitate life, but to know what life is. We want to emphasize again that if life has to be created in some artificial way, it would be unpredicted and uncontrolled even in the way it would reproduce. The idea of artificial life cannot be associated to the idea of controlled conditions. If we succeed in producing life through artificial devices, it would reveal to us its mysteries *a posteriori*.

Entry 15: Cloning as Broken Technology
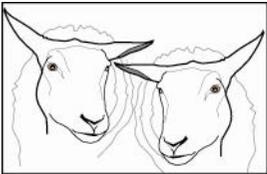
Identity–broken		Cloning and Assisted Reproductive Technologies

Is a cloned organism the same case as of a robot? Like the robot, a cloned organism is an example of the brokenness of nature but not exactly the same brokenness, because it is not the whole nature that which is broken here but only the process of *natural reproduction* of living organisms. It is only a part of the copying process that is mechanical. In this sense the technology of cloning shows some kinship with other reproduction processes that are also "artificial". The first "test tube baby" is 30 years old today and was conceived using a technique known as "in Vitro Fertilization". Since then, also other techniques have been used successfully: e.g. *Intracytoplasmic Sperm Injection* (ICSI) y la *Ooplasmic Transference*. In each of these cases it is the natural reproduction that broke but in different degrees and with different phenomenological consequences. However the phenomena of cloning has large and unique consequences for the everyday world because the making of copies is achieved through "universalizing" an already specialized (particularized) cell which had been transformed to a primitive stadium of undifferentiated properties: life shows to be a *reversible* process. We say that cloning cause brokenness in identity.

The current discussion about the promises and the risks of genetic manipulation recalls us of previous situations as those in which the freedom of the human being has been questioned by some form of "necessity". This necessity has been expressed frequently as the presence of an omnipresent and all mighty God but also and above all, from the 17th century, as the inexorable mandate of nature. The problem of genetic manipulation is related to other philosophical problems not less important, for example to the problem of the existence of universals – a problem that in its moment gave place to the development of two mayor philosophical schools; the realists and the nominalists - and to the existence of the soul as a different and independent substance. A study of the problems treated in relationship

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to genetic manipulation shows us that such manipulation supposes the freedom of modifying the genetic inheritance. At the same time, this manipulation is made possible thanks to the character purportedly mechanical of the genes, or with other words, to the necessary interrelationship between properties and genes. In fact, it is not the process of cloning in itself (multiplication of exact copies of a certain genetic code) the revolutionary phenomenon by excellence, but the fact that it has been achieved through "universalizing" an already specialized (particularized) cell which had been transformed to a primitive stadium of undifferentiated properties (even called *totipotent*). The group of scientists that cloned Dolly, achieved to develop an undifferentiated cell from the point of departure of a perfectly differentiated one. Life is revealed to us now as *reversible*, as able to be changed through the axle of time, then, as in some sense *mechanic*. However, far from being a great victory of Mechanism, cloning reaffirms exactly the opposite, that is, the non-mechanical properties of life, which become revealed when the mechanical step "backwards" surprised everyone. Cloning is not the case of a simple step backwards as in the wheels of a mechanism; it is the jump from the particular to the universal, a jump without sharp-edged limits.

> What exactly do we mean by cloning? There are two possible types of cloning, the first of which is really a misnomer. The first type is creating two, four, or eight embryos out of one original very early embryo. When the embryo is composed of only two to eight cells (called *blastomeres*), before it has begun to differentiate into the inner cell mass (which will become the embryo) and support cells (which will become the placenta), all the cells are *totipotent* which is to say that each of them has the ability to become an entire new organism.[73]

Davis understands this as *kvasi-cloning*. Cloning is understood by Davis as follows:

> The second type of cloning, and the one on which I will concentrate here, is somatic cell nuclear transfer. A somatic cell is any cell in your body other than sperm or eggs. Somatic cells have the full complement of chromosomes, half from your mother, and half from your father. But germ cells (sperm and eggs) have only half that number (otherwise, when they came together in fertilization, there would be twice the correct number). In somatic cell nuclear transfer, the genetic material is scooped out of an egg cell and replaced with the genetic material of a "regular" or somatic cell, taken from anywhere in the donor's body.[74]

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[73] Dena S. Davis. *Genetic Dilemmas*. Routledge, 2001; p.109.
[74] Dena S. Davis. *Op cit*; p.111.

Cloning also, is the process by which it is made possible to copy a genetic code independently of the course of the historical time. The properties of life appear now as reversible functions, which can be multiplied and be transmitted to other particulars, in other times. That is why it is possible to imagine the recovering of extinguished animals as dinosaurs or the recreation of dead persons as Hitler, Jesus or Einstein, now in a very different historical situation. All indicates that within few years it will be possible to recreate an exact copy of a dead human being from the genes of his hair or from his nails. But will those particulars be the same particulars as they were in the past? We can be sure that they would be in such a case, and without any doubt, the exact copies of a genetic code, with what this entire means, but never the same particulars. History manages to introduce historical time through the interstices of cloning through the unavoidable variations of circumstances. In a few words, we can say that the plasticity of life will not affect the course of history, course in which the genetic code is only a part of an enormously complex reality.

We have here once again, the great topic of the existence of universals and particulars. Consequently, in connection with cloning it will be necessary to distinguish between vital time and historical time. The fabric of life demonstrates that the relationship between what is particular and what is universal is *reversible*. In the vital process, the passage of what is universal to what is particular coincides with the direction of time, while the passage of what is particular to what is universal reverses the course of time, modifying the chain of the events through the repetition of a certain genetic code emerged in a disappeared historical time. The concept of cloning supposes furthermore a redefinition of the topic of death. In some way the genetic code is appeared to us as a-temporal, free of all kind of decadence and from death. Life, seen now under a mechanical light, seems to enjoy two parallel capacities, that of evolution and that of involution.

Part II: The Humanist as Engineer

Introduction

The category of "humanistic engineer" or "engineer of brokenness" includes two fundamental groups. First, there are those, which produce ideal societies and paradigmatic human relationships – I will call this group the "utopians" respectively "dystopian"; the society and world of Plato, More and Campanella, are examples of the first group, George Orwell's *1984* is the best example of the second group. A second group of humanistic engineers is that which works principally with artefacts designed and produced by humans; this group could be called "humanistic technologians". Broken technology is the name we give a kind of praxis which have a broken connection to the everyday world and through which we can reach foreknowledge, intuition or presentiment of realities that do not have an obvious place in this Everyday world. The humanistic engineer does not imagine, design or reconstruct machines but "artefacts". These artefacts are built according to different principles than those of machines, they are *routines rather than mechanism.* The technologian differs from both the technician and the technologist:

> A technologian is neither a technician nor a technologist. Although she or he is one who understands technology, she focuses her investigation on the role it plays in creating meaning in human life. The fields of study pertaining both to the practical and technical aspects of information as a commodity (librarianship) and information technology as a tool or system to capture, manipulate, store and deliver information (information science, computer science, systems engineering) are well developed. Each has a history and tradition of research and scholarship of its own which focuses on the technical aspects of each while considering human beings only as consumers of information or users of information systems. While much attention has been paid to human needs, with regard to the ways information is packaged and displayed and to the ways technology is used to manipulate and deliver it, little research has been done on the lived human experience of technology itself.[75]

The technologian is a phenomenologist working to make conscious the unconscious world of everydayness. This work will be done by focusing the analysis in the artefact itself and not in the noema-noesis relationship which reduces the artefact to

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[75] What is a technologian? http://technologian.com/introduction.html

a mental content.

The technologian	produce "possible" places, realities which have either ontological or ontical references but never both
The technician	produces "genuine" places, realities which are both ontological and ontical references

Bringing attention to the "thing itself" for us does not mean to focus on the "perceived as perceived" but on the "perceived as praxis". The perceived is then for us, always a product of acting and therefore the consequence of technologies implemented throughout effective procedures. We understand this approach as phenomenological. Some of the procedures are technological adequate and some are not. From the point of view of phenomenology the cases of brokenness are more interesting because in their negativity they expose the hidden structures of the everyday world.

Caring for first-level brokenness

From pure thought and language to praxis

If we hastily resume the panorama of classic 20th philosophy of meaning we can establish that the common reference of these philosophies is *judgement*, *logic* and the development of a *universal language* as the only certain reference for intentionality and knowledge. This situation leads to the reductionism of consciousness to "linguisticism" a matter of fact that is obvious in the analytical tradition and less remarkable but present in classical phenomenology and its ramifications. We have to point out here, the philosophical "distance" existing between the debates over "knowledge", "intentionality" and "belief", developed during the first years of the 20th Century and the ideas about the same issues in Postmodern (Post–Analytic, Post–Structuralist, Post–Marxist) philosophy. What is new after these new approaches is that the achieved idealized representation *is devalued in respect of truth*. With the entrance of Derrida in the scene of philosophy in the early sixties, the discussion presented above, moved to the history of philosophy. The critic that Derrida directed to the modern classics of linguisticism, to Husserl and Ferdinand de Saussure but also to Austin and with him, to all the analytical tradition, was possible through the introduction of a deep instability in the philosophy of language. Derrida's critique awakened a new consciousness and a more fruitful understanding of the heritage of Greek metaphysics in the thought of the West. Derrida concentrated his criticism against what he called *logocentrism,* manifested especially at the centre of philosophy of language and was the centre of Husserl's work. His critique was directed to all form of positivism, also in its structuralist, Marxian and psychoanalytical alternatives. In addition, even the possibility of a phenomenological scientific program became impossible.

However, Derrida's philosophy becomes a victim of its own criticism because it is impossible to conceive his methodology (we will call it *deconstructionism*) without the ideological "ism" that it implies. Further, it is not possible to see Derrida's philosophical project different than a *method* in spite of the fact that Derrida himself specifically rejected both consequences. As an "ism" deconstruction becomes a *metanarrative* and a part of the logos. In addition, the worst scenario is that as a *method*, deconstructionism has a clear positivistic value. Because of Derrida's work, it is impossible today to speak about meaning in any sense and therefore it is impossible to understand the real content of Derrida's own work and of any other work. Therefore, it is necessary *to put Derrida in between brackets* and try to see his work's

consequences instead of focusing our attention to the *traces* of his thought. The *consequences* of his work on the other hand are much clearer; there is the awareness of the end of logocentrism, ethnocentrism and phallus-centrism in any of its expressions, and the end of the dominance and simplicity of linguisticism in philosophy and in science. To think philosophically after Derrida demands that we incorporate his conclusions in more traditional philosophical models, those that in some sense had anticipated his work, I am referring to Marx and Marxism, to Husserl and Phenomenology and to Freud and Psychoanalysis. Against linguisticism we are going to work with ontology; against logocentrism, we have to *differentiate intentionality from knowledge*. The reason for that is that logocentrism is the consequence of just this identification. Western thought cannot escape the destiny of logocentrism, *if knowledge should be the goal of acting*. After Derrida, we know that culture in such way it is produced, should be constantly deconstructed. However, this goes for Derrida's philosophy as well, otherwise the *différance* and deconstruction becomes the new metanarrative. On the other hand, a deconstruction of deconstruction requires that we stop deconstructing. Otherwise, we should deconstruct and construct simultaneously. The result must be a construction, made free from that naive attitude which characterizes the positive sciences before the 1980's. The new science should therefore be humble towards itself and its products, like a careful positivism or post-positivism. It must withhold a healthy distance to itself, show less dogmatism and promote the variety of ideas. It must become '*fröhliche'* in Nietzsche's sense[76].

The two states of mind

Franz Brentano said that the acts of consciousness *are directed* toward an object and he called this directness the *intentional* relation. He thought that *to think is to think something*. With Husserl, the intentional act creates the noema (the perceived as perceived) and the noesis (the consciousness of the perceived) while their relation is noetic (as pertaining to the mind). For us an act is an "act" when it *is directed throughout* an object and we call this the act of *incursion*. For us *to think pragmatically is to act right through something* making the noema a *pragma*. The idea of "acting" is intuitively understood as the cause of an "act" both mental and physical. To "act" is the opposite of the idea of "rest" passivity –stillness, apathy, immobility– to which we have a special term *acedia* –from Latin and from the Greek *akedeia*, meaning "indifference". To simplify we say that the mind is either acting or is not, and then it is in a state of *acedia*. As an example, *intending* is acting; *knowing* at the other hand, is to be in acedia. We shall not differentiate either the communicative act from other acts, because we believe that every act is directly or indirectly communicative in its purpose. There is

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[76] Look at Nietzsche's *Die fröhliche Wissenschaft*.

an analytical philosophical study of acting, which is relevant to our reflection; Arthur Danto's Analytical *Philosophy of Acting* from 1973, which includes Marx' starting–points in the problem that he chooses to study.

> Exemplarily, we are knower of a fixed reality; our essence is fulfilled through the acquisition of ideas whose clarity is their guarantee of truth. This theory of man generates accordingly a theory of reality and of our relation to it. Marx, in opposition, perceives us as agents, reality is something we help shape, it has an essentially historical dimension, it is not something fixed and given, of which we might have some hope to achieve a final representation in thought. So his injunction to change the world is underwritten by an implicit metaphysics of world and men, if men are to be effective as agents.[77]

Arthur Danto makes a parallel between the cognitive process and the processes of acting. Danto's intention is to understand how knowledge and acting is treated within Cartesianism and Marxism. He speaks of Descartes as a typical modern intellectual theorist of knowledge who takes interest in the question of the possibility of apodictic knowledge based on a modern dualistic subject–object relation. Danto writes, "It is in part to map these complexities, to get a better philosophical picture of man as related to the world through knowledge and acting, that I shall employ the concepts of knowledge and acting as mirror–images of one another, having parallel but inverse structures."[78] Danto's conclusion is that there are parallel structures that connected the process of knowledge and the process of acting. About this opposition, Sigmund Freud wrote:

> I have noticed in the course of my psycho-analytical work that the psychological state of a man in an attitude of reflection is entirely different from that of a man who is observing his psychic processes. In reflection there is a greater play of psychic activity than in the most attentive self-observation; this is shown even by the tense attitude and the wrinkled brow of the man in a state of reflection, as opposed to the mimic tranquillity of the man observing himself. In both cases, there must be concentrated attention, but the reflective man makes use of his critical faculties, with the result that he rejects some of the thoughts which rise into consciousness after he has become aware of them, and abruptly interrupts others, so that he does not follow the lines of thought which they would otherwise open up for him; while in respect of yet other thoughts he is able to behave in such a manner that they do not become conscious at all - that is to say, they are suppressed before they are perceived. In self-observation, on the other hand, he has but one task - that of suppressing criticism; if he succeeds in doing this, an unlimited number of thoughts

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[77] Arthur Danto. *Analytical Philosophy of Action¸* 1973. Sid. 1-2.
[78] Danto. Op. cit. Sid. 1-2.

enter his consciousness which would otherwise have eluded his grasp.[79]

This parallelism builds on an epistemological perspective that has its roots in the philosophy of Descartes and that imagines the problem of knowledge as a subject–object relation. Danto's comparison could in that case be applied to a concept of acting that is congruent with philosophy before Kant and Hegel, and an example of a concept of phenomena that Heidegger in *Sein und Zeit* describes as "vulgar". From this perspective, Danto's comparison is misleading since the "acting" that Marx talks about is not comparable to the *experiment–like* situations that are the kinds of acting that Danto thinks about. An experiment–like situation differs from an intentional act in that the cognitive subject in the first case has been isolated from the immediate world. This isolation is a necessary condition to the success of the experiment. The artificially created world is already a product of knowledge, destined to "produce" the empirical object. The process of isolation in an experiment is meant to break all the intentional ties that bind the object of study to the "living world" and by these means create an artificial ontology. An experiment–like acting is hence fully compatible with the Cartesian view of life but incompatible with a Marxist one.

Let us now take a closer look on the connection between the two states of mind, the one that starts from the disposition to *be an observer* and one that starts from the disposition to *be engaged*. We will now present an analogy that builds on a reference that Danto makes to art in the 16th century. In the year 1520, the pope Leo X (Giovanni di Lorenzo de' Medici 1513–23) consulted Michelangelo to build a chapel for the Medici family. The pope also wanted Michelangelo to place in the chapel the tomb of his younger brother *Giuliano* and his nephew *Lorenzo*. The genius of Michelangelo captured the opposition between acting and thought in the tombs of these two men. On one hand, the athletic *Giuliano*, a man of acting and on the other hand Lorenzo – *Il Pensieroso* who seems to be lost in deep thoughts, unaware of his surroundings. The point of the analogy is to show the relation between thought and acting, or also, between pure information and intentionality. Let us picture a situation (the analogy that follows is our own invention) that could take place in a detective anecdote: "a desert landscape during the war, in which two individuals, who know each other well, are confronted after a long period of thinking that the other *no longer was alive*." The individual whom we call Lorenzo is the first to come to the scenery of the meeting – let it be a house on the countryside, surrounded by a forest – and when Giuliano arrives and discovers that *someone* already is in the house, he hides in the forest waiting to reveal the others identity. Could it be an enemy? Soon Giuliano sees a man through one of the windows; he is smok-

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[79] The Interpretation of Dreams- Sigmund Freud (1900). Chapter 2: The Method of dream interpretation
http://www.psywww.com/books/interp/toc.htm

ing. Something reminds him of Lorenzo, "who died in the war". Alternatively, did he not? Time passes and Giuliano thinks to himself that if the man in the window was Lorenzo, he surely would have visited the childhood–place in the valley. He hurries over there and finds fresh traces from a visitor. Then, Giuliano thinks and realizes that if the man from the hiding place is Lorenzo, something amongst his belongings will reveal his identity. As soon as he can, he examines the man's properties. Amongst the belongings of the man, he finds an old family portrait that strengthens the theory of the man's identity. Giuliano reasons that the probability of his chain of hypotheses and proofs is so strong that he should reject the thought that Lorenzo is dead; *he then, makes the decision to meet this man*.

Giuliano – The dimension of intentionality, acting or *praxis - Active rationality*

Lorenzo – il Pensieroso.

The dimension of information and knowledge *- Passive rationality*

Figure 35: Giuliano and Lorenzo. Praxis and knowledge

Let us now view the same situation from Lorenzo's perspective. During the same period, Lorenzo feels shadowed. During one of his daily visits to the childhood place in the valley, he finds proof that someone else has been there. This is worrying, since it could be enemies. Gradually he calms himself down with the thought that it could very well be wild animals. When Lorenzo discovers that someone has been in his room, going through his belongings, he understands that the situation is serious. The visitor has to be someone who wishes to reveal his identity but who already knows about him. However, "it could not be Giuliano since he is dead". He then decides to leave the house, hide in the forest, and wait to see what happens. What is the difference between the situations of Giuliano and Lorenzo? What makes them apply different strategies? In Giuliano's case, the initial *information* (as fragmented intentionality) that he got during his observations has been transformed into *intention*. As we understand this dialectics, the two states of mind implies the movement from intentional state as *order* to a cognitive state as *pure data* (information or also, fragmented intentionality). This dialectic can be expressed relating order to certainty and information as disorder and uncertainty.

> Information becomes an intentional act when it diminishes to be almost identical with *order* and conversely, information is the measure of *disorder* when acting is impossible.

Giuliano's alternative has such a safe outcome that it *automatically leads to acting*. Giuliano has a world populated by phenomena in front of him – "familiar" objects – that make Lorenzo's presence an understandable whole. *For Giuliano the artefacts become pragmata while the world of things is still noemata for Lorenzo.* Giuliano's relation to the situation is of an *active* nature. Lorenzo, on the other hand, has only *pure information* (fragmented intentionality) to his disposal, which presents a chain of events that make it highly unlikely that he is connected to the "being". The subjective probability here stands in relation to the completeness of the conception. The intentional *orientation* of the conception is only compatible with conviction and therefore with "very probable" outcomes. Lorenzo on the other hand, has a *not* oriented construction of thought, since it is based on empirical facts, a conceptive model that cannot be compatible with the living world. Lorenzo cannot act because all he has to his disposal are hypotheses. As in all experimental situations, Lorenzo can act first when the empirical situation has been transformed into a rational active whole.

In Giuliano's case, the observation of the "man in the window" has made the other person's existence a part of the everyday conception. That observation makes it possible to apply the hypothetical deductive method, which after every confirmation strengthens the original assumption. Giuliano digs deeper into active rationality and simultaneously the feeling of conviction grows stronger. Even though, nothing says that the figure in the window is the man he expects it to be, the certainty of the presentation is given. As soon as a situation is experienced as very probable, it is a certainty to act from. Observe that Giuliano becomes a "dogmatic" and Lorenzo a "sceptic" from the point of view of theory of knowledge. The conception of the world that is immediate is the one that gives us the conditions to act. We could say that while Giuliano is engaged in a situation, Lorenzo is only *in suspense* in front of it. Whereas the first can act immediately in complete agreement with his surroundings, the other must wait until the immediate world would be created. The difference between Giuliano and Lorenzo is to be found in their relations to the order of the world that each of them has got. Danto has studied the incongruence between looking and acting: "So knowledge and acting, with regard to the same representation, are logically inimical: where there is *room for acting, there is none for knowledge; and where there is room for knowledge, there is none for acting.* In this respect, the man of acting and the man of thought are logical antagonists."[80]

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[80] Danto (1973). Sid. 26.

As my analogy shows, acting is caused by beliefs and those are the base of praxis. Nevertheless, beliefs depend on the order accessible. Conviction becomes an ideology when beliefs are combined with larger and more complex unities. Knowledge, on the other hand, is a consequence of acedia. Knowledge connects aimlessly to the chain of transcendental events and the mind is randomly connected to the world. This condition makes methodical scepticism possible allowing conclusions of empirical nature. However, when it is time to act, the subject must *transport* itself from the knowing–state into the acting–state and *transcribe* the meaning of the known information (fragmented intentionality) into beliefs. It is interesting to observe that you cannot *engage* yourself in one or the other situation in any manner. To *engage* yourself, you have to be a part of the chain of events. High probabilities are the sign *you have to wait for,* the sign that will tell you that you have become "one" with reality in an ordered world. It is only after this that the conditions for acting have been produced; you *believe* instead of *expect*. On the other hand, to transport yourself from the engagement–condition you must become neutral to the chain of events. This is typical for the experimental–condition in natural sciences, but first after not being able to realize the expected predictions of the experiment. As a form of acting, the experiment–condition supposes to produce certain outcome and therefore involves beliefs. It is first when the experiment does not give the expected result that it can be seen as neutral to the chain of events. As we see it, there is then a connection between the nature of conceptions and our appreciation of order and expected results. This connection turns the "very likely statement" into the rationality of praxis and the "less likely" into empiricism. The shifting in–between the rational dimensions of praxis and knowledge suppose then the comprehension of the fundaments of rationality in general, that is the understandings of the rules that control the dimensionality of the world, the human body included. Observe that in our analogy, the development did not stop with Giuliano's resolution to act, in fact when Giuliano had decided to confront the "man in the house", Lorenzo had already decided to hide in the woods *and they never met each other.* This is allegory of the incommensurability existing between empiricism and phenomenology.

Order and Information

The concept "information" is not so easy to define because it is used in different contexts. It is used in connection with natural sciences and technology with a specific signification and in social and human sciences meaning something different.[81] The term comes from Latin and originally meant "to form" something. It can

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[81] A complete study of the history and the definitions of the term can be found in: Capurro, Rafael and Hjørland, Birger: *The concept of Information*. Annual Review of Information's Science and Technology. Ed. Cronin. Vol. 37, 2003.

be found already in Publius Vergilius Maro and after him in Saint Augustine and Saint Thomas Aquinas. Later it appears again in Descartes and the new philosophy meaning "to form matter" and "to communicate something to someone". In our times, the term became concrete after World War II associated with theoretical and technological developments in the fields of mathematics, communication technologies and computer science and to the names of men of science as Norbert Wiener, John von Neumann and Claude Elwood Shannon. Especially important is the book by Shannon and Weaver *A Mathematical Theory of Communication* from 1948. Shannon distinguished the meaning of the term "information" from that of the term "meaning". According to Shannon, "information" does not need not to be meaningful. "Information" to Shannon is the measure of a "difference" between signals. The binary difference between "yes" and "no" is the simplest of all possible contents of information. This measure defines a binary unit or "bit". The richer the open alternatives the richer the content of information in the message, therefore the technological meaning of information is a measurement of "organisation" and "order".

> Messages are themselves a form of pattern and organisation. Indeed, it is possible to treat sets of messages as having entropy like sets of states of the external world. Just as entropy is a measure of disorganisation, the information is a measure of organisation.[82]

One of the most important consequences of the modern use of the term" information" had some importance to our times materialism:

> The mechanical brain does not secrete thought "as the liver does bile", as the earlier materialist claimed, nor does it put it out in the form of energy, as the muscle puts out its activity. Information is information, not matter nor energy. No materialism, which does not admit this, can survive at the present day.[83]

Rafael Capurro introduced a very interesting connection between the technological meaning of information and the phenomenological field of philosophy[84]. According to Capurro, information is *fragmented intentionality*. Capurro understands the modern age of informatics as postmodern phenomena, which can be found already in the philosophy of Husserl and Heidegger. The informative content can be understood according to Capurro as Postmodern knowledge because it is neither rational nor scientific. Another important difference is that informative communication leaves behind the opposition between object and subject and

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[82] Wiener, Norbert. *The Human Use of Human Beings. Cybernetics and Society*. New York, 1967.
[83] Capurro, Rafael och Hjørland, Birger: *The concept of Information*. Anual Review of Informations Science and Technology. Ed. Cronin. Vol. 37, 2003.
[84] Capurro, Rafael. *La Hermenéutica y el Fenómeno de la Información*. Cuaderno de psicoanálisis freudiano 8, 1987.

substitutes it with inter-subjectivity and context; the informational content is not attached to a subject. Following our paradigm in which information is a kind of knowledge, it should be also meaningful and conscious. The fragmentation of intentionality in small and disconnected parts can be reconnected producing different and always unexpected results as new knowledge. Unexpectedness of meaning depends on the vanishing of intentionality. Because the mind's closeness in the state of knowledge makes any acting impossible, the mind closes itself to any impute from the subject. *Knowing* as *static* consciousness is the opposite to acting and at the same time a consequence of it as its complement. The relationship between acting and knowledge has been very important for Alfred Schütz who studied this problem under the title of "Relevance". As starting point, he referred the teachings of the Greek sceptic Carneades (214–129 BC) the first who criticized the dogmatic doctrines of the Stoics and the Epicureans. Relevance is in fact the problem of the deciding to act because of limited order (certainty). According to our interpretation of human acting, the essence of a conscious act is order. In other words, we understand "order" as inversely proportional to information; that means that if we know that an act produces x bits, it generates an order of $1/x$ bits. By the same reason if an artifact embeds x bits of informational value, it embeds $1/x$ bits of organizational value. In his writings, Schütz refers many of the examples introduced by Carneades. We will not repeat these examples here because each of these have the same structure that our own analogy about the brothers Lorenzo and Giuliano.[85] According to Schütz, this problem had been studied by Husserl in *Erfahrung und Urteil* and by Bergson in *Time and Free Will:*

> He (Husserl) is especially interested in the problems of alternatives in which several interpretations of the same precept compete with one another. In case of so competing he calls them *problematic possibilities*; each of them stands to choice, as it were. Each has its own weight, and the mind oscillates from the one to the other weighing these possibilities before it comes to a decision –a decision which itself is always open to verification or falsification by even fur-ther events. Husserl's theory may be correlated to Bergson's interpretation of choice, found in the last chapter of *Time and Free Will*. According to Bergson, it is not the case that there are two possibilities standing to choice. He speaks therefore not of choosing between two possible interpretations or courses of acting, but of two ways of possible acting or two goals to be brought about before any such process of choosing.[86]

What Schütz is studying here is the same that concerns us: that any presenta-

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[85] Schutz, Alfred. *The Structures of the Life-World*. Northwestern University Press; 1973; p. 183. And
   Schutz, Alfred. *Reflections on the Problem of Relevance*. Yale University Press; 1970; p. 17.

[86] Schutz, Alfred. *Ibid.*

tion has to deal with the problem of choice, that consciousness is always confronted with the alternative of either *perform* or *inspect*. The presence of the *noema* in a philosophy of technology is the condition for the existence of some idea of an artefact. The noema can be either ideal or material but its essence is to be pure information. That is the case for the philosophy of Husserl which floated between monism and dualism. The undecided aspects of Husserl's phenomenology of knowledge depended on his interest on the pair noema–noesis with the accent put on the self–reflection of the phenomenological analysis. Husserl was interested in building a philosophy of ideas or mental contents. He belonged to the generation of thinkers who was kept by the problem of the "entertainment of thought". However, after Heidegger, the idealism of Husserl's phenomenology became obvious. Heidegger introduced another pair of categories, which relocked phenomenology to a new dichotomy. The new pair of foundational categories is pragma–noema, in which *noema* is the "perceived as perceived" and *pragma* is the usability or pragmaticity of a noema revealed through the acting of *using* the artefact. To "use things" as a way to understand their meaning is the essential difference between Heidegger and Husserl. The idealism of Husserl's phenomenology makes it to a cognitive philosophy without connection to the real world of phenomenal artefacts. Don Ihde refers to this as follows:

> They are clear adaptations from the Husserlian notion of intentionality which 'consciousness' is always of something to which the act of consciousness refers. The intentional act in Husserl is thus: Ego–cognizing–World. It should be noted preliminarily that the interpretation in the Husserlian context is one that dominantly sticks to a more traditional perceptual and cognitional characterization of the act as 'mental'. Functionally, the intentional act remains operative in *Being and Time* but it is no longer interpreted cognitionally – it is rather existentialized such that what turns out to be basic or primary is what I shall call the *praxical*.[87]

A necessary condition, which makes a technology work, is that the dimension of *pragma* is present. That means that an intentional act is been designed to transform some noema through praxis. The presence of pragma makes the artefact an intended one and that it is a part of an acting, which *produces* something *occasioning changes* in the order of the World. The dualism of pragma–noema then controls the materiality of any intentional act. We say that the absence of pragma make an artefact pure perception or pure entertainment of thought.

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[87] Ihde, Don, *Technics and Praxis*. 1979; p. 116-117.

Giuliano –				Lorenzo –
The techno-logical act as intentional. 'ready–to–hand' (*Zuhandenheit*)				Technology act as knowledge present–at–hand' (*Vorhandenheit*)

Figure 36: Technology as intentional act respective technology as knowledge

This is what Don Ihde refers to as Heidegger's inversion of Husserl's phenomenology introducing the notions of 'ready–to–hand' and 'present–at–hand':

> Heidegger argues that to take "things" interpreted as bare entities with properties, is already to have presupposed ontology prior to the concrete investigation of human engagement with the environment. It is from this argument that Heidegger constructs two different ways of relating to entities with the environment. These two ways of relating are well known as the distinction between the 'ready–to–hand' (*Zuhandenheit*) and the 'present–at–hand' (*Vorhandenheit*). It must be noted that both are qualitatively different relations to entities within the environment. Heidegger's inversion of Husserl is one which makes a strong contrast between the 'present–at–hand' relation and the 'ready–to–hand' relation. The first is one in which entities (beings) appear as 'just there' and as having certain qualities or predicates. They are 'theoretically determined'. Contrarily, the 'ready–to–hand' belongs to the stratum of productive use or other forms of active engagement, which characterize *praxis*. And Heidegger's strategy in *Being and Time* is to show that these are not merely two alternate modes of relation, but that one is founded upon the other, in this case the 'present–at– hand' upon the 'ready–to–hand'. This is, in effect, and acting theory of ontology.[88]

The relationship between noema and pragma have two aspects, the first is that we call "absolute congruency" meaning by that the direct relationship between pragma and noema. Another aspect is that of "relative congruence" in which the important issue is the weight of pragma respective noema to decide the emerging

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[88] Ihde, Don, *Techniques and Praxis*. 1979; p. 118.

World. Husserl philosophy for instance, does not study ontologicity but onticality; the relationship between ideal artefacts and the perception of these as meanings. In a Heideggerian perspective, the presence of pragma connected to noema supposes ontology. When the mind works with these dichotomies the absence of one of the alternatives, suppose the invasion of one of the underling possibilities. Being not ontological suppose being ontical and conversely, being not ontical suppose being ontological. The disoperation of e.g. pragma makes noema stronger and the ontical emerges; conversely, the disoperation of noema makes pragma stronger and the World becomes ontological. The ontological and the ontical together "make" the everyday world. Some technologies are broken because they fail to produce pragma. That is the case of fantastic technologies. They delimited a field and a possible world with artefacts as noemata, which are only pure entertainment of thought. Conversely, other technologies are broken because they do not manage to connect a pragma to a noema. That is the case of *magical* technologies. They have reduced technology to pure pragma (rituals) without connection to knowledge. One kind of technology goes on faithfully on Husserl's side: that is the case of *tentative* technologies, which are trapped into the world of noema–noesis and of the pure phenomenological analysis. The technologies of *poverty* do not match onticaly but their flexible relationship between pragma and noema makes them working well, revealing new aspects of an underlying unknown ontology. The pragmatics of these technologies is built on the range of the docking possibilities of the pragma. Conversely, fruitless technologies are ontological–broken because their connection between pragma and noema do not match the everyday world. They work in an ideal world, a world that is half way from praxis. The pragma–noema and the ontological–ontical relationships even if they exist and work properly, have to dock with Time. Some broken technologies are *enigmas*. An enigma, is a historical riddle and it supposes the study of all the information available and the interpreter's *own phenomenal experience*. This "phenomenal experience" is generational and non-transferable. We said above an enigma is not an abstract cognitive problem, but a concrete one, it is a cognitive problem converted into a cognitive concrete situation. An enigma supposes acting, the acting of solving it in our own time. An enigma is never empirical but phenomenal, suppose intentionality and not knowledge. Solving an enigma supposes working out some "missing" part of the reported events." The functionality of an artefact depends on the quality of docking with the tangible world. However, this docking is enigmatic or time–connected and so is the world, which is constantly changing. In this sense, the capability of docking of an artefact is praxis–sensitive and historical determined. We say that the pragmatic aspects of any technology "grow old" with the humans that are using these technologies. That is the situation of *outdated* technologies, which work as self–referring parts of a whole ´that does not exists anymore. Their pragmatic properties are damaged but they "are still there", as a *ghost* or as a *trace* of another world–time.

Caring for second-level brokenness

The World

We will name the problem of the being in general "ontical" and "ontological" the problem of belief. We will use the following structure of ideas:

Ontological: intentionality – belief– certainty – acting – doxa – technological act

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Ontic: knowledge – information – being – being in acedia – inspective attitude – probability - technology

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The grounds of this structure are the same as in Husserl's *Ideen*. Husserl wrote about this global dichotomy in section 103 of *Ideen*, with the title "Characters Distinctive of Being and of Belief" and then in the section 105 with the title "The Modality of Belief, as Belief; the Modality of Being, as Being":

> Looking around now for new characters, our attention is first drawn to the fact that interlinked with the groups of characters previously treated, we have characters which are clearly of a wholly different type, namely, *the characters of Being*. As noetic characters, correlatively related to modes of Being –as "doxic" or "belief characters" we may cite as closely linked with intuitable presentations the perceptual belief present as a real (*reell*) factor in normal perception, and functioning therein as a "sense of reality," and, more closely still, perceptual assurance or its equivalent; to it corresponds in the appearing "object" as noematic correlate the ontical character "real' (wirklich). The same noetic or noematic character is shown in the "certainty" which may accompany all repeated representation, in "sure" recollection of every kind, whether in respect to what has been, to what now is, or to what will be in the future (as in anticipative expectation). Such are "*thetic*" acts, acts that "posit" Being. […] The way of "*certain*" belief can pass over into that of *suggestion* or *presumption*, or into that of *question* and *doubt*; and, according to the line taken, that which appears (characterized m respect of that first order of characterizations which takes in the "primordial," the "reproductive," and the like) will adopt

the ontical modalities of the "*possible*," the "*probable*," the "*questionable*," and the "*doubtful*" respectively.[89]

Transcribing Husserl's ideas to our perspective can we say that our own contribution has to do with the dichotomy of the "two states of the mind" create to develop a comprehensible structure of the relationship between acting as intentionality and information as fragmented intentionality. The World as it reveals itself for us as pure phenomena adopt a twofold structure that we identify as the group of *substances, and* the group of *scenarios*. Substances for instance, are dense, continuous and do not relate to space or time. "Consciousness" for example has been understood as a substance, also "electricity" or "air", "dust", the "soul" and even God. *Scenarios* are representations in space and time in which dignities, sizes and substances can be projected. Each of these aspects of the structure of the world has a dynamic and a static state, which produce the ideas of *movement, change or growth*. The change of substances is understood as the changes of the identity of the noema. With the development of modern science, the idea of "movement" became more important than the idea of "change". "Movement" consisted as the projection of the noema in a scene-like "place" in which the changes in identity of the noema are given in the scene itself. A combination of scene–like phenomena and substance–like phenomena gives the *plastic* model. The plastic model arises from the attempt to explain the phenomena of life. The dynamics of life includes both movement and change, producing a kind of *stretching* in every direction. The Greek idea of *kinesis* referred to any kind of change and before Aristotle, nobody had distinguished movement from change. Aristotle was the first who tried to develop a clearly limit between scene-like phenomena and substance-like phenomena. He works out the differences between *movement-in-a-scene* and *movement in-place*. Aristotle distinguishes also the changes of birth and the changes of destruction, and quantitative changes from qualitative changes. Before Aristotle, the study of the dimensions of the world assumes the substance-like perspective. Thales of Miletus, the first of the pre-Socratic philosophers from Ionia, opened the scientific Western tradition with a typical substance-like interpretation of the world. The driving axiom of his philosophy was the discovery and explanation of the substantial ground of the world. According to Aristotle, water was Thales primary substance or *arche*, the ground of the whole world. The same substance-like proposal can be found in the following philosophers from Ionia, Anaximander (*apeiron)* and Anaximenes (air). In the same line, Empedocles from Sicily developed the successful model of the *four elements*. In addition to these, he describe the principle of *philia* (Love) to explain the attracting of different forms of matter, and the principle of *neikos* (disorder) to explain their separation. Other pre-Socratic living in Elea, were more interested in scene-like explanations; notably Parmenides, and Zeno. The same is valid for the atomists who tried to reproduce

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[89] Husserl, E. *Ideas*. London, 1972; p. 273-274.

and explain substances as scene-like phenomena. During the Middle Age, the interests of philosophers changed in focus to historical and religious issues. However, the ontological alternative between scene–like and substance–like models was still there. The "soul", for Saint Augustine is a kind of rational substance separate from the body and meant to control it. The soul is simple, non-material, non-extensive and immortal; the soul has no place. The material existence of species leads Anicius Boethius to the first formulation of the problem of the universals. In the *Commentary on the Isagoge of Porphyry* he wrote:

> He [Porphyry] omits the question whether general and species have a definite subsistence, or dwell in the mind and intellect alone; whether they are corporeal or incorporeal; and whether they are separate or joined to the objects that our senses perceive. On these matters, seeing that the disputation was a deep one, he promised to be silent.[90]

Universals became a philosophical problem when the mind tried to re–dimension thought and language into the dimensions of reality and on the contrary, reality into thought and language. Because of the difficulties of the effort of re–dimension of thought and language into the dimensions of reality, philosophy was obliged to the developing of theories of the origin of knowledge, theories as Realism, Conceptualism and Nominalism. We shall found that these difficulties arose because the mind understands as zero–dimensional, and language as one–dimensional and they are realities that are incongruent with the plural–dimensionality of the real world. Euclidean geometry specifically, is a *construction* of some rules to transcribe real dimensions into mathematics, images and words. There are not any *points* or *lines* or *triangles* or *circles* in the "transcendent" world. All those figures are empirical constructions meant to work as transcriptions rules between pure thought and the perceived. With time and education, these rules became "reality", a very strong collection of rules that we understand as intuitively truthful. With the rise of the scientific era, knowledge moved from commonsensical ontology to an empirical and transcendent following the Euclidian movement. In these early days, the limits between scenarios and substances were not obvious. The experimental process of modern science can be illustrated with the help of the development of the science of electricity and magnetism. In the year of 1546, Gerolamo Fracastoro develops an *electroscope* (that is an instrument for detecting the presence and the quality of electricity) with rotating axis that was intended to work with small pieces of paper and feathers.[91] In 1600 William Gilbert built the same electroscope and called it "versorium non magneticum"[92]. This was the very beginning of electrology and Gilbert was the first to coin the term "electricity" from the Greek word for *amber*.

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[90] Curtis M.A. 1950, s.34.

[91] Hieronymi Fracastorii: *De Sympathia et Antipathia rerum liber unus. Venezia 1584*. Quoted by Giovanni Polvani: *Alessandro Volta*. Pisa 1942.p.26.

[92] G. Polvani p.26.

Gilbert wrote about the electrification of many substances in his work from the year 1600, *De magnete, magneticisique corporibus*. This was the stage of the study of the substances. Gilbert introduces the Greek name *electron* to denote the stone of amber. The very first problem to solve was to determine whether the electrical *substance* was the same substance as the magnetic. The works of Cardano (1550), Gilbert (1600) and, Nicola Cabei in his *Philosophia Magnetica* from 1629, fixed the difference between the magnetic and the electric. It was done with some resistance because the ideal solution was to reduce both phenomena to only *one substance*. The experiments were conducted with among other substances, diamond, glass, arsenic, and resin. The metals were listed as non–conductors of electricity because no experimental results showed that they reacted on rubbing.[93] Consequently, at this point, we have this scheme:

Thesis: one substance: *de atractiva*
Two phenomena: Amber stones (electricity) and Magnet stones
The experiments associated to these stones are not supporting the same conclusions
--> (then) there are being used two different substances

Table 6- Number of substances involved in electrical phenomena

In 1550, Cardano described one of the differences between electricity and magnetism. According to Cardano the magnetically acting, is reciprocal, it attracts and repels matter. On the other hand the electrical acting only attracts. In 1629, Nicola Cabei discovered the phenomena of the electrical repulsion and the theory of Cardano broke down. From that time and up the rise of modern physics, the relation between magnetism and electricity switched systematically between the one–substance scheme and the two–substance. In fact, the modern electromagnetic theory is a kind of compromise allowed by the transcription of the whole problem into a scenario-representation with the incorporation of particle theory. The debate about the nature of electricity, worked also with other oppositions as those of *attracting* and *repulsion*. This schema was not introduced clearly until 1687 when Newton used it for the gravitational theory. When it became clear that magnetism and electricity had to be held apart from each other, the problem was to make a decision on the reason of the attracting and the repulsion and the alternatives were

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[93] What really happens is that the electrical current goes to the earth through the body of the scientist. Later in 1792, this misunderstanding played a very important role in the discussion between Volta and Galvani about *animal electricity*.

two:

a) One electrical substance, that has the attracting as a quality, and another electrical substance that has the repulsion as a quality. We are talking about two substances, quality A and quality B.
b) Alternatively, the magnitudes of one substance change, and explain the repulsion and the attracting, as consequences of the variation of magnitudes of some qualities. We are talking about plus or minus quantity of some unique substance.

Table 7: Number of substances and of qualities involved in electrical phenomena

In 1660, Otto von Guericke built the first electrical machine. A globe of sulphur "magnitudine ut caput infants" was put into an axis of iron that caused the globe to rotate.[94] Newton said of this machine: "vapor electricus frictione manus...exitatus".[95] The hand was held against the globe while it was rotating. That caused friction and the electrical "fluid" or "vapour" developed around its surface. Electricity was perceived as small lightning in a very small atmosphere and felt like a breeze in the palm of the hand. Here it is interesting to point out all the underlying associations: all have the character of simple phenomena and are very close to the archaic Ionian philosophy of nature. These associations were not explicit but played a very central role; suppose we have some material, which is a liquid, and we believe that this material "goes from one body into another body". The recipient–body must have the fine structure that is needed to collect a liquid, which is very different from the structure that is needed to collect a solid or a gas. In the case of electricity, the situation was especially difficult because it appears as a very complicated substance, sometimes it behaves as a liquid, sometimes as a gas and sometimes as fire. If the moving–material is a liquid and the receiving–material is a solid, we could visualize the recipient as a vase or as a sponge. Open alternatives with four types of materials could be the following:

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[94]Experimenta Nova...Amsterdam 1672.
G Polvani,p. 27.
[95]Optice, Book III. G: Polvani s 27.

Moving material= MM	Receiving material= RM			
	(l) Liquid	(s) Solid	(i) Igneous	(g) Gas
(l) Liquid	X	L-->S	L-->I	L-->G
(s) Solid	S-->L	X	S-->I	S-->G
(i) Igneous	I-->L	I-->S	X	I-->G
(g) Gas	G-->L	G-->S	G-->I	X

Table 8: The ontology of electricity, alternatives with four types of materials

Different experiments conducted by Gilbert and von Guericke showed that gases do not participate in the electrical phenomena. However, in spite of those results the dominant idea by scientist was the idea of Galileo, that electricity attracted gases and the bodies that were embedded in them.[96] As we see, the first step in the study of nature is that of solving the problem of the decision of the *imbedding dimension*, in this case the problem concerning the *nature* and the *number* of substances. This was also, the procedures followed by the old school of Ionian philosophers in Greece. Commonsensical dimensionality belongs to the archaeology of science, and its study can be useful for a study of the history of science, if it is possible to demonstrate that the mind always goes through the same formal steps. Those steps are: the developing of a theory that uses only *one* substance to explain the phenomena. If that shows insufficient, the next step consists in introducing the idea of an *amount* of substance. If after this, the facts have not been explained, a second substance is introduced and the possible alternatives increased rapidly. The name and description of the substances that could be chosen changed from antiquity to the early modern time from *earth, water, air and fire* to *solids*, *liquids*, *gases* and *igneous substances*. During the eighteenth century, the choice of a determined "substance" was in fact the choice of some of these four general "states", and the explanation had to use the ideas intuitively associated to them. The first electricians alternatively used the scheme of an electrical "fire", that of an electrical "vapour", or that of an elec-

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[96] G. Polvani, p.28.

trical "fluid". In 1720, Stephen Gray studied different materials by rubbing them. He came to the conclusion that all matter could be grouped into two qualities; as *conductors* and as *isolators*; once again the dualistic schema, but now in the form of secondary qualities. In 1734, Charles François de Cisternay Du Fay found that electrification is a property of all the materials with the exception of metals and fluids. He showed that colours were not important to determine the electrical activity of matter. Du Fay came to believe that there are two different kinds of electricity: *resinosa* and *vitrea*; another pair of alternative substances that later became the modern theory of *negative* and *positive* electricity. Nevertheless, the scientific community did not attend Du Fay's ideas. His theory was built using the schema of two substances while the majority of contemporary physicists preferred the competing explanation worked out by Benjamin Franklin, which used one substance changing in quantity. This confrontation between the two schemes is illuminating and it continues indirectly today. The theory of Du Fay had to wait to the year of 1759 to get a successor in Robert Symmer. The theory of Franklin said that the electrical fluid "differs from common matter in that the parts of the latter mutually attract" but the parts of the electrical fluid "mutually repel each other". However, though the particles of electrical matter do repel each other, they are strongly attracted by all other matter." "This supposed that all kinds of common matter do not attract and retain the electrical, with equal strength and force"; "[…] in common matter there is (generally) as much of the electrical as it will contain within its substance. If more is added, it lies without upon the surface, and forms what we call an electrical atmosphere".[97] A related theory is the one exposed by Jean-Antoine Nollet in 1745 and shared by Georg Mathias Bose and William Watson according to which there is also a porous moving-receiving–substance and there is only one electrical fluid. In this case, the fluid is already in the matter and it will be provoked by rubbing. After rubbing, the electrical substance divides itself into a *matiere effluente* and a *matiere affluente*. The "receiving-matter" was attracted by the *difference of porosity*. This theory is electromechanical because of the importance of friction.[98] The dimensionality of phenomenal objects reveals also in the theme of the presence of electricity in the "vacuum". Drawing conclusions from some experiments with rarefying of air, the early science of electricity believed that the vacuum was a perfect conductor of electricity. Scientists extrapolated and deduced that, "if more rarefying meant more conducting, then absolute rarefying of absolute void, meant absolute conduction." Air was depicted as *one* and uniformed substance. It could be more or less in quantity, but it was uniform. The void then, could not be anything else than the a*bsence of air*. To rarefying air meant then, "the diminishing of the magnitude of air". Howev-

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[97] Experiments and Observations on Electricty, made at Philadelphia in America. Benjamin Franklin. Quoted by G. Polvani 1942.
[98] G. Polvani, p.40

er, other experiments showed that electricity could not be conduced in the absolute void of matter and that therefore rarefying air could not be the same as "less" substance. When the scientist has decided which kind of substance has to be used, he studies the relations between qualities and their magnitudes. The first model is the "going to – going from" model. The second model is the "going into–going out from" model. The first interpretation of change is the *scenario–dimensions* and it could be reduced to a problem of identity. The movement of the body A from the place x at time t, to the place x' at time t', could be seen as the identity of A's qualities in both places and times. An example could be that of an arrow, which is represented as a projectile in the air. In this case, the moving–quality is the same as the arriving–quality and it is independent of space and time. When the moving-quality and the arriving-quality are not the same, the movement does not consist in the identity of the amount of one quality that simply changes its co-ordinates in space and time; instead it consists in a change of amount of the same quality. It could be seen as if the changing quality is growing or diminishing in magnitude. This is the *substance–dimension* of the commonsensical world. An example of this could be the growing–diminishing electricity of Franklin or as Nollet explained not in a space/time relation but in a magnitude of quality/time relation. Any *explicit* ontology develops in connection with philosophic and scientific studies. Before Galileo, the scientific works consisted in converting everyday *implicit* ontology to an everyday *explicit* ontology. The idea of an experimental science was not yet an option. Older science was a kind of hermeneutics in which the unconscious became conscious.

Empirical versus phenomenal dimensions

When we study the noema in the noesis-noema duality, we have to distinguish the dignity and size of it and the dignity (power) and size of the noesis that is the cognitive process or the consciousness side to duality of noesis-noema. The plasticity of thought, allows the mind to convert itself to different *dignities* and *sizes*, during the processes of intentionality and of knowing. We say that the mind adjusts itself making transcriptions of mental contents to be congruent with the world. During this process, the mind shows the capacity of reorganizing its power and resizes itself, adapting its values to the referring media. Talking about visual representations, this movement of the mind is popularly known as *zooming*, and has become a part of everyday life with the development of photography and film. In the old days, before the age of photography, the same process was known as "abstracting" a process that was essentially conceptual rather than visual. The idea of *zooming* is constructed upon the ideas of *dignity* and *size* as expressions of empirical dimensions in the case of the dignity of an object and of phenomenal dimensions in the case of size. It supposes the movement of the mind trough different dignities of dimensions and different sizes of representation:
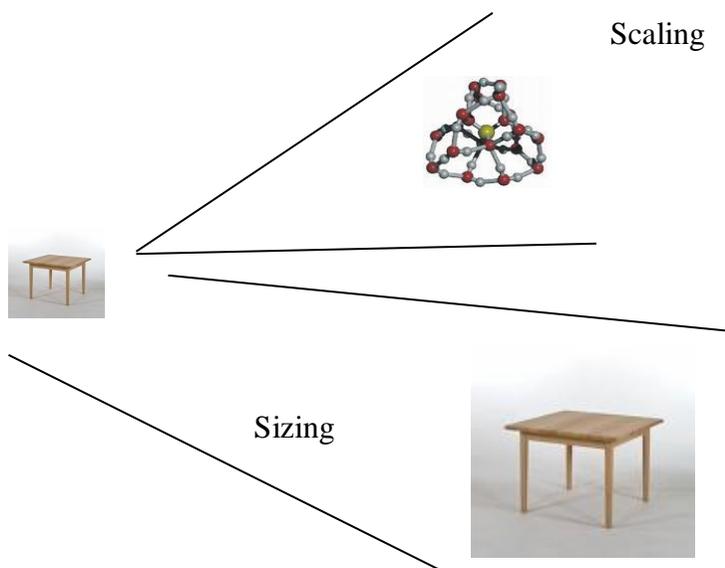
Figure 37: Scaling and Sizing

The noema or the pragma cannot belong to two or more dignities or to two or more size–levels without going through a *stretching* process. If the stretching process occurs because of changes in dignity and size of the noema/pragma we say that the stretching is *empirical*. A stretching process occurs in pure thought when e.g. the content of thought gets a visual dimension. Plato describes visual representations as the "eye of the mind":

> And do you not know also that although they make use of the visible forms and reason about them, they are thinking not of these, but of thee ideals which they resemble; not of the figures which they draw, but of the absolute square and the absolute diameter, and so on the forms which they draw or make, and which have shadows and reflections in water of their own, are converted by them into images, but they are really seeking to behold the objects themselves, which can only be seen with the eye of the mind?[99]

This stretching transforms the noema into a *fractal* and their "meaning" into *a syn-*

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[99] Plato, *The Republic*, book 6.

apse. There are two different ideas of fractal representation; both have been developed by Benoit Mandelbrot in *The fractal Geometry of Nature*[100]: the first is the idea of a picture or geometrical representation (but also a physical object), which stretches itself between different whole–realities becoming a fractingated artefact, a noema in-between whole-worlds. The second idea of a fractal refers to its structure; for Mandelbrot, a fractal constitutes through the continual iteration of the same pattern in different scales. As a stretched object or artefact, the media–product becomes a fractal reality. To illustrate how the observer decides the fractality of the representation in respect to dignity, we shall introduce a brief example. Let us picture a man or woman who is working as a cleaner in a butcher's shop. Every evening after closing time, the cleaner is expected to clean the entire place plus the butcher's tools in such a perfect way that no trace of meat or grease could possibly be detected. In fact the limits of the cleaning are not specified and cannot be specified either. How thorough should the cleaning be? Let us accept that the place is of 40 square meters and is expected to be cleaned up to a m–level. When the cleaner begins the work, the total area becomes the perceived object of the acting of cleaning. As a first step, the worker cleans the rests of meat and grease that are of the largest size. *This is the phenomenal level of work;* we may say that the cleaner begins with a representation of the space in a size–level= $m + n$, because this size–level is congruent to the size of his or hers own body. That is the level of the perceived as perceived, the noema in its immediate manifestation. A second step of the work, would be to clean the same area but departing now from a more detailed representation. Let us call this new size–level as $m + (n–1)$. With other words, the cleaner changes the stick with which he/she measures both the room and the objects in it, for instance the pieces of meat and grease. The cleaner goes from a larger size of particles to a smaller size of particles of grease. Now the cleaner uses chemical products to penetrate in a deeper level of reality. The immediate consequence of this change in the scale of the acting is that the working area is not the same as before. Diminishing size conducted the cleaner's mind, from the phenomenal sphere of thought into the empirical sphere of thought; a sphere, which after being empirical, becomes phenomenal again.

If we accept that the change of the scale of observation, responds to ontological changes and not only in the mind of the cleaner, we have to accept that the working area increases in proportion to the carefulness of the cleaning.

We have to consider now the fact that when the worker cleans the room in step 2

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[100] New York, 1982.

(size–level m + n–1), his/her body is still in size–level m + n, a level that the worker chooses as a natural point of departure and which he/she cannot leave. Getting deeper in size–scaling implies that the work is stretching deeper in a new dimension that is a part of the world which we have not reached before. That also means that the dimensionality of consciousness changes from pure representation of the idea of the room as noema, to a level of molecules and atoms as noemata in a very different scale. If we accept that the body of the cleaner, is only a manifestation of he/her mind and vice versa, and that one is not conceivable without the other, then, the penetration in scale is a penetration of the body in a non-congruent world. The idea of a trans–dimensional relation can be studied as self–reference in mathematics trough *implicit* equations, equations that show the same variable at both sides of the symbol of equality, for example:

i) $x = (x^2 + 1)$

The equation (i) refers to itself therefore it can be denoted as *implicit*. Instead, the equation (ii) does not "mention itself":

(ii) $y = (x + 2)$

In the case of self–reference in (i), the symbol of equality stands for *proportionality* and *incongruence*, but *not* for identity. In spite of this, *it means* identity. With other words, equation (i) means identity but that is an illusion. In an analogous way, as a logical paradox, it presents this particularity, that of the reference to incongruous situations of false identity. In the case of (i), the incongruence does not necessarily occur in the level of dignity of the representation, which could be linear for both terms. Nevertheless, the incongruence may arise simply in the level of the size of x, if it assumes two different values simultaneously.

Empirical dimensions

Size and *dignity* differ however in one fundamental aspect: things have "sizes" in an immediate way. They are therefore "phenomenal" in the sense that "size" and the everyday world are inseparable in any representation. "Empirical" dimensions could not be thought before the phenomenal world was questioned. This process which began with the geometry of the Greeks, became a reality when the men of the Renaissance understood that, e.g. the moon and the sun have to be bigger than they appear to be, or e.g. that the earth is not as large and could be circumvallated in one single tour. The empirical arose when the absolutely given by *vision, hearing, smell, taste and touch* did not give us the answers we needed. Then, we questioned our common sense and made experiments, tests or engaged us in discovery travels. The empirical dimensions arose when humanity could think of "sizes" as if they were

"dignities" (expression of the "power" of a magnitude), when the mind could represent what is far away as "little" in spite of being very "large". This empirical approach to analysis was Husserl's own during the first years of his writing. He transported this methodology from mathematics in a new interpretation of it, which Husserl called a system of "variations". Don Ihde described this in the following quotation from *On non–foundational phenomenology*:

> Actually, the model behind Husserl's notion of variations is originally out of mathematics. He was doing mathematical variations and applying this model now to different regions of human experience than had been previously applied. Of course, like the mathematicians, he wanted to arrive at that he called an *essence*. And, of course, the Husserlian essence is very difficult, because it has a long history of terminological use in other parts of philosophy, and he is radically modifying that use.[101]

What the mind does is converting the world from pure perception (sensible data) to essences or pure ideas; a methodology, which in many aspects reminds the project of both Plato and Descartes. Husserl wanted to distinguish the noema from the noesis but was deeply inserted into the classic philosophical problem of object–subject. Ihde wrote about the "origins of geometry":

> Now, how do you get geometry? Geometry is the increasing abstracting and idealization of certain parts of that sensory plane. So, what is basic are these ordinary objects: tables, chairs, and all the stuff that philosophers always talk about. The first thing is a practice of abstracting. (…) The first process is a process of abstracting. Instead of regarding all these objects simply as what they are –ordinary sense, material, concrete, dynamic, all these things– you abstract into shapes: these kinds of shapes and those kinds of shapes, but not just abstracting (sub) one, but abstracting (sub) two: Not just shapes, but particular shapes, because Husserl is talking about originating geometry. And geometry at the beginning is totally incapable of dealing with any shape whatsoever. It has to deal with certain particular shapes, and historically of course, you are talking about things like "measuring practices. For example, the Egyptians. [102]

Husserl wrote about variations and dimensions in *Ideen*:

> It is clear that in respect of all the peculiar characterizations we have come across in the structurally diversified domain of modification through variations in the form of representation, we must distinguish, and on the grounds already alleged, between the noetic and the noematic. The noematic "objects"

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[101] Ihde, Don. *On non–foundational phenomenology*. Fenografiska notiser 3. Göteborg, 1986; p. 15.

[102] Ibid. p. 19–20.

the object as copy or the copied object, the object functioning as sign and the significant, *disregarding* their own proper characterizations "copy of," "copied," "sign for", "signified" –are unities of which we have evident awareness in experience, but which yet transcend experience. […] But of characters such as these that cleave to the noematic nucleus, there are still other instances of quite different type, and of these the modes of attachment to the nucleus vary widely. They come under radically different genera, under radically *different dimensions* of characterization, so to speak.[103]

Generally, we considered ideas or intuitions, sensations or emotions, as mental contents of dignity–0, whereas we considered the outer world, included our own body, as extensive materials of dignity–3. Descartes e.g. wrote in the Sixth Meditation:

...there is a great difference between mind and body, inasmuch as body is by nature always divisible, and the mind is entirely indivisible. For as matter of fact, when I consider the mind, that is to say, myself inasmuch as I am only a thinking thing, I cannot distinguish in my self any parts, [...]. [104]

Nevertheless, the classification of any mental activity as representations of dignity–0, need to be studied closely. With a closer analysis, we can see that it is not accurate to assign the dignity–0 to linguistic representations such as a symbol, a word or a sentence. Even though these representations cannot be identified as objects of the material world, it is evident that they more or less have some kind of "extension", which means that it would be more accurate to understand its dignity as "d = 1" (that is as linear representations). If we think e.g. the idea of the number 4, it will be a representation d=0 of the number 4, but if we think the symbol "4" or think the word "four", we have a case of linear dignity. Let us say that according to this criterion the semantic level could be always represented as d=0, whereas the syntactic level could be represented as d=1. The study of the dignity of a representation can help us to understand the internal structure of the paradoxes of classic logics, for example the *Liar* paradox. We could understand the arising of paradoxes as the *incongruence* between the level of pure ideas and the level of its factual representations as a *displacement* between the semantic level and the syntactic level. Paradoxes are in general self–referring expressions that compromise in using different dimensionalities for the semantic and the syntactic level. It is not paradoxical to think, "This sentence is not true" (d=0), but it is paradoxical to represent the sentence (d=1). The reason to this is the incompatibility of two or more mental contents of different dignity. With other words, in one dimensional level alone, there cannot be paradoxes. The acting of thinking demands energy and so does the transcription of

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[103] Husserl, E. *Ideas*. London, 1972; p. 272-273.
[104] Descartes, R. *The Philosophical Works of Descartes*. Vol. 1; p.196; 1981.

meaning from a dimension to another. In the history of western thought, pure thought has always been understood as primary to vision; and this is possible to show following the history of geometry. According to Descartes, who considered that thought has no extension, the dignity of thought is cero (d=0) or even the dignity of a "point", thought must be understood as *compact* and *dense*. The transcription to other dignities implies both a reduction of richness and an increase in accuracy. Thought became words through a *reduction* of its richness (the process supposes a primary objectification of thought.) The fluidness of thought *petrifies* in language producing a stable base for communication. This new discourse shows a 1–dimensionality in written language. Mental words became a fractal in between thought (d=0) and written language (d=1). Language is of lineal extension while images and pictures belong to the dimension of the flat (d=2). Written language is not an image and certainly not an artefact. It can be written on paper, but that which is written is not the same as the discourse in which it is written in. Three–dimensional noemata are those we can *touch* and those we usually call "artefacts". We cannot touch a thought or a word or an image, but we can touch a book or a painting. The dimension of time is the next in order; it is usually counted as the fourth dimension. This is the dimension of history, of processes and of life. The four–dimension affects the other dimensions in different ways. In connection with thinking, time is relevant for *memory*. For any dimension, time determines the rhythm of the any communicative process and for music and poetry, time, as rhythm is essential. Finally the contemporary contribution to the corpus of dignities, the dignities of *matter*, the dignity of waves and the dignity of particles, two new aspects of the modern empirical research, which we will place in order –by pure convention– as dim=5 respective dim=6. The dignities of empirical dimensionality can be ordered as follow:
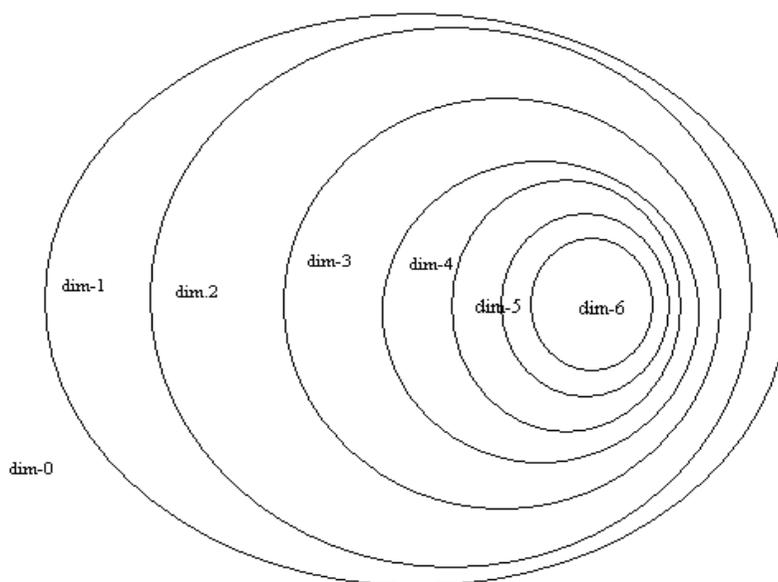
Figure 38: The spheres of dignities

Language for instance, is not the same as the marks of symbols in a paper; these are visual marks and therefore 2–dim images. However, language is not the same as thought. Therefore, language is something in-between pure thoughts and the written string of letters. We can say that language is a "linear" or one–dimensional frame, existing in-between pure thought, which should be 0–dim and written symbols, which should be 2–dim. Neither language nor thought can be reduced to any material object. We note that what is valid for language is also valid for any form of symbolic communication. Within the category of language, we shall count every symbolic expression, from mathematics to music notation. The situation of vocal language is obviously different. It would belong to the dimension of waves because its discourse empirically belongs to field of sound.

Phenomenal dimensions

The plasticity of mental media is capable of bringing together and expressing the whole world through other families of dimensions that we call "phenomenal" dimensions. The archaic classification of the world according to the properties of the

senses *vision, hearing, smell, taste and touch* belongs to this approach to reality. This classification belongs to the same family as the oldest scientific classification of substances as *earth, air, fire* and *water*. This way of organizing perceptions suits an old science, which created an order built on phenomenal *congruencies*. Congruencies in this sense are phenomenal dimensions that are involved in an enquiry about the nature of the everyday world; for example, the frontiers between *inside and outside* or the borderlines between *static and dynamic*[105]. The phenomenal nature of these dimensions is commonly covered, and it often appears first through the work of artists. Modern art has specifically worked with this approach to reality, making visible the hidden connections of the everyday commonsensical world.

Figure 39: The frontiers between the inside and the outside;
design by Vivien Westwood at London Fashion show

The photography of a woman wearing suspenders on the outside is a *signal* for "sexual provocation" and a transgression of semantic rules in the grammar of Fashion.[106] However, in ontological terms, the picture is a *transcription* of the inside to the outside, a phenomenal fractal. This transcription between an inner–dimension and outer–dimension reminds of another empirical transcription, that of the Möbius strip[107], that is, a transcription between dignities d=3 and d=2 in which the transcription makes *paradoxical* the relation between the inside and the outside; another example is Max Ernst's *La Table* from 1964 a synapse between the pair upright/invert of the discourse.

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[105] Pictures from: Lloyd Jones, Peter. *Taste Today. The Role of Appreciation in Consumerism and Design*; 1991.
[106] Lloyd Jones, Peter. *Taste Today*; p. 60.
[107] August Ferdinand Möbius (1790 – 1868).

Figure 40**:** Max Ernst's *La Table* from 1964.

Figure 41: Möbius' *Strip II*, 1963. Painting of M. C. Escher (1898–1972)
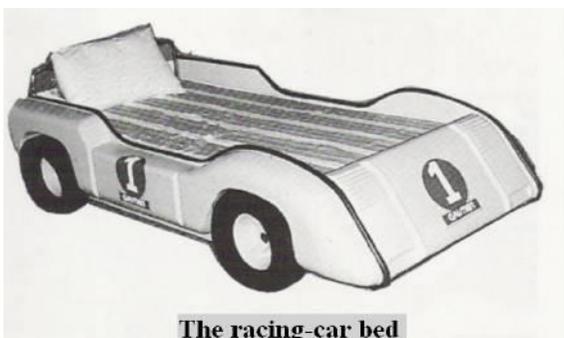
Figure 42: The frontiers between the static and the dynamic; the racing–car bed

The picture showing the racing–car bed is similar but the parameters are now

static–dynamic or *rest–motion*. In the artworks of Christo and Jeanne–Claude for instance, the dimensions of the natural and urban environments work in concordance with more sophisticated and less obvious transcriptions, as in the "Wrapped Reichstag" in Berlin, in which the size of the wrapped object is not congruent with the acting of "packaging". Christo and Jeanne–Claude use the incongruence of size to explore the limits of the human praxis as a "phenomenology of acting".
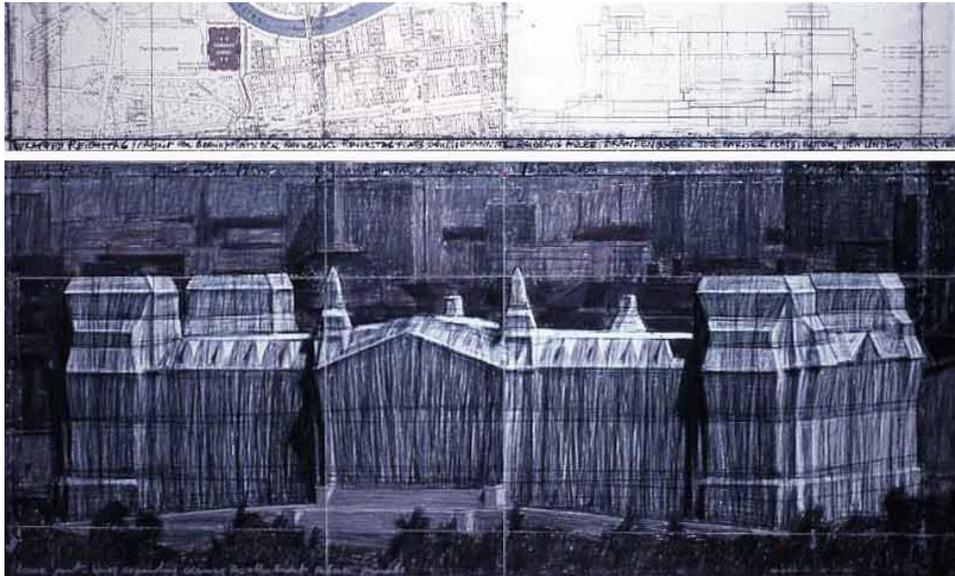
Figure 43: *Wrapped Reichtag*, Berlin, 1995. Christo and Jeanne-Claude

Technology and epistemology

From the philosophical point of view, it can be useful to classify technologies depending on the epistemological frame in which they are thought. In the following table Lucas Introna classifies (and defines) technologies according to the epistemological frame in which they were conceived:[108] The way we understand Introna's typology, the first definition of technology belongs to empiricism and modern science. This is the Cartesian model of tools and machines as mechanical devices and technologies as *mechanisms*. The relation of the artefact to the mind is that of the relationship between *res extensa* and *res cogitans*. The second definition coincides with

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[108] Introna, Lucas, "Phenomenological Approaches to Ethics and Information Technology." First published Sat 19 Feb, 2005.
http://plato.stanford.edu/entries/ethics-it-phenomenology/#1.1
Stanford Encyclopedia of Philosophy.

Positivism and the rise of Modern Sociology and Political Economy. Svante Lindqvist defines technology as follows:

> Technology is defined as those activities, directed towards the satisficing of human wants, which produce change in the material world. This definition is not so vague as it may perhaps sound, and has in fact to be as broad as this in order to accommodate all the phenomena that we call "technology" today. The distinction between human "wants" and more limited human "needs" is crucial, for we do not use technology only to satisfy our essential material requirements. Helmer Dahl has written that historically technology has had basically to fulfil three different functions in society: A productive function, a military function and a symbolic function.[109]

Approach or view	View of technology / society relationship
Artefact / tool	*Technologies are tools that society draws upon to do certain things it would not otherwise be able to do. When tools become incorporated in practices, it tends to have a more or less determinable impact on those practices.*
Social Constructivist	*Technology and society co-construct each other from the start. There is an ongoing interplay between the social practices and the technological artefacts (both in its design and in its use). This ongoing interplay means that technological artefacts and human practices become embedded in a multiplicity of ways that are mostly not determinable in any significant way.*
Phenomenological	*Technology and society co-constitute each other. They are each other's condition of possibility to be. Technology is not the artefact alone it is also the technological attitude or disposition that made the artefact appear as meaningful and necessary in the first instance. However, once in existence artefacts and the disposition that made them meaningful also discloses the world beyond the mere presence of the artefacts.*

Table 9: Lucas Introna's typology

Svante Lindqvist's definition is social–historical and could be reformulated as follows:

> The *body of knowledge available to a society* that is of use in fashioning implements, practicing manual arts and skills, and extracting or collecting materials.[110]

Finally, the third interpretation is proper to Heidegger and the Phenomenological school. In this case, technology can be understood as "the *act of bringing something to bear* and using it for a particular purpose".[111]

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[109] Lindqvist, Svante. *Technology on Trial. The Introduction of Steam Power Technology into Sweden 1715-1736.* Uppsala Studies in History of Science I, Uppsala 1984; p. 14.

[110] The Free dictionary: http://www.thefreedictionary.com/technologies

[111] Ibid.

In *Technics and Praxis,* Don Ihde wrote quoting Heidegger:

Technology is a mode of revealing. Revealing is a coming to presence within a framework. Already at this level, one can detect the emergent value given to praxis by Heidegger. In typical fashion, he reverts to etymological expositions upon Greek thought which stands at the origin of our epoch of Being. *Techné*, Heidegger points out, is originally thought of as broader than 'technique' in the contemporary thought. "*Techné* is the name not only for the activities and skills of the craftsman, but also for the arts of the mind and the fine arts. *Techné* belongs to bringing forth, to *poièsis*; it is something poetic." *Poièsis* is both making and bringing forth, but bringing forth is presenting and thus is a praxical truth. Here is already the seed for the primacy of the praxical, which characterizes Heidegger's phenomenology, but at this point is only important to see that *techné*, as with the ancients, is linked to *epistemè* as a mode of truth as bringing to presence. Techné reveals or brings to presence something which is possible. "What has the essence of technology to do with revealing? The answer: everything. For every bringing–forth is grounded in revealing."[112]

In this last case, technology is understood as an intentional act, acting that is directed to practical means. It is in this sense, that the "thing" of the empiricists became the pragmata of phenomenology. In any case, we will support the idea that an act is technological when it produces docking between material objects. Our understanding of technology embraces the three of the definitions of Introna's classification. That is because our philosophical standpoint is eclectic. We think that any definition of technology should consider the congruence between artefacts, and the human body. That is an idea embedded in modern materialist philosophy; however, the implementation of technology does not necessary lead to some utilitarian results.

Technology from the point of view of post-phenomenology

While Introna presents an epistemological typology of technology, Don Ihde follows another pattern to classify technologies.[113] Following Merleau-Ponty rather than Heidegger, Ihde developed a typology of technologies, from the point of view of *empiricism* and *pragmatism*. He named this approach post-phenomenology. We notice that the perspective of Ihde is to sketch the dichotomy between the *initiative-taking behavior of acting* and the *passivity of knowing*. Ihde's two first cases are typically intentional while the last two cases are typically cognitive. Further, Ihde's perspec-

[112] Ihde, Don, Techniques *and Praxis*. 1979; p. 108.
[113] Ihde, D. *Technology and the Lifeworld: From garden to earth*. Bloomington and Indianapolis: Indiana University Press; 1990.

tive makes underlying references to the consciousness respectively unconsciousness of the technological artefact and of the World and indirectly to the relationship between the artefact and intentionality respective knowledge. His typology makes visible the goal of intentionality, when it is powered by technology. To act technologically means to be intentional and therefore to be in a middle of an unconscious process, which we "know" after its consequences. Following Ihde, we know that some artefacts also became unconscious, as the eyeglasses are during the act of seeing. The intentionality of the act "drags" the artefact into unconsciousness. The same thing happens with the act of mapping the World but in this case, both the artefact and the World are dragged into unconsciousness. In the other two cases, we have another kind of unconsciousness, one that we should call *indirect*. In the case of *alterity,* the World is eclipsed by an artefact and therefore is not conscious. In the case of *background* technology, is the technological process itself that which is outside the range of consciousness.

Don Ihde's typology		*formula*
Technologies of embodiment	*In wearing eyeglasses, perceptions changes. The perceived World seen through the eyeglasses become the real world.*	*[I-glasses]-world*
Hermeneutic technologies	*Thinking the landscape through a map the World and the map become the same. But the connection between the map and the World is not perceptional but hermeneutical.*	*I-[map-world]*
Technologies of Alterity	*Intelligent robots and humanoids are good examples. The real World disappears behind an analogical device that imitates life. The World becomes unconscious.*	*I-technology-[world]*
Background *technologies*	*That is the case of technologies as electricity. We notice its presence first when it is absent. Technology is working outside the conscious world.*	*I-[technology]-world*

Table 10: Don Ihde's typology

Technical solutions can be classified depending on the way they satisfy human wants. Some techniques are developed to do that which the human body cannot do at all; that is for instance the case of the wheel or the propeller. However, the majority of techniques are developed to improve the human capacities, as a hammer or a screwdriver do. In any case, techniques are developed to do *something,* they are *pragmata*, which means for us that they are things brought through praxis, and existing only in the frame of that praxis. We will classify the different types of technologies according to two intentional processes: *technological equivalence and technological imitation.*

Table 11: Technological equivalence respective technological imitation

Technological equivalence	Supposes the construction of tools and machines according to analogical principles.	Examples are the wheel and the propeller.
Technological imitation	Supposes the expansion of some movements from the pattern of the movement of the human body to develop it in a tool or a machine	Examples are both tools as the hammer and more elaborate machines as the robot.

The process of *technological equivalence* built tools and machines according to *analogical* principles. The mechanic process tries to reproduce a movement or change what is typical for living processes. The wheel and the propeller are examples of that. There is no identification but *some kind of ontical kinship*. The wheels of a railway wagon are to the legs of a horse as the propellers are to the wings of a bird. The kinship demanded a gap between the living body and its pattern of movement and the resulting technology. Consequently, the train and the automobile can be understood as analogies of horses, camels and elephants and any other animals used as a vehicle of transport. The power of a motor for instance is still measured in "horses". Equivalent technologies work as the living does, but do it through mechanical principles.

Technological imitation supposes expansion of some movements from the pattern of the movement of the human body to develop it in a tool or a machine. There is no analogy of those movements; they are only a pure copy. That is the case of hammering which is the simple amplification of the acting of beating with hands. Leonardo's wings in his flying machines are an example of the last group of technologies. Observe that the "wings" of Leonardo's flying machine are working as an *imitation* of the bird's wings.

Things and devices

Albert Borgmann introduced the notion of "device paradigm" to describe modern society and its relation to technology. According to Borgmann, the "device" substituted the "thing" and provided modern society with both more control and efficiency and an increasing factor of social alienation. A "thing" for example is a stove, functioning as the central place of the home, a point to which the engagement

of the family converge. According to Borgmann a stove is more than simple warmth, it is *engagement* too and with the introduction of the more efficient central

THINGS	DEVICES	
	MERE MEANS	A MERE END
	machinery	commodity
	variable	fixed
	unfamiliar	familiar
Gathers and illuminates the world	Reduce the world to resources, machinery, commodities	
Engages us mentally, physically, socially	Disburdens, disengages, distracts	

heating system, the increasing control and effectiveness of the purpose of technology results in the splitting of the original family.

Table 12: Things and devices

In calling forth a manifold engagement, a thing necessarily provides more than one commodity. Thus a stove used to furnish more than mere warmth. It was a focus, a hearth, a place that gathered the work and leisure of a family and gave the house a centre. Its coldness marked the morning, and the spreading of its warmth the beginning of the day. It assigned to the different family members tasks that defined their place in the household. The mother built the fire, the children kept the firebox filled, and the father cut the firewood. It provided for the entire family a regular and bodily engagement with the rhythm of the seasons that was woven together of the threat of cold and the solace of warmth, the smell of wood smoke, the exertion of sawing and of carrying, the teaching of skills, and the fidelity to daily tasks. [114]

We think that the central heating system cannot be just the "negation" of a stove in question of engagement. In fact, the central heating system makes the *whole* house a meeting place while the stove reduces it to the surrounding space. It is certain that the provenience of the commodity we call "warmth" is not so obvious in the case of the central heating system and that this is a typical case of that which Don Ihde defines as background-technology. Many of the philosophers of technology share this view of the technology of devices; one of them is David Strong[115]. David

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[114] Borgmann, Albert. *Technology and the Character of Contemporary Life. A Philosophical Inquiry*. Chicago, 1984. Pages 41-43.

[115] Strong, David. *Crazy Mountains*; 1995.

Strong schematizes this crucial difference as follows[116]:

According to Borgmann there is a crucial difference between "things" and "devices":

> The wood-burning stove yields to the coal-fired central plant with heat distribution by convection, which in turn gives way to a plant fueled by natural gas and heating through forced air, and so on. To bring the distinctiveness of availability into relief we must turn to the distinction between things and devices. A thing, in the sense in which I want to use the word here, is inseparable from its context, namely, its world, and from our commerce with the thing and its world, namely, engagement. The experience of a thing is always and also a bodily and social engagement with the thing's world.[117]

The notion of "device" used by Borgmann is interesting because it can be used to distinguish between two different kinds of artefacts, those traditional and those that introduce "complexity" in the artefact or the tool. Traditional artefacts have a simple relation of *congruence* with the human body and its parts. Devices at the other hand are in a complex and never obvious relation of congruence with the human body and its parts. We can easily add our ontological categories to Borgmann's scheme showing that the *engaging* connotations of Borgmann's "thing" are related to intentionality and that the opposite, the *disengaging* connotations of devices are connected to knowledge and information or "fragmented" intentionality.
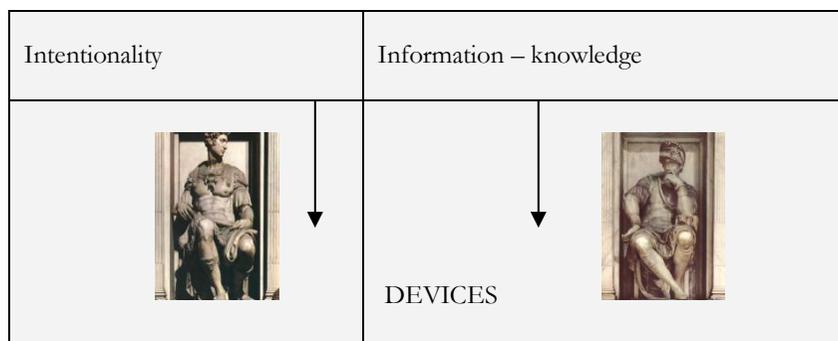
Figure 44: Intentionality and Information

To Borgmann "engagement" means "skills" or, "the experience of the world through the manifold sensibility of the body". It is not difficult to associate his ideas

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[116] Ibid, p. 84.
[117] Borgmann, Albert. Ibid.

about skills to the idea of acting connected to the intentional act.

> These features of physical engagement and of family relations are only first indications of the full dimensions of a thing's world. Physical engagement is not simply physical contact but the experience of the world through the manifold sensibility of the body. That sensibility is sharpened and strengthened in skill. [118]

When skills leads to a social engagement, technologies are connected to labour:

> Skill is intensive and refined world engagement. Skill, in turn, is bound up with social engagement. It molds the person and gives the person character. Limitations of skill confine any one person's primary engagement with the world to a small area. With the other areas one is mediately engaged through one's acquaintance with the characteristic demeanor and habits of the practitioners of the other skills. That acquaintance is importantly enriched through one's use of their products and the observation of their working. Work again is only one example of the social context that sustains and comes to be focused in a thing. If we broaden our focus to include other practices, we can see similar social contexts in entertainment, in meals, in the celebration of the great events of birth, marriage, and death. And in these wider horizons of social engagement we can see how the cultural and natural dimensions of the world open up. [119]

According to Borgmann, "the thing" needed skills to be present and these skills were an engaging part of human life. Knowing how to make things were in some sense an "intuitive" procedure. The production of things happened through what we should call "amateurish" methods. Resuming, with the advent of the device the world of skills were destroyed, and amateurism was replaced with professionalism:

> We have seen that a thing such as a fireplace provides warmth, but it inevitably provides those many other elements that compose the world of the fireplace. We are inclined to think of these additional elements as burdensome, and they were undoubtedly often so experienced. A device such as a central heating plant procures mere warmth and disburdens us of all other elements. These are taken over by the machinery of the device. The machinery makes no demands on our skill, strength, or attention, and it is less demanding the less it makes its presence felt. In the progress of technology, the machinery of a device has therefore a tendency to become concealed or to

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[118] Borgmann, Albert. Pages 41-43.

[119] Borgmann, Albert. *Technology and the Character of Contemporary Life. A Philosophical Inquiry.* Chicago, 1984. Pages 41-43.

shrink.[120]

Finally, a last important aspect of devices is that they are not "reparable". Devices complexity makes them things that we use and "throw away". To try to repair a broken device is the same as to try to understand the congruence with our body and this congruence is always beyond the skills.

Congruence in artefacts and tools

The intentional act developed through Martin Heidegger as a general philosophy of the relationship between phenomena and the World as the *Dasein*.[121] This concept (Dasein) can be understood as "everydayness" of the human "existence". The Dasein manifests itself through the acts of care (S*orge*) and concern with which the Dasein treated the phenomena and the World. World signifies the totality of artefacts (*entities* for Heidegger) which can be present-at-hand within the world. For Heidegger, everything that exists is present–at–hand and some of that which exists is *equipment* when it is part of an acting or process that he called an *assignment*. In the everyday World, many artefacts (entities) are equipment, but if any of them is familiar for us it is because they are 'something in-order-to' achieve some results. A hammer is not a hammer because of its form or because of its materiality, but because its *use (intentionality)*. The value of the hammer consists in being *usable* as a hammer. Further, this equipment belongs to an 'equipment structure' or greater system of equipment often hidden or less obvious to the analysis. The equipment of hammering consists on the hammer, a nail, some piece of wood, etc. According to Heidegger, work is the 'towards–which' of equipment. The work produced by the hammer, is the same as the 'towards-which' of the hammer. That is why equipment cannot be a noema in itself. Equipment is only definable by its use, through the acting of using the tools these entities of the equipment gain meaning. In other words, *the intentionality of artefacts* emerges by its use. As we see it, intentionality 'coagulates' (a Marxian metaphor for value) in the produced artefact trough the process of work. That which make a hammer just a "hammer", is that coagulated intentionality or the *purpose* hidden behind the artefact. Understood as a process technology then is praxis and the tool or the machine is *pragmata*. For us, technology is not the same as work but cannot be separated from it. We do not coincide with Gilbert Simondon when he wrote that:

> C'est le paradigme du travail qui pousse à considerer l'objet technique comme utilitaire; l'objet technique ne porte pas en lui a titre de definitions essentielle

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[120] Ibid.
[121] Heidegger, Martin (2000), *Being and Time,* John Macquarrie & Edward Robinson (trans), London: Blackwell Publishing Ltd.

son caracter utilitaire ; il est ce qui effectue une opération déterminée, ce qui accomplit un certain fonctionnement selon un schéme déterminée.[122]

Coinciding instead with Heidegger, we think that is an intentional–technological act, Heidegger wrote:

The Greeks had an appropriate term for "things": *pragmata*, that is, that with which one has to do in taking care of things in association (praxis). But the specifically "pragmatic" character of the *pragmata* is just what was left in obscurity and "initially" determined as "mere things". We shall call the beings encountered in taking care *useful things*.[123]

Artefacts and tools are an indissoluble part of technologies, they have been created to *dock* with the human body and suppose a performance of some kind to *manoeuvre*, to *couple* the one with the other.
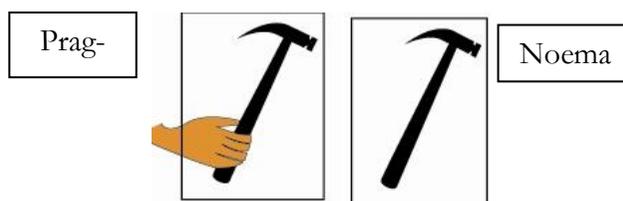
Figure 45: the tool as pragma and the tool as noema

If we consider the tool as a part of the act of work, they became *pragmata,* and otherwise they are a reference of cognition and then *noemata*.

Multistability and brokenness

Don Ihde discovered an important particularity of the process of developing technologies which he named *multistability*. He explains multistability as the phenomena in which the "same technology takes quite different shapes in different contexts."[124] Ihde studied different forms of firing an arrow and established that "each of these variations, however, serve the same purpose, to fire an arrow. But in a new context if one holds the bow in a horizontal position instead, and 'plucks' the bowstring—we are transforming the bow from its usual use, into a new use, as a sort

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[122] Simondon Gilbert. *Du Mode d'existence des Objects Techniques*. Paris, 1958 ; p. 246.

[123] Heidegger, Martin. Being and Time. New York, 1996.

[124] "Technologies—Musics—Embodiments". Don Ihde. *Janus Head:* http://www.janushead.org/10-1/. p. 13.

of stringed instrument!"[125] Ihde then describes what happens in the mind of the archer: "Every archer could hear the bow string 'twang' when fired. Could it then be 'played'?" Ihde then concluded: "Thus the 'same technology'—a bow—apparently fits two radically different trajectories, one of them musical. And this set of different trajectories is apparently also very ancient."[126] In our terms what happens in the mind of the archer is divided according to the four fundamental alternatives of the dialectics of intentionality and knowledge: 1) the acting (intentionality) is redirected and the pragma is broken; 2) there is a lack of knowledge that reveals the absence of noema; 3) There is a lack of general forms to make the world congruent; 4) There are forms to understand the world but there are no adequate pragmatics to make these work congruently.

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[125] Ibid.
[126] Ibid. p. 15.

Type of brokenness	The type of relationship between the noemata and the pragmata	Argumentation
pragma broken	The bow (B) is used as a harp (H)	Intentionality is redirected. The pragmatics of the bow's *weapon-hood* is broken
noema broken	The bow is used just as a bow, only to hear the "twang"	There is a lack of knowledge about the bow's "other face", that is, that of the possibility of being converted into a musical instrument
ontic-broken	A harp (a bow-like musical instrument) that is used as a weapon	The relationship between the bow and the harp *is not symmetrical*; in this case the harp *cannot be* a weapon. There is a lack of knowledge about how the harp and the bow dock with the world
ontology-broken	A bad harp (a bow-like musical instrument that cannot be used as a harp) that can only be used as a (bad) weapon	The artefact does not work neither as a harp nor as a bow, but still is intended to be a harp

Table 13. Don Ihde's multistability combined with an analysis of brokenness

Apparently the pragma-broken cases (the absence of one pragma) are simple cases of broken ontologicity (the absence of pragmaticity in general) and the noema-broken cases (the absence of one form) are simple cases of broken onticality (the general absence of forms).

Docking and congruence

If we consider the human body as the *primary* reference, we can give some of the artefacts the category of *secondary* pragmata. There are artefacts that have been developed to *dock* with the whole body. That is the case of the bed and the lie–

down–type group of artefacts. In this case, every point in the human body corresponds to a point of the secondary artefact.

	Primary pragmata/ noemata		
	The human body	Back	Legs	Head
Secondary pragmata/ noemata	Group of places to lie	X	X	X
	Beds, stretchers			
	Group of places to sit	X		
	Chairs, banks, couch			
	Clothes	X	X	X

Table 14: Primary and secondary artefacts

We shall call this docking as point–to–point (or 1–1–congruence). The seat–type–group of artefacts shows approximately a ½–½–congruence. This group includes chairs, couches and their like. The docking between the body and the secondary pragmata create families and sub–families of artefacts. Some families are

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related to a third group of artefacts and not to the body as the primary group of artefacts does. That is the case of the shelf–type–group, which includes the bookcase and the hat–rack. The related group of artefacts includes books and hats. We could say that the bookcase has some definable congruence with each book on the self.

Secondary pragmata/ noemata	Type of docking (congruence)	Tool – group
	Docking with one hand	In relation to a third noema: hammer, Screwdriver, …
	Docking with both hands	A pick, a shovel
	Docking with one foot	A ski, a shoe
	Docking with both feet	A carpet

Table 15: Types of docking (congruence)

A cabinet or closet is different from the bookcase not because of their structure but because the kind of pragma they are intended to preserve. However, a closet is also appropriate to save books, more appropriate than a bed or a couch. The table that consists only in one and broad "shelf" can also "be used" as a bookcase. Kinship between those artefacts depends on their capability to substitute each other in connection with the process in which they were created. The capability to substitute each other reveals the genetic process underlying the artefact's genealogy. If we accept that evolution fallows a process from the simple pattern to the complex pattern, then it is acceptable to think that the first "piece of furniture" of humankind was the simple flat surface of the "floor", the foundations of the cave. Because a bed can be used as a shelf but a shelf cannot be used as a bed, we can deduce that the bed is more primitive than the shelf. We can formulate this law of evolution as fallows:

> The *utility* –that is, its relative pragmaticity– of a piece of furniture determines the place of that piece in the genealogical process of the development of household's artefacts; more pragmaticity, means less primitiveness.

We can grasp two directions in this development; first a tendency to *loose mass* winning *in mobility* and second a tendency to a *multiplication* of artefacts trough a s*pecialisation* of functions and a reduction of pragmaticity. Furthermore, there are tertiary artefacts that work in direct contact with the body and other that work indirect with the body. When a tertiary artefact works directly adjacent to the body it becomes secondary; that is the case of the comb and of the toothbrush. However, that is not the case of cutlery, the set of knife, spoon and fork or that of a drinking glass, because those artefacts work as ordinary tools, working "from" the body and directed to another tertiary artefact. Cultural artefacts as food, drinks and medicines, work directly at the *inside* of the body, in a kind of *internalisation* of the process of *docking*. When a tertiary artefact works on another tertiary artefact, we could call this a *peripheral* artefact. These peripheral artefacts as the nail, which is not thinkable without the hammer or the piece of wood, make possible the process of nailing up a shelf.

Tertiary artefacts	Static docking	Dynamic docking
	Shelf – group	Tool–group
	Bookcase	Hammer, scissors
		Knife, screwdriver
		Tongs

Table 16: docking of tertiary artefacts

With the term "docking" we refer to two process, first to the processes of adjustment in–between artefacts of different dimensionalities and secondly to the adaptation process that the body goes through when it tries to match tools, machines and the raw material during some process of work. The process of docking can be described as a *movement that develops in many dimensional levels*. To work for in-

stance, supposes a permanent adaptation of the dimensional conditions of the body with the dimensional exigencies of tools, machines and raw materials. To initiate the study of this adaptation process we have introduced the term "congruence". The mathematical idea of proportionality could be an example of the "congruence" of two quantities; it can be understood as the *measurement* of the relation between those quantities. The practical comparison or measurement achieves making the arithmetical division of the compared quantities. Proportionality became a special kind of *analogy* between two quantities. The measurements or analogies between quantities can be applied to concrete quantities as velocities, masses or distances the results being a value of empiric character. Proportionality between e.g. "a" and "b" usually denotes as "a/b" or as "a:b" or also as "a|b ∝ c|d". The congruence respectively the incongruence between terms in a quantitative analogy became clear when they are linked through space–dimensions of different dignities. Differences between congruency and incongruence can be presented as the differences between isometric comparable terms and non–isometric terms in a relation of proportionality. To make our analysis simple, we shall illustrate incongruence referring only to *dignity* (power) and *size*. We say that, when the artefact is also a real thing, it shows a complex combination of those two kinds of incongruence (in dignity and size) and I call it *absolute incongruence*. Incongruence in *dignity* can be found in relationships with the same empirical status, as in the relationship between linear–artefacts and volumes. Docking artefacts that are incongruent in this sense can be made congruent with the introduction of an adequate *constant* of proportionality –that is, a quantity assumed to have a fixed value in a specified mathematical context. Incongruence in *size* can be found in analogies that have the same empirical status as in the relationship of an artefact with its components or parts, e.g. between the body and its organs. Everyday–artefacts, media-artefacts, or commodities*,* present a combination of these two kinds of empiric incongruence plus others of phenomenal character. *Absolute incongruence* is the type we cannot simply reduce to empirical categories as distance, time, kilogram or velocity. The process of production of e.g. clothes, can illustrate what we mean as absolute incongruence and what we mean with *absolute docking.*

Studies of dimensionality show that any classification, any definition, can work as a convention, working in some specific context and during some period. However, the impossibility to a definitive classification does not mean that it is impossible to manage a successful classification and that classification should not be useful. We can make such a classification recurring to a very simple schema as Erwin Panofsky does when he classifies artefacts as belonging to two classes: vehicles of communication, and tools or apparatuses:

> Those manmade objects that do not demand to be experienced aesthetically, are commonly called "practical," and may be divided into two classes: vehicles of communication, and tools or apparatuses. A vehicle of communication is

"intended" to fulfil a function (which function, in turn, may be the production or transmission of communications, as is the case with a typewriter or with the traffic light).[127]

The world of artefacts has since the 19th Century increased dramatically and if we accept that each artefact reveals some unique connections to man's world, we can expect that the world will be increasingly rich and complex. Any effective classification should then report the registered uses of names and then try to organize this in some suitable theory, which shall survive no longer than the individuals and groups that it classifies.

Docking based on sexual analogies

During the ontical process that dock artefacts, the human mind identifies artefacts as male or female if they resemble the male or the female sexual properties. We can therefore speak about male–artefacts and female–artefacts. The identification happens in two levels: first, we find the *form* of the artefact and second the *function* of it. The reference that makes the determination of the *ontology* is the factual form of the sexes, the phallus and the vulva or vagina. The reference that determines the sexual category by *function* is the relational dynamics of the act of copulation translated to the act of congruence between pragmata: these roles are *passive* respectively *active*. Furthermore, artefacts can be *bisexual* because they act as 'females' in some situations and as 'males' in some other situations. A nail is a she–artefact in respect to the hammer (functionally) but a he–artefact in respect to timber (ontological and ontical). The process of sexualisation of the everyday world is archaic and can be found in any society of any time. The ontological sexualisation of nature plays a very important role in the process of "taming natural forces". Wind and rain, mountains and floods have always been sexualized. The same process determines the character of jobs, carriers and professions that organizes in connections with procedures that we see as male work and female work depending on the dominating functions of the procedures used in the working process. According to psychoanalysis, human communication is highly sexualized and artefacts are the natural sexual symbols of it. An analysis of the ontological properties of the human body conduces to the conclusion that because the body has the capacity to act on itself, it could be seen as a *hermaphrodite* artefact. In this sense, machines are also hermaphrodites. The majority of the secondary artefacts (beds, couches, tables, chairs, etc) can be seen as female while tertiary artefacts as tools or machines often are male. While tools and machines many times act as male, the commodities produced on the working process often acts as female. Bags for example, are "female":

Bags are female seeming objects, and have strong associations with female

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[127] Panofsky Erwin (1955). *Meaning in the Visual Arts*. Sid. 12.

experience in many cultures. Few women are able to bear the horror of male fingers rummaging in their handbags; there is no man who has never itched to do this. In Britain and America, subtle, untaught but unbreakable rules still govern the kind of bags that men and women can feel comfortable holding or carrying. One of the rules seems to be that the floppier the bag, the less male it seems. Another bizarre rule concerns the length of the handle. The longer the handles of a bag, the more effeminate the bag, perhaps because the more handle there is attached to a bag, the more it can appear to be something hanging on to you, rather than something that you are actively holding. And then, for reasons which I cannot easily explain, a man's masculinity seems more compromised by a string bag than any other kind. But then why do women, whom men delight in imagining to be made up almost entirely of dark recesses and hidden cavities, usually have no pockets? My father used to say that somebody or something was 'as useless as a pocket in a singlet'. But such a thing has only to be named for me to be able to imagine its marsupial comfort and utility. I would willingly wear a singlet in secret if only to have such a thing close to me.[128]

Because of the importance of sexuality for the human being, it is almost inevitable to use sexuality as the analogical reference to any form of congruence but in fact, this explanation is build in the wrong way. What in fact happens is the opposite: sexual organs and the act of copulation are formed in a way that they match the ontological properties of the World.

Figure 46: "Rock, Paper, Scissors"

The importance of the congruence or incongruence of artefacts became obvious in games that try to dock artefacts as the "Rock, Paper, and Scissors-game" in which the artefacts accept some docking alternatives and reject others.

According to Calvin S. Hall[129], in psychoanalysis "one object or activity be-

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128 Connor, Steven. *Bags.* http://www.bbk.ac.uk/english/skc/magic/bags.htm

129 Hall, C. S. (1953). "A cognitive theory of dream symbols." *The Journal of General Psychology, 48,* 169-186.

comes a stand–in for another object or activity" because some law of resemblance as follows:

1. Association by resemblance in shape to the human sexes. All circular objects and containers with the vagina, and all oblong artefacts with the penis.
2. Association by resemblance in function of the human sexes. All objects that are capable of extruding something, e.g., gun, a fountain, a pen, a bottle with a penis.
3. Association by resemblance in acting. Any act that separates a part from a whole, e.g., beheading, loosing a tooth, an arm or a leg, having a wheel come off an automobile identifies with castration. By the same token, dancing, climbing stairs, riding horseback, going up and down in an elevator identifies with the coitus.
4. Association by resemblance in colour. Chocolate identifies with faeces, yellow identifies with urine, milky substances identifies with semen.
5. Association by resemblance in value. Gold identifies with faeces, jewellery identifies with female genitals.
6. Association by resemblance in number. The number three identifies with penis and testicles.
7. Association by resemblance in sound. The blaring of a trumpet or bugle or the sound of a wind instrument identifies with flatulence.
8. Association by resemblance in quality. A wild animal identifies with sexual passion, a horse identifies with virility. The Church identifies with virtue, a night club identifies with sensuality, a bathtub identifies with cleanliness.
9. Association by resemblance in personal quality. A Policeman, the army officer, a teacher identifies with the father, a nurse identifies with mother.
10. Association by resemblance in structural position. Basement identifies with the unconscious mind.
11. Association by resemblance in status. The King identifies with father, a Queen identifies with mother.
12. Association of part with whole. A specific accident identifies with difficulties of life, a school test identifies with a test of fitness for life.
13. Association by contrast. Crowd identifies with being alone, clothed identifies with being naked, to die identifies with being alive.

We see that the way in which psychoanalysis understands the kinship between pragmata and the imaginary, is possible when it in some sense is related to the concept of docking (congruence). The relationship between e.g. rocks, papers and scissors is not depending on human sexuality, but sexuality is related to it through intentionality and knowledge. This relationship is developed on the artefact's intrinsic (ontological/ontical) properties, properties that change as soon as these artefacts are confronted with others. The properties of the paper in relation to the rock – in "Rock, Paper, Scissors" – are different than those of the paper in relation to the

scissors.

The docking of devices

Following Borgmann, we need to distinguish simple artefacts from machines and other devices. Machines are not extensions of the body as tools are but *surrogates* of the body. When Karl Marx studied the machines impact on industry he wrote the following words:

> All fully developed machinery consists of three essentially different parts, the motor mechanism, the transmitting mechanism, and finally the tool or working machine. The motor mechanism is that which puts the whole in motion. It either generates its own motive power, like the steam engine, the caloric engine, the electro–magnetic machine, or it receives its impulse from some already existing natural force, like the water–wheel from a head of water, the wind–mill from wind, etc. The transmitting mechanism, composed of fly–wheels, shafting, toothed wheels, pullies, straps, ropes, bands, pinions, and gearing of the most varied kinds, regulates the motion, changes its form where necessary, as for instance, from linear to circular, and divides and distributes it among the working machines. These two first parts of the whole mechanism are there, solely for putting the working machines in motion, by means of which motion the subject of labour is seized upon and modified as desired. The tool or working–machine is that part of the machinery with which the industrial revolution of the 18th century started. And to this day it constantly serves as such a starting point, whenever a handicraft, or a manufacture, is turned into an industry carried on by machinery. [130]

Power–machines	Transmissions devices	Tool–machines
Provide with energy the whole mechanism.	Transmissions devices coordinate the completely mechanical process using gear wheels, flywheels, axels, straps, etc. Converting e.g. Pendle-movements into circle–movements	The machine that works on a peripheral artefact: to change it, or to produce new artefacts

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[130] *Das Kapital.* Part IV, Chapter 15.

Table 17: Typology of devices

As we already pointed out, devices work "from outside" the human world and independently of the human body. This property breaks the dependence of the tool with the human body restraining the "present–at–hand" relationship described by Heidegger. Franz Reuleaux's (1829–1905) classical work *Kinematics of Machinery* from 1876 introduced a typology of technological "elements" which combined in different ways could produce an infinite combination of these elements in kinematic chains and machines. His study is one of the most complete earlier studies of docking in mechanical devices. Franz Reuleaux's fundamental idea was that all machines consist of basic '*constructive elements*' and in turn they build basic '*kinematic chains*'. In the typology of Reuleaux, mechanical parts could be organized in levels of complexity. Some of these have been listed out by Francis C. Moon in his work *The Machines of Leonardo da Vinci and Franz Reuleaux*.[131] Francis C. Moon defends the thesis that Leonardo had anticipated the codification of machine design of the 19th century. To show this, Moon follows Ladislao Reti's comparison between Leonardo's machine elements and the classification of Franz Reuleaux. The picture we have of Leonardo's relation to technology is that of a lonely genius working in a desert of ideas. That picture has to be changed to a more realistic one, in which the technological work of Leonardo shall be connected to the technology of the industry of his time. According to Francis C. Moon Leonardo owned a very large library with a complete list of important works in the topics of science and technology. It is obvious that Leonardo worked with deep knowledge about the mechanism used in the textile industry of his time and in contact with several other people engaged in the same matters.

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[131] Moon, Francis C. *The Machines of Leonardo da Vinci and Franz Reuleaux. Kinematics of Machines from the Renaissance to the 20th Century.* Springer, 2007.

Screw

Wedge

Linkage

Belt & Pulley

Coupling

Piston & Cylinder

FIG. 420.
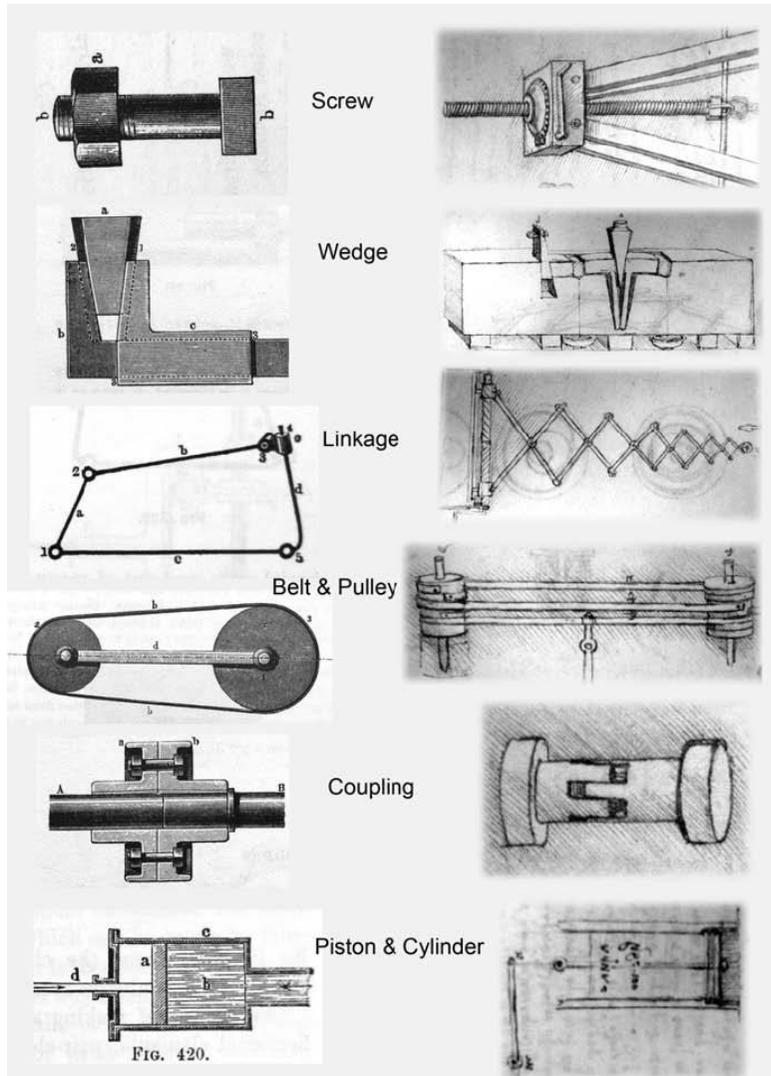
Figure 47: Moon's comparison of kinematic elements in machine design from the books of Franz Reuleaux (on the left) and drawings of Leonardo da Vinci from the *Codex Madrid I* (on the right).

Caring for third-level brokenness

Transcriptional discourse, meaning and synapse

The *transcription* of semantic contents into different ontical contents, that is, between different cognitive communicative dimensionalities, makes the development of knowledge and praxis possible. As "communicative dimensionality", we understand the dimensions of the everyday world. These dimensions are empirical and phenomenological and we also understand also them as *media of communication*. Ontical inquiries are concerned with knowledge of facts about artefacts. Following Husserl, we understand the sphere of the *ontic*, as well as knowledge the sphere of being. "Ontic", seen from our perspective, is the being of artefacts before they become pragmata, that is, before they are being *used*. We say then that *transcriptional discourse* (knowledge and information) is built upon two axes, an ontical and an ontological. The ontical axis works *within* dimensions and produces *meaning* while the ontological axis, works *between* dimensions and produce *synapse*. As "synapse", we understand the *conjunction* of meanings from different communicative dimensions. Meaning can be translated within communicative dimensions –e.g. words can be translated into other words– but meaning cannot be translated to another communicative dimension –e.g. words cannot be translated into images. Instead semantic contents can be *synapsed* into another communicative dimension, e.g. words can be *synapsed* into images. As *transcription,* we also understand the collection of *procedures* that make possible the existence of semantic contents in communicative levels other than language. "To transcribe" is to *synapse* or *conjunct* two or more semantic contents from different communicative dimensions. When transcription is studied in connection with communication*,* that is, as the intersubjective process that involves groups, then *transcription* arises as *discourse*. The discourse is the consequence of the "conciliation" between the meaning of an act (its noema) and synapse (the "fractalized" noema). This "conciliation" makes the discourse an artefact, and as such, it becomes a "medium". Referring to Rilke and McLuhan, Kittler wrote the following lines:

> A medium is a medium is a medium. Therefore, it cannot be translated. To transfer messages from one medium to another always involves reshaping them to conform to new standards and materials. In a discourse network that requires an "awareness of the abysses which divide the one order of sense ex-

perience from the other," transposition necessarily takes the place of transla-tion.[132]
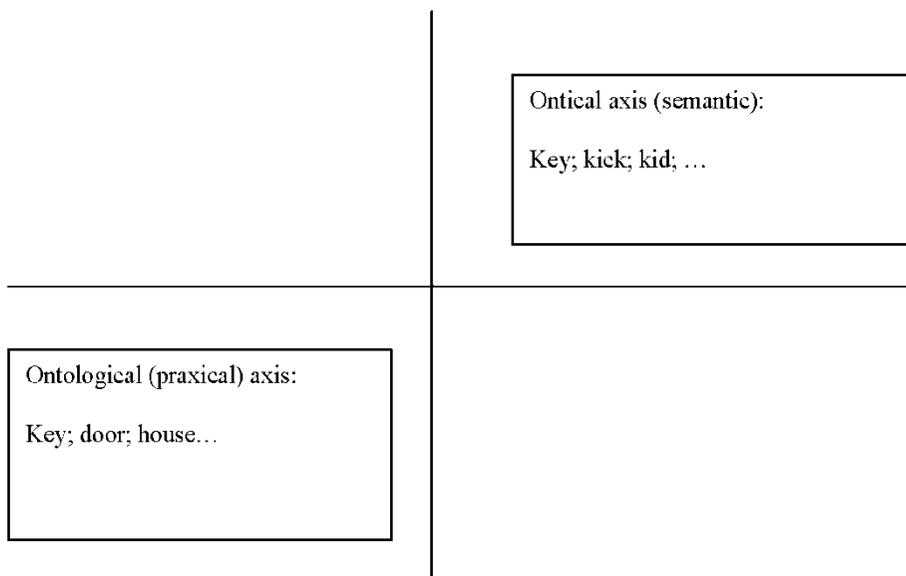
Figure 48: The ontical axis of meaning and the ontological axis of synapse

While a *translation,* is the transference of the meaning of a message from a lan-guage to another, a *transcription* is the transference of some ontical properties from a communicative dimension to another. The "meaning" of a transcription is the same as its "synapse". The *transcription* –process converts the semantic content into "syn-apsing". Synapse is the semantic level that makes ontology meaningful. Because of synapse we understand intuitively that the "key" shall be used to "open" the "lock". How do we know that the key should be used in that way? We know it because be-hind ontology there is an ontical level that derives from the transcription's process. Because this, we say that there is no "meaning" in Duchamp's *Fountain,* there is *syn-apsing.* Duchamp's ready–made, uses transcriptions to make art combining multiple

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[132] Friedrich A. Kittler. *Discourse Networks 1800/1900*. Standford University Press, California, 1990; p. 266.

communicative dimensionalities. As in his *Fountain,* an existing discourse is used to represent a new one; a urinal then, became a fountain.

Figure 49: Duchamp's Fountain (1917)

The semantic transformation is built upon a transcription occurring between phenomenal congruencies, the opposition upright/invert as well as the opposition fine/ordinary, etc. In this situation, we are speaking about many transcriptions that happened on many levels. We have then many parallel discourses, some at the level of ontology and others at the level of onticality. Ontical studies of a great interest for our own approach are those that Roland Barthes presented in his *Systéme de la Mode.*[133] The studies which Roland Barthes carried out about Fashion, in which he distinguished between "objects, supports and variations" (O, S, V) creating a "grammar of Fashion", are synapse–studies and not simple meaning–studies. Barthes understood fashion as a language and as many others influenced by Ferdinand de Saussure he identified meaning with synapse. However, Barthes managed to indirectly describe synapse. Barthes distinguished between "image–clothing", "written–clothing," and "real–clothing". Image clothing is presented as "photographed or drawn"; written–clothing "is the same garment, but described, transformed into language; this dress, photographed on the right, becomes on the left: *a leather belt, with a rose stuck in it, worn above the waist, on a soft shetland dress*; this is a written garment."[134] According to Barthes, real–clothing is "the various traces of the acting of manufacture, their materialized and accomplished goals: a seam is what has been sawn, the cut of a coat is what has been cut; there is then a structure which is constituted at the level of substance and its transformations, not of its representations or significations […]." That identifies the *real* level with the *technological* level of the manufacturing of clothes. Further, real–clothing cannot exist at the level of language, because "language is not a tracing of reality". This is important to

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[133] English translation: *The Fashion System.* University of California Press, 1983.
[134] Op. cit., 1990; p. 3-7.

differentiate the study of a "system of fashion" and a possible study of a "system of clothes". We can see that Barthes recognized three communicative dimensions and they refer essentially to *phenomenological* foundations: the image; the written description and the dimension of technology that consists of *processes*, *acting* and *work*. Barthes described also a fourth level, the world of *clothes*, in which clothing exists as just "clothes". In fact, the technological level cannot be thought without a product that exists independently from the technological means to produce them. A coat can be produced by hand or using machines, but it has an ontical existence as just a "coat". Furthermore, Barthes recognized "shifters" or "keys" for the "translation" of the semantic content of one level to the other levels. (Barthes used the word "translation" referring to what we instead call "transcriptions"). First, he describes the shifter that transcribes the technological contents to an image as the "sewing pattern". Secondly, Barthes describes the shifter that transcribes the technological contents into a written text as the "sewing program or formula"; a text without nouns or adjectives "mostly verbs and measurements". Finally, Barthes introduced the shifter that allows the transcription of the iconic level into the written level as "the anaphoric of language, given either at the maximum degree ('this' tailored suit, 'the' Shetland dress) or at degree zero ('a rose stuck into a belt')." In chapter II of the same book, Barthes arrived to the conclusion that it would be possible to describe two "commutative" classes in the structure of fashion–communication[135]. The pair; "clothing" and the "world" constitute the first and the relation between "raincoat" and "rain" can illustrate it. The relation of the pair "clothing" and "fashion" constitutes the second "commutative" class. This last pair is connected through "purely conventional conformity". The common element of those two pairs is "clothing" as an ontical level of fashion and as a reference to the materiality of the real world in which "rain" is also a phenomenon of nature indifferent to any human needs.

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[135] Barthes, Roland. Op. cit. p. 19–24.

Departing dimension	Arriving dimension		Shifters
From technological contents	To an image	=	The "sewing Pattern."
From technological contents	To a written text	=	A "sewing program or formula"; a text without nouns or adjectives "mostly verbs and measurements."
From the iconic level	To the written level	=	The "anaphorics of language, given either at the maximum degree ('this' tailored suit, 'the' Shetland dress) or at degree zero ('a rose stuck into a belt')."

Table 18: Barthes recognized "shifters" or "keys" for the "translation" of the meaning of one level to the other levels

The unconscious character of Intentionality

Getting into the analysis of the problem of meaning and synapsing, it is important to remember the distinction between the *meaning* of a message or communicative act, and the *intention* of it. "Meaning" in our analysis will refer to a dictionary and to a list of synonyms; it is the consequence of facts of knowledge and never an act of *intention*. While to "mean" is to be in *acedia,* "to intend" on the other hand, is always pure acting (mental or not) directed to produce some results. Intending is an *act* –an acting, or praxis– "mental" or "material"; as in "thinking", "loving", "imagining", but also in "working", "painting" and "performing".

Meaning Intending Believing Desiring – The uncon			Sense Information Consciousness Knowing

Figure 50: Giuliano and Lorenzo, meaning vs. sense

We will use the term "meaning" as a consequence of intentionality, and the term "senseful" as a consequence of information; these two as excluding states of the mind. "Meaning" is not what we list in dictionaries but "sense" (or "fragmented intentionality".) Meaning is an unconscious process, which we know after its consequences, when it had become "sense". Because of our understanding of intentionality as an unconscious state of the mind, our views differ strongly from that of Brentano and Husserl; our notion instead is akin with Freud's "intentional act" as an unconscious act. András Pöstényi[136] studied Freud's idea of intentionality and concludes that Freud was strongly influenced by Brentano's identification of the "psychic" with the "meaningful" which conduced Freud to the breakdown of the school of psychology that identified the "psychic" with the "conscious". Freud could then conceive *unconscious meaningful psychical acts* and concluded that if the representations in a dream were produced randomly, they would be caused by a somatic cause and could not be psychic phenomena. According to Freud, *only psychical phenomena can be interpreted* and everything that can be interpreted has to be psychic. Because the dream is an intentional act, it is something *we do* and *not* something that *happens to us*. The act of dreaming then, understands by Freud as "acting". The dreamer is at the same time the "observer", the "writer" and the "director" of the dream. According to Pöstényi, if we say "intention" we are saying "desire" as well. Pöstényi concludes that psychoanalysis studied intentions (desires) which are in conflict with each other and "without our subjective intentions, preferences and purposes, the information collected by the senses should be without consequences."[137] The dream is a ordered presentation with meaning that can be studied as fragmented intentionality in a conscious level. In spite of the common source of their thoughts Freud and Husserl followed different paths. Husserl maintained the

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[136]At the Introduction of the Swedish translation of Freud's *The Interpretation of Dreams* (*Die Traumdeutung*, 1899). *Drömtydning*.
http://www.nok.se/nok/forf/002151/inledn.htm
[137]A. Pöstényi; Ibid.

connection between the psychic and the meaningful. However, for Husserl, only conscious acts can be meaningful. This became later also the position of Jean Paul Sartre for whom unconscious mental acts were logically impossible. Sartre criticised the psychoanalytical idea of a psychic "censor":

> How can we conceive of a knowledge which is ignorant of itself? To know is to know that one knows […]. All knowing is consciousness of knowing. Thus the resistance of the patient implies on the level of the censor an awareness of the thing repressed as such, a comprehension of the end toward which the questions of the psychoanalyst are leading, and an act of synthetic connection by which it compares the truth of the repressed complex to the psychoanalytic hypothesis which aims at it.[138]

"All knowing is consciousness of knowing," says Sartre, and within our system, this would be correct as long as we are talking about the mind being in the "mood of knowledge". Consciousness for Husserl and Sartre is "order" but this would imply that the information level of thought would be low, and it could not be complex. As we see it, the solution of this question demands the opposite understanding: thinking must be very complex expressing in is very low level of order. In fact, everybody knows that "smoking is not healthy", but only those who *believe it*, can stop smoking. Freud broke with the identity *psychic–conscious–meaningful* and instead used the identity *psychic–unconscious–meaningful*. As said, we agree with this with the additional comment that the unconscious intentional act became senseful and analysable in another context than the intentional.

We shall go further in our study of our paradigmatic dichotomy as the two sides of a coin. We shall consider "to intend" as *unconscious acting* and "to inform" or "to know" as *conscious meditating*, we have, at one side the identities "unconsciousness–intending" and at the other side "consciousness–informing". As we said above, intending is an unconscious process that we know after its consequences. As we understand intentionality, the process of intending is unconscious but the results are not necessarily unconscious.

Ontological – intentional – belief– certainty – acting – unconsciousness - order
Ontic – knowledge – information – being in acedia – inspective – probability – consciousness

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[138] Sartre, Jean-Paul. *Being and Nothingness. An Essay on Pehnomenological ontology*. Methuen & Co. Ltd. 1977. Sid. 53.

The world of intentional artefacts is meaningful in their production and use and senseful *after* they have been produced; only then can be listed out "semantically." If it is not, it is still intentional, and need to be transformed into a conscious content trough an increment of the informational value of the presentation of it.

Re–dimension through praxis

The opposition between "intention and order" to "information and disorder" can be studied from the point of view of communication of "discourses". "Intention" can be seen as the process of communicating through a *discourse* and "information" as the delivered message using a physical *vehicle*. Discourses are of two kinds: those that are intentional and those that are informational. The conversion of an intentional discourse in another intentional discourse (the case of linguistic translation) demands the implementation of a *synapse*. With that term we name the process during which an intentional discourse expand to an informational fragmenting intentionality and then compress its informational value into a new intentional discourse. The complex process of "expansion" and "compression" characterizes the human mind. To transcript through a synapse, is "to put in order" or "reorder" the first into the second, suppose to understand the ontological differences of the used discourse in which the primary discourse is embedded. Synapses are reductions of informational levels into intentional contents and vice versa. Each discourse produces or transports some specific kind of meaning that –when it has been delivered – has been fragmented and reorganized. The word "praxis" cannot be secured without an understanding of the capability of thought to re-dimension itself in acting reducing original high informational levels into order. "Praxis" is the same as "synapsing" supposes that mental contents transcribes into acting and vice versa. Specific for the technological process is the concatenation of several synapses transcribing the dimensional levels of the original materials into new specific dimensional coordinates specific for the new product. This result follows different steps in which each material moves on into different dimensional coordinates. That is what constitutes a *technological process* because any technology is in fact a specific reorganization of the dimensional coordinates of artefacts and substances. This reorganization became possible because the human labour force canalizes muscle energy to achieve the goal of the reorganisation of material's dimensional levels.

Let us study this reorganisation of the dimensional levels of the materials involved in the production of goods studying the synapses of a concrete working process: that of a baker making bread. During this working process, different products are *worked up* to produce bread. First, the baker verifies the quality of the ingredients and plans the steps of the process. She knows that each ingredient belongs to different categories of phenomenal and empirical dimensionalities. First, the baker controls that the yeast is fresh. Then she checks the temperature of the water used to dissolve the yeast; this temperature is critical. The flour used to the

bread is also very important to determine the quality of the final product. When water is added to flour, two proteins, glutanin and gliadin combine to form gluten. Gluten forms a network of proteins that stretch through the dough like a web, trapping air bubbles that form as the yeast ferments.[139] The baker sprinkles the yeast over the water, and lets this sit for a few minutes. When the yeast mixture rises and starts bubbling, the baker measures part of the flour into a bowl and add any other dry ingredients or flavourings. Then the baker makes "a depression, or well, in the centre of the flour, and adds the dissolved yeast and other liquids.
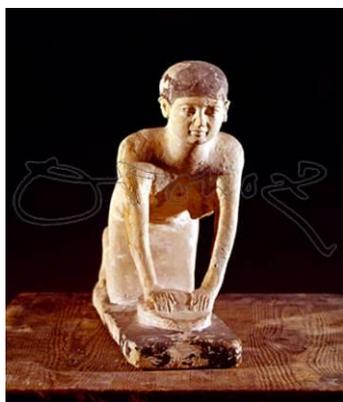
Figure 51: A servant grinding grain to make bread. Egypt, V Dynasty

After that the baker begins to beat the dough to combine the ingredients. The *acting of beating* is the beginning of the high point of the process of reorganisation or *re–dimension* of each material into a new synthesis. Gradually the worker adds the rest of the flour until the bread dough becomes difficult to stir. At this point, the baker flours the work surface and dumps the dough out of the bowl onto the floured surface. She *begins kneading the dough*. To knead, the baker turns *the dough over several times*, gathering any stray particles. Then the baker repeats this process until the dough is smooth, elastic, springy, and no longer sticky. This will take from 5 to 10 minutes. At this point the dough will constitute a new and particular combination of the different materials with an own dimensional reference. Further, the baker greases "a large mixing bowl lightly with shortening and places the smooth, kneaded dough into the bowl, turning it over so the top is greased as well". Then the baker covers the kneaded dough with a clean cloth and places it in a warm spot. When the dough increases in size until double in bulk the baker punched down the dough, and turn it onto a floured surface. Then places the dough in a preheated oven.[140] The first phase of the working process is the phase of finding the *congruency* between the dif-

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[139] See: http://busycooks.about.com/library/lessons/blbread1012.htm (2008-01-13).
[140] Ibid.

ferent materials. The right temperature level, will make the combination possible, it guaranties the congruency. The second phase is that of *docking*, that is the manoeuvring of the materials to combine them with each other. In the case of the baker it is *the acting of kneading the dough*. Each working phase of the chain of productive acting supposes a reduction of the level of complexity; the high point of any working process is always the phase of docking. Each phase supposes one and unique *working rhythm* based on muscle movements or machine movements or on both combined. Each point of contact between the different materials is unique and dimensional determined. When each point of each material is in the right dimensional level, the final product emerges from nowhere and the "magic" of labour becomes visible. Labor is the process that reduces the complexity of knowledge and thinking into a condensed intentional and meaningful product.

The autonomy of artefacts

Inquiring how e.g. the "mop" docks with the "floor" during the process of cleaning, is a *technical* question that involves fragmented intentionality while asking about how the mop *docks with itself* is *technological* because it is asking about the thing as embodied intentionality: we say that the artefact is *autonomic*. This autonomic process "creates" the artefact; it becomes a "thing" carrying "purpose". The autonomic mood of thought creates the artefact from being a gathering of molecules to its *existence* as a cultural product. When in the middle of a working process we choose to use a mop instead of a brush because of the nature of the floor which we are going to clean, we have made a *technical* decision based on fragmented intentionality. However, if we are taking in consideration the "wearing" of the floor or the "wearing" of the mop, then we are thinking *autonomously*. Decisions we make because of technical considerations are free from emotional consequences; however, that is not the case of autonomous decisions, in which our feelings identifies with the artefact *as if the artefact was a part of us*. If a doctor decides to submit his patient to a surgical operation, he might think of it technically because his decision demands from him the best technical solution to a technical problem. However, he cannot avoid the autonomous parallel process of identifying himself with the patient and feel anguish about the consequences of the intervention.

Some artefacts are easy to be understood as autonomous, as the case of machines, robots and computers; these are artefacts that easily can be seen as "living". In the daily process of work, the identification with the artefacts is unavoidable and necessary for the quality of the achieved results. During the process of cleaning not only the mop is understood as autonomous, dirt itself also has plenty of autonomy. From the point of view of "dirt", bad mops and soft floors are "good" mops. These complexities demand that the cleaning process of a bathroom have to be different from the cleaning process of a living room or an office. That is because each room has its own autonomy, and the dirt of each room is different and demands different

autonomic considerations. Technically speaking, "dirt" can be understood both as a "substance" and as "particles" (as particles in a scene) and can be object of different technical process depending of these considerations. In the first case, as a substance, "dirt" shall be treated with *chemical* procedures; in the second case, dirt is often conceived as "dust" and worked out with *mechanical* methods. The acting of soap is chemical; the acting of the mop is mechanical. The soap "reacts" on the artefacts against which it is applied; mechanical procedures instead "interact" with the other artefacts that are in the same scene. When two substances react on each other, a new substance appears. Substances cannot be used as containers and they cannot be "formed" at all. Water is a typical substance and the ground material to any chemical process of cleaning.

I thing when I am not

Anticipation depends on the *expansion* and *compression* of synapsing. Jung studied the process of anticipation and gave it the name of "synchronicity"; the meaningful coincident, the temporary connection between two autonomously and randomly occurrences with *connected meaning*. Jacques Lacan studied this in the following "sophism":

§ A man knows what *is not a man*

§ Men recognize each other *because they are men*

§ I *stipulate* that I am a man, because I fear that the other men *convince* me that I am not.[141]

Transcribing Lacan's conclusions to our scheme we got the following presentation:

Figure 52: "I think when I am not; then, I am when I do not think."

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[141] Lacan, Jacques. *Escritos.*, Siglo XXI editores, México, 1972. Our translation; p.36.

For Lacan Descartes' *cogito* is modified to satisfy a divided subject in: "I think when I am not; then, I am when I do not think."[142] The "think" here stands for "knowledge and sense" while the "I am" stands for I believe, "I exist and act in order creating meaning".

Labour, value and the dimensions of time

Let us picture a garment worker who is sewing clothes with a sewing machine. He or she is producing clothes in an increasing amount in quantity.

Figure 53: The Garment Worker, by Judith Weller, 1984

His/her product is increasing "effectively" depending on the increasing quantity of outcasts of labour, and this depends on the growing accuracy of the performed technical acting. During the working process, the worker is learning, and because of this, less time takes to produce the same quality piece. Therefore, the increasing skills of the garment worker are condensed in a number of pieces of increasing quality in less time. How does the worker manage to produce a complex piece of clothes that has such a high level of different sizes and shapes? Here is when the "magic" of labour comes in. It is not only the technical aspects of labour, that is, its functionality, which make this magic, but the plasticity of synapsing in all its dimensional complexity. The mind recalls the piece of labour and *becomes one with it*, the mind *materializes* through the intentional act and becomes a *pragma*. Let us accept that the garment worker begins to work with a piece of material at an m–level, which is congruent to the size of his, or hers hands and body. When the worker begins the work, the total area becomes the object of the acting of sewing. At the first step, the worker recreates on matter the future piece of material understood as a whole. The garment worker continues then with a representation of the piece in a size–level= m + n, because this size–level is congruent to the size of the needle

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142 Lacan, Jacques. *Escritos*. Siglo XXI editores, 1966, p. 202.

he/she is working with. A third step of the work would be to sew the same area but departing now from a more detailed representation facilitated by a tool or a machine. Let us call this new size–level as m + (n–1). With other words, the garment worker changes the scale of the representation of the future piece at the same time in which he/she changes the dimensionality of the perspective. The worker goes from a larger size of areas to a smaller size of areas, from the 0–dim of pure thought to the dimension of matter when the hands become one with the piece of work and the mind cannot be distinguished from its object. The worker then is fully engaged in his/her product and all his/her existence is pure intentionality. That is when the "I" of the worker disappears into the identification of the Ego within the process of work. Emulating Jacques Lacan's adaptation of Descartes' *cogito,* "I" affirm that: "I work when I am not, then, I am when I do not work."[143] In our words, the "being" stands here for "knowledge, information and meaning" while the "working" stands for "I believe", "I exist" and "I work", in acting, because working is the most complete process of intentionality, the one in which acting definitively materializes. To work is to "jump out of subjectivity" paradoxically as a consequence of the stronger form of subjectivity: *praxis.*

| Giuliano – I work | | Lorenzo – I exist |

Figure 54: "I am when I am not working, then, I am working when I am not."

Changing between the working–mode to the contemplatively–mode demands to change between the states of intentionality and the states of information (fragmented intentionality). While work is the result of a conglomerate of intentional acting, deliberation, on the other hand, is possible, when the referential subject, does not modify the existing conditions of the world and remain passive. Whilst with work the subject identifies with the world, with deliberation the subject connects randomly to the chain of transcendental events. Changing from a state of mind to the

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[143] Lacan, Jacques. *Escritos.* Siglo XXI editores, 1966, p. 202.

other causes the *temporality* of the system to *jump forward or backward*, depending on the direction of the change. Gaining the initiative –that is, when in the act of communication one of the parts changes from pure passivity to work – the consequence *is a jump into the "future"*. "Future" and "past" are defined within the system and not in absolute terms, we are talking about the future and the past of the communicating partners. In our analogy, the gardener's time jumps forward into the future of the history of the society in which he/she is alive. During the working process, the worker is moving forward according to the rhythm of an historical watch. Seen from outside, the time is absolute (Time I) but that time is an illusion. In fact, the second diagram (Time II) illustrates what really happens during the working process. While the chronological time defines the same rhythm for both discourses, the historical time is asymmetric; accelerates for the worker, and brakes for the observer. We may say that, synapsing creates the future increasing the tempo of history.
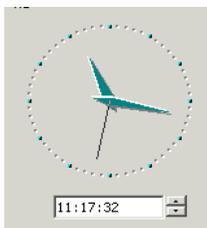
Time I: chronological time
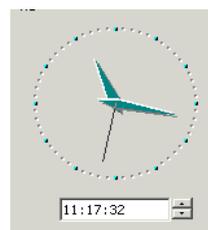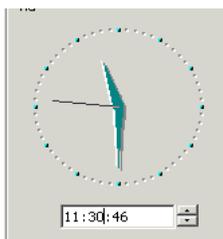
Time II: phenomenal time
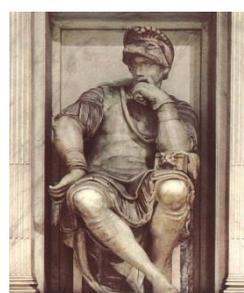
In the worker's case, the *information* (or knowledge) has been transformed into *intention and vice versa*. His alternative has such a safe outcome that it *automatically leads to action* and time jump *forward*.

The deliberator has only pure information to his disposal, which presents a chain of events that is highly unlikely and time remains unchanged.

Figure 55: The "worker" and the "deliberator". The first wins time in respect to the second

As Giuliano won historical time and could "read" in Lorenzo's future, the gardener can anticipate the finished product of his work, existing in a future time of society. Nevertheless the jump is social, the product of work belongs to a future reality and when it is ready to be used, the whole society jumps forward, entering a new stage of development. The condensed time of the process of work, is what we usually call "value". We coincide with Marx and the theorist of political economy asserting that work creates value. However, for us, value is not connected only to work but to praxis and therefore to intentionality and information and to acting in general. To act for us, is to jump into the future and to create value. The value of the intentional act is then connected to the size of the jump into the future. The larger the jump is, the larger the amount of created value produced.

A whole technological act characterizes by two fundamental aspects: First: the process during which the *re–dimension or docking* of the involved materials, muscles, tools and machines happens in a synapse. Secondly, the *jumping in a future time* of the social reality involved. We say that changing from a state of mind of knowledge to the state of mind of productivity and vice versa in a synapse process, causes the temporality of the system to jump forward.

Epilogue: History and phenomenology

The enigmatic and the descriptive

According to Nietzsche the pursuit of the origins is metaphysical or "essentialist" "because it implies that events have a "beginning" a privileged point which history discovers. History is "metaphysical" in that sense. Genealogy, on the other hand will cultivate the details and accidents that accompany every chain of events without giving them any privileged position. The Nietzschean words for this difference are *Urusprung* and *Herkunft*. "Herkunft" means "provenance", the description of family resemblances that connect events in some complex context. In some sense, genealogy is always synchronic and descriptive; it is informative, genealogy works from the third person perspective. However, history is not genealogy and cannot be substituted for it either. Certainly, the question of origins makes history the science of paradoxes, the science of interpretation *per excellence*, a problematic but systematized set of experiences and beliefs organized from the private point of view. Our choice is to see the epistemology of history as the solving of one special kind of riddles that we will call *enigmas*. Working with history implies working from the first person's perspective with events that demand interpretation; nevertheless, history is intentional never descriptive. History has to do with the enigma, Latin *aenigma*, from the Greek *ainigma*, "to speak obscurely or speak in riddles", from *ainos* "fable or riddle", a word of unknown origin certainly connected to the speaking manner of the Gods. While riddles are cognitive problems based on fragmented intentionalities in which some fragments are known and others are not, enigmas are based on intentional unconscious acts. The difficulty of a riddle just depends on the balance between the known and the unknown. Some riddles are deductive, others inductive. Some riddles have to be solved with experiments, others with interviews, others with mathematics and others by research in archives or libraries. However, the solution of an enigma (historical), implies the study of all the information available and something *more*. With "more" we mean that which the interpreter gets from his or her *own phenomenological experience*. This "more" is unique and untransferable. An enigma is not an abstract cognitive problem, but a concrete existential one, it is a cognitive problem converted into a "existential dilemma". An enigma implies acting, the acting of solving it in our own time after a chain of synapses. An enigma is never empirical but phenomenal, implies intentionality and not knowledge. Solving an enigma implies working out some "missing" existential part of a fragmented material. Bartolomé de Las Casas knew this. In his *Historia de las Indias*, Bartolomé de Las

Casas studied, under the subtitle "Old cosmographical news that might have influenced Columbus to perform the travels which ended with the discovering of Indias, five different reasons explaining the discovering of America".[144] We know through the words of Las Casas that the motives behind Columbus travels were enigmatic already in his own time. Four of the reasons that Las Casas speculate with, have to do with cosmographic data, such as the roundness of the earth, the distance to Indias, etc. Las Casas' examination is astonishingly modern because he tried to find a connection between the scientific knowledge of his time (fragmented intentionality) and the historical development (existential context). However, one of Las Casas' five motives is different, more traditional, and paradoxically more interesting to our purpose than the others. According to Las Casas, Columbus could have heard from other sailors that "nearly all was already discovered" and that the "only missing part was the space between the East Indies and the islands of Cape Verde". We know today that other sailors had travelled in direction towards the New World. For example, the Portuguese João Vaz Corte Real could have been the first modern European to visit America. He presumably explored North America in the year of 1472, that is, twenty years before Columbus. Many of these travels were "secrets of state", and therefore very little are documented of them. Consequently, it is possible that Columbus got some information about these travels through his contacts with other sailors. This is an enigma, which only the experience of Las Casas could tell us something about, because Las Casas' own life belongs to this time and he knew what was possible and what not. He could interpret the events from the point of view of a person who was at the centre of the events and who could connect this event to the common sense of the phenomenological experience of these days. The amount of data to disposal are senseful but only the interpretation of men as Las Casas can give to this data the value of an historical interpretation. We could say that there are many enigmas connected to the period of the discovering and conquest of America. Beside Columbus' motives, we can refer to Amerigo Vespucci's bizarre significance to the transmission of the earliest information about the magnitude of the discoveries. We do not know, for certain, to what extent Vespucci was a liar or to what extent he could not reveal secret information. Another example could be the amazing behaviour of the Aztecs in Mexico, when they for the first time confronted Hernán Cortés and the Spaniards.

The history of artefacts

With the word "thing", we will refer to the artefacts of the everyday life. Then we will refer to the "history of the artefact" meaning with that something different from the changes of a thing during time. This kind of history is the history of the

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[144] Las Casas, Bartolomé de. *Historia de las Indias.* Alianza Editorial; Madrid, 1994; p. 368.

"thing" understood as phenomenon. To the history of the thing belongs the study of its changes in shape and colour during some periods and depending on social and economic aspects. This is sense in which the history of technology has been written. That which we want to write about instead, is the history of the phenomenon associated and hidden behind the thing, the *pragma* and its relationship to the *noema*. We are interested in studying the changing process of an artefact but in its *ontical* or cognitive praxical aspects and its *ontological* or intentional praxical aspects and not in only its noetic or positive conscious manifestation (as it is apprehended by reason). In the case of e.g. garment, we want to know how and why the garment we know as a "dress" in time follows some other piece of clothing that we name as "tunic". Our interest is not only in noting the changes in time but to understand the underlying praxical process which relates the shapes to the human body and to the everyday world. In the case of the media of communication, we are interested to know the connections existing e.g. between the telegraph and the telephone. During a traditional historical study of the artefact's evolution (empirical), the centre of the attention is concentrated to the social aspects of the changes. We say that the tunica diapered in some region because the social needs changed. In the same way, we can say that the becoming up and disappearance of the telegraph depended on the acting of economical causes. However, ontical and ontological aspects are not depending exclusively on economic and social factors. The economic and social factors determine the need of new shape and new content, but this shape and content have to be developed in an ontical and ontological matrix that is a priori determined by the shape of the human body and the shape of the environment, their respective proportions, and the laws of congruence between dimensions. That is why ontical and ontological developments have their own "history". The history of artefacts we are trying to develop is a kind of "natural history of the thing". It is the same "history" as the history of stones, plants and animals that Linnaeus once studied in nature but now in the human world. We are searching for structural laws that permit us to understand why artefacts have the shapes they have and why this particular shape is followed by another particular shape and not another. We studied that e.g. no living form can develop mechanisms as those that characterises machines because no living creature can develop *gear wheels*. Our idea to develop a history of the relationship between pragma and noema supposes an idea about time.

Cases studies

The Accident and the Brokenness of History

Aristotle understood the word "accident" as an attribute of a class or a thing that is not essential. The word comes from Latin accidentum meaning "something that happens by chance"[145]. In everyday modern life on the other hand, we normally understand and experience accidents as an unexpected and undesirable event that can cause harm in some form, which consequently makes the word negatively charged. Further, we give the name "catastrophe" to huge accidents, that is, accidents that affect a large number of people and have huge consequences. Catastrophes can in turn be differentiated in to two main groups: man-made catastrophes and natural catastrophes. Accidents belong to the first group because they are always the consequence of human acting performed by one or more individuals. From our point of view and according to our theory of acting, an accident is always an intentional act and therefore an unconscious act. For us any act is unconscious and the difference between normal acts and accidents is that an accident for us is a "broken act", which is an act that is being directed to achieve a result or a purpose but failed to achieve it. The existence of a broken act indicates what we will call parapraxis. This can be compared with the corresponding Freudian concept of parapraxis which is the consequence of a conflict between unconscious and conscious intention. For Freud parapraxis is an error in speech, or in acting. It can be understood as a kind of "stumble with an invisible obstacle" outside the range of consciousness. That is because to be conscious for Freud is the same as "to see", and to be unconscious means to "stumble blindly" forward. However, Freud left the question about the relationship between unconsciousness and acting unsolved. For us intentionality is identical with human acting and the unconscious has no other possible place than in the relationship between the body and the everyday world of culture. For us there are two essential states of the mind: the straightforward experience and the reflective experience, terms introduced by Don Ihde:

> If I begin now to take note of my experience, deliberately trying to find the most straightforward experience possible, I may well make a certain discovery. In most of my straightforward experiences, I am certainly not primarily, or even self-consciously, attentive to what is going to the matter at hand. Thus, if I am chopping wood for the evening fire in Vermont, I am so involved with splitting the wood, that I do not notice much of what goes on

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145 Online Etymology Dictionary: http://www.etymonline.com/index.php

around me, nor do I think self-consciously about how it is that I am splitting the wood. In fact, if I do turn critical and self-conscious, while my ax is raised to swing, I may miss the log entirely. But after the fact, I may note in this simple report that I can distinguish and easily move between what appears to be two variations within experience. Straightforward experience, I could and did characterize: it was actional, involved, immersed in the project of the moment, narrowly focused and concentrated. My thinking about that experience, also an experience in the general sense (reflective experience), was a reflection or a thematizing of the straightforward experience. These two modes of experience are familiar and easily alternate in the on- going affairs of the day.[146]

I have illustrated this dichotomy of the mind with help from a metaphorical reference borrowed from Arthur Danto who in his book *Analytical Philosophy of Acting* from 1973 presented an analogy based on the work of Michelangelo. In the year 1520, the pope Leo X (Giovanni di Lorenzo de" Medici 1513–23) consulted Michelangelo to build a chapel for the Medici family. The pope also wanted Michelangelo to place the tomb of his younger brother Giuliano and his nephew Lorenzo in the chapel. The genius Michelangelo managed to capture the opposition between acting and thinking in the tombs of these two men. On one hand, the athletic Giuliano, a man of acting and on the other hand Lorenzo – Il Pensieroso who seems to be lost in deep thoughts, unaware of his surroundings. In our book Broken Technologies, we tried to show that it is possible to describe the difference between the straightforward experience and the reflective experience with the help of probabilities. Straightforwardness is the consequence of certainty and on the contrary, reflectivity is the consequence of uncertainty. Another way to express the same is to say that straightforwardness is the consequence of order and reflectivity is the consequence of information.[147] In that sense, the Freudian Unconscious is a very rich informational state of the mind in which order is impossible. As we say above, the essence of a conscious act is order and we understand "order" as inversely proportional to information; that means that if we know that an act produces x bits, it generates an order of 1/x bits.

Barry A. Turner and Nick F. Pidgeon (T & P) wrote about the relationship between information and beliefs in his book Man-made Disasters from 1978.[148] According to T & P, it is necessary to distinguish a communication channel from an observation channel.[149] In a communication channel the system is closed and the

[146] Ihde, Don. Experimental Phenomenology. An Introduction. State University of New York; 1986, p. 45.

[147] Flores Morador, Fernando. Broken Technologies. The Humanist as Engineer. Version 1.1. University of Lund, 2009; p. 131.

[148] Barry A. Turner and Nick F. Pidgeon. Man-made Disasters. 2nd ed. Butterworth-Heinemann. First published by Wykeham Publications 1978 Second edition 1997; ISBN: 0750620870.

149 Turner refers to C. Cherry's On Human Communication: A review, a Survey and a Criticism.

values between expectations and changes of information are absolute. In an observation channel on the other hand, the system is open and if the amount of information changes a redefinition of the system is required. From our point of view, this difference reveals another expression of the above introduced analysis of the "divided mind": on one hand, an intentional state of mind (the communicative channel related to order) and on the other hand a cognitive state of mind (the observational channel related to information). Even if in any case the simplification can be risky, the dichotomy helps us to understand how intentionality is related to information and intentionality. Changes in order are unexpected outcomes and are experienced as informative "surprises". According to our point of view, changes in information determines changes in the degrees of beliefs and therefore to the connected capacity to act. We act when the odds of succeeding to realize our intentions are very high, or what is the same, when order is very high and the state of mind is that of an unconscious identification with the task; otherwise we wait. "Waiting" at the other hand, is the suspension of acting and a very conscious state of mind. The query aspect of the scenario of an accident is that the high amount of information can paralyze and make preventive acting impossible. We drive the thesis that uncertainty leads to apathy and certainty to acting. Our distinction is relevant for our analysis of accidents, because an accident is always the consequence of the brokenness of some praxis occasioned by apathy. Preventive acting destined to avoid accidents, can only be successful when the general conditions of acting are given. These conditions exist if the relationship between the system of beliefs and the protocol is absolutely congruent. According to our philosophy of acting, technologies are working "properly" when an absolute congruency between the system of beliefs and the protocol is present. If this congruence is partial or inexistent we say that technologies are "broken". Consequently, to "prevent an accident" means to fully anticipate parapraxis following the question of congruence in each level of intentionality. T & P distinguishes three mayor types of events in which uncertainty increases:

> The kinds of event which may provoke a higher order of surprise can be separated into three groups - which we may label as anomalies, serendipities and catastrophes. All three types of event share the common property that the news of their occurrence does not reduce uncertainty, or at least, does not do so immediately.[150]

As T & P understands "anomalies", "pieces of information which are clearly not irrelevant to the concerns of those who receive them, but which cannot be assimilated into the existing world-view, so that their implications for understanding

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London. Chapman and Hall; 1957.
[150] Op.cit. p. 127.

and for decision-making cannot be fully assessed at the time of their acquisition."[151] Anomalies are "disturbing" the worldview but not stressing the actors to perform correcting acting. Anomalies are catalogued and saved waiting for a future solution. The other two main groups of "surprises" are the serendipity and the catastrophe, the first is an unexpected favorable event and the second an unexpected unfavorable event. Both of them are attributed to "random factors".

> In both types of cases, major pieces of information are discovered in un-expected areas, with implications for the accepted view of the world, and the acting-related assumptions flowing from it, so that a revision of expla-nations previously accepted as satisfactory becomes necessary. In both cases, the consequences draw attention to the discrepancy between the view of the world enshrined in the relevant sets of premises upon which decisions are based, and the additional external factors which now have to be recognized.[152]

For T & P the surprising content of extreme changes in the previous world-view has to do with the discovering of "major pieces of information in unexpected areas". However, these surprises have to be taken already as "anomalies" because any anomaly is the manifestation of some case of incongruence. If any correction of the events can be performed to avoid accidents, these corrections will be possible as long as the anomalies of the events do not paralyze acting drowning it into pure in-formation. In other words, the methods developed to achieve the security of any system, imply a permanent reinforcing of the system of beliefs and of its coherence with praxis through a congruent protocol. Let us now introduce a table with a more systematic approach to the problem of accidents and errors:

Type of broken-ness	Example

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[151] Ibid.
[152] Ibid.

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Order-broken and/or protocol broken.	Tentative programming: Prototypes, Beta-versions. The system of beliefs and/or is not clearly established.	Prototype or trial product of a computer program. The ideas of the task and how to solve them are not presented unambiguously. At the centre is the relationship between a Beta-version and an Alfa-version of a program. It is a kind of self-reflexion in programming language.
Ontically broken	Deficient balance between the system of beliefs and the protocol.	A program which is insufficient for the intended task or the contrary, a program which is too complex for a task.
Ontological broken	Incongruence between the system of beliefs and the protocol. No congruence between program and hardware.	A program which is less powerful (or the contrary, more powerful) that the hardware can bear
Time- broken	Obsolete System of beliefs and/or protocols.	An outdate program that need to be surrounded by a outdate environment.
Value broken	Amateur system of beliefs and/or protocols (programming).	Programming which is intended to work in a non-professional environment.

Table 19: Accidents and the type of brokenness

The "new information found in unexpected areas" may be enough to paralyze acting; in that case other routines (maybe security protocols) have to be implemented to create the condition of engagement. In any organizational (informational) system, congruence (order) changes continuously (because of entropy). The simple "pass of time" makes these changes; in the sense that the social conditions of the system are changing with time.

The Metaphysics of Sexual Technologies and Brokenness

There are certainly many possible definitions of "sexual technology" and we will discuss some of these in this paper. Of course it depends on what we understand by "technology". In this book I have been using a definition which belongs to Svante Lindqvist[153] who defines technology very intuitively as "those activities, directed towards the satisficing of human wants, which produce change in the material world." He also says "the distinction between human "wants" and more limited human "needs" is crucial, for we do not use technology only to satisfy our essential material requirements." In the case of sexuality, humans do not exercise sexuality with the only aim of reproduction. Consequently, from this perspective, a sexual technology could be defined as those activities, directed towards the satisficing of human sexuality that are intended to produce changes in the material world that *manage to satisfy these wants producing simultaneously changes in the material world.* Any definition of technology implies the incursion in metaphysical considerations concerning different aspects of sexual technologies and its evolution. Technologies in general, are "effective procedures" directed to achieve a praxical result. We can assume that human *intentionality* imbedded in sexual tools, could be described as the "effective procedures" that work beyond human capabilities through the sexual tools. However, a sexual tool or a sexual machine can do worse than the human body or than another tool or machine. When tools or machines do worse than the human body does, or when they do better than the human body but worse than other tools or machines, they became *broken technologies;* otherwise they are *full technologies.* We can use this principle to define operationally what a "full technology" is and what distinguish it from a "broken" one. Another approach to a definition of sexual technologies is their usefulness which improves studying the interacting between the artefact and its user. In engineering, the usefulness of an artefact is determined by two qualities: its *utility* and its *usability.* In the case of sexual technologies and sexual artefacts their usability is *broken* in all or some of these aspects if they are not more efficient to use; they are not easier to learn and they are not more satisfying to use. Of course there are other ways to define brokenness that are *historically* related. For instance, let us consider the case of *old* technologies, as the condom. This technology still "works" today and it could be used in the same way

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[153] Lindqvist, Svante. *Technology on Trial. The Introduction of Steam Power Technology into Sweden 1715-1736.* Uppsala Studies in History of Science I, Uppsala 1984; p. 14.

that it was used hundred years ago. Why should it then be called "broken"? The answer is "because of its age", we would say that it belongs to a world that does not exist anymore. Then, it could be described as "historically-broken".

Figure 56: "Casanova (1725-1798) mentioned condoms several times in his exhaustive memoirs. However, he was not enthusiastic about them. He did not appreciate the value of the condom until later in life. He used to inflate condoms to amuse the ladies and test them for holes."
H. Youssef (Institute of Obstetrics & Gynecology, Hammersmith Hospital, London), Journal of the Royal Society of Medicine Volume 86 April 1993.Presentation from *Casanova's memoirs*. (The British Library London).

But, what about other old sexual technologies, e.g. the introduction of spermatocidal substances in the vagina such as sodium carbonate, acacia gum, lemon juice, stones and other natural substances to prevent pregnancy? They are in some sense old technologies too, but we notice that they are different from cases like that of the condom. We know that the old condoms are the same as old chemical contraceptives, the product of a world that has disappeared; however, we notice that an important aspect of these two technologies is their efficiency to achieve the intended goal independently of history. A condom is an old technology but it is the product of an idea (noema) and praxis (pragma) which is adequate to the surrounding world independently of historical time. We name this adequacy as "congruency" and these technology as "perpetual"; we say that the condom and the world still "dock congruently" independently from the historical period in which it is used. At the other hand, in the case of old contraceptive chemistry, while the pragma (methodology) of using chemical substances inside the vagina is still contemporary, the foundational ideas of acting need to be changed completely because these old technologies were based in inadequate chemical and medical knowledge.

The fact that old technologies of sex should be included in the family of full respectively broken technologies actualizes the importance of history in this study. We know that the condom is a historic vestige of another time, but—pragmatically considered—it is still going on, and it could be implemented at any time in any future situation. In the condom's ontology is something that is historically-free. So, what is old in it is some particular materialization (pragma) of the condom-noema;

specifically the material used to produce it. "Sexual technology" for us means the development of "sexual effective procedures" that work within and beyond the human capabilities. In this sense, broken sexual technologies can also be seen as the result of the situation in which sexual effective procedures of any kind, do worse than the human body does, or when they do better than the human body, they do worse than other sexual effective procedures.

First-level of techno-sexual brokenness

Let us now consider another example, the "sexual technologies of poverty" which for us define a family of broken technologies. Any materials that society discards as garbage are suitable for being reprocessed as technologies of this category. What is broken here is the *amount of forms* (noemata) that are available to be used as sexual artefacts and tools. Using a "bottle" as a "dildo" could be a good example of how this technology *redirects intentionality*. The immediate question is the following: what *dildo-like*-qualities does the "bottle" have? Moreover, what is it that is *not working properly here*: is it the *knowledge* of the possibilities of the bottle respectively the dildo's possibilities to "dock" properly which is inadequate? Is this case, as in the case of old contraceptive chemistry, a case of lack of knowledge? Alternatively, is it the *system of beliefs*, which is not congruent with the tools? Can it be so that "deprived" people *believe that* a bottle is *the same* as a dildo? The answer is simpler, deprived environments do not offer the full range of tools that match the everyday world of "regular" environments. There are no problems with the system of beliefs or with the implied knowledge; what happens in fact is that the technical means that are of disposal are incomplete to match the world of garbage. But this insufficiency is noematic; an initial lack of "forms" demands the recourse of a redirection of intentionality. Because of this case of brokenness, it is necessary to distinguish between that which *depends on knowledge* and that which *depends on praxis*. Knowledge can be manifested as a *clear idea or form* about how the laws of the world work. I call this clear idea a "noema". For example, to have "virtual sex" with an *avatar* implies the material connection from a person to the digital projection of an alter-ego that it is nowhere placed, is a sexual technological idea that belongs to the *fantastic*. The idea or *noema* of this technological procedure exists but not its "pragma". As *pragma*, we understand the sexual technological procedure *itself*, which permits the idea or noema to be realized. We say that sexual fantastic technologies are pragma-broken because "they know what they want" but they do not know "how to manage" to produce these outcomes. To realize avatar-sex properly, will demand the development of a "touchable" avatar technology which does not yet exist otherwise would it be a variant of masturbation. An opposite situation is that of *magical sexual technologies*. They have a pragmatic solution (that is the "sexual ritual") but they have not a clear sexual noema or sexual cognitive base to produce this. The acting of having sex with a

surrogate partner to "fertilize" a third partner is a sexual magical procedure that shows a "precise procedure" for the expected outcomes of this praxis. To drink magical potions to stimulate sexual powers also belongs to this family of technologies. In this procedure, the connection between the involved bodies is *too equivocal*, and therefore is not congruent with the world. We say that the magician "knows how to do" but does not know "what he/she wants," and that magical sexual technology is *noema-broken*. We find that other cases of sexual implementing that are more complex than the fantastic and magical, cases in which both the noema and the pragma are—in some degree—congruent with the world. That is the situation of the chemical technologies that prevent pregnancy discussed above, which show the full presence of both noema and pragma. In any case, we can say that this presence is *weak*. We deduce that their weakness affects their wholeness but *more* in respect to their pragmatic aspects than to their noematic aspects. It is possible to say that preventive chemical technologies are *ontological-broken* because they do not work properly in spite of having a *nearly clear* idea about how they *should* work. Ontological-brokenness is a higher level of the pragma-brokenness. It is a matter of degrees that makes the one different from the other. Preventive chemical technologies are *a more* pragmatic-open than the case of the fantastic erotic avatar. Following the same path, we say that the sexual technologies of poverty are *ontical-broken* because they are weaker in respect to their noematic aspects than to their pragmatic aspects. The bottle can be used as a dildo, but it *does not match properly* the idea of a dildo. Noema-brokenness, pragma-brokenness, ontical-brokenness and ontological-brokenness constitute for us the first-level of the brokenness of the world.

Second-level of techno-sexual brokenness

In the case of obsolete sexual technologies as the condom; the problem deserves a deeper analysis because there is nothing wrong with their noematic and their pragmatic aspects. These levels work "properly" notwithstanding that these technologies, are *archaic*. Historical-brokenness cannot be explained in terms of noematic and pragmatic aspects or with reference to their onticality or ontologicity. We identify this *second-level of sexual brokenness* as the level in which what is broken is *dimensional*. It is a kind of sexual brokenness that affects the dimensions of time and space, of duration and extension. Explaining that condom-technologies are "old" is to say nothing new; to solve this problem we need to introduce the idea of *enigma* or "historical riddle". We mean that out-dated sexual technologies are enigmatic in the sense that they work "properly" but only in a *reconstructed scenario*. In some cases the reconstruction needs to be significant and in some cases will be impossible. For instance, if some primitive plant used as preventive chemical technology become extinct, the situation makes the preparation of this kind of preventive technology impossible. We can reconstruct the sexual procedure and the preventive chemical

technology, but we will never manage to *restore* the authentic phenomena into our own reality. Of course, our analysis is an historical one too, and what we classify and organize depends on our perspective of the historical facts. That which for us is broken today was certainly not broken for men in another time-scenario.

Third-level of techno-sexual brokenness

In the highest level of brokenness, we find the third-level of brokenness, in which technology is intended to affect sexual behaviour in the social and cultural level. We are thinking of a special kind of sexual procedure, which involve *gender* aspects. As a typical case of gender technologies the case of *sexual reassignment surgery* can be considered. This kind of surgery converts a man who is "living as a woman" into a woman, and a woman "living as a man" into a man.
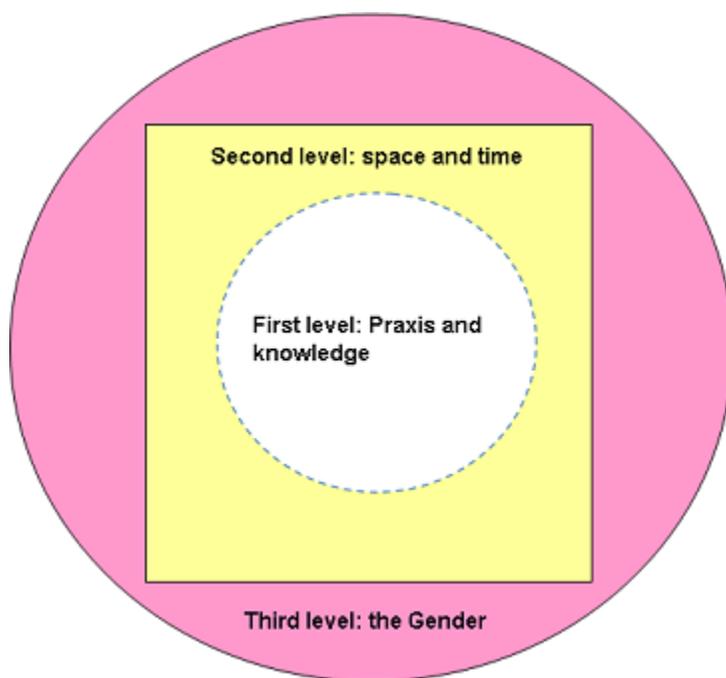
Figure 57: The three levels of sexual brokenness.

Typology of sexual technologies

At this point of our investigation, it is necessary to initiate a preliminary classification of some different approaches to the study of sexual technologies recurring to the idea of "docking". With the term "docking" we refer to two processes, first to the processes of adjustment in–between artefacts of different dimensionalities and secondly to the adaptation process that the body goes through when it tries to match tools, machines and the raw material during some process of work. As we have said above,[154] we have classified the artefacts of the worlds as primary, secondary and tertiary. For example in a sexual context the penis pump is a *secondary* artefact that consists of a cylinder that is fitted over the penis, with a manual or motorized pump to create suction.

Figure 58: A penis pump

The pump removes gas molecules from the inside of the cylinder creating a partial vacuum around the penis. We can say that the pump is a *peripheral* artefact to the cylinder which is *secondary* artefact to the penis. In the same manner, sexual bodies, artefacts and devices can be studied from the point of view of their docking properties: 1) The first and most common conception of techno-sex is when the sexual praxis is reduced to a *methodology*; when the sexual intercourse is conceived as an "effective procedure"; for example the perspective of the *Kama sutra*. The approach is that of listing all the possible docking alternatives between human bodies. The human body acts direct on other human bodies and can be described as a *primary-to-primary* docking.

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[154] See above the section with the title: "Docking and congruence".

Figure 59: Monuments from the Khajuraho Temple, at the Indian state of Madhya Pradesh.

2) The second most common approach is that of technological devices used as *sex tools*. In this case, the artefacts act as an extension of the human body, as the hammer is an extension of the arm. For example: the dildo acts as a technological *surrogate* of the penis and therefore the praxis can be considered a *secondary-to-primary* docking. As we said above, when a tertiary artefact works directly adjacent to the body it becomes secondary. 3) A third group consists of technological resources that improve sexuality. For example, the Viagra or the penis' pump. This group can be divided in mechanical and chemical. The Viagra works *internally* and then can be considered a secondary artefact, participating indirectly in the sexual act. The same can be said about the penis' pump but in this case the grade of congruence is minor. 4) A fourth group consist of contraceptives and in general artefacts that prevent pregnancy. This group can also be divided in mechanical and chemical. These technologies have an important but indirect influence in the sexual intercourse. However, their docking path is *secondary-to-primary*. 5) Technologies that only indirectly influence the sexual life. For example the development of the bicycle which influenced in women's use of trousers and the general impact on women's dressing mode. A bicycle and other means of transportation, is also a secondary artefact.

Figure 60: The bicycle.
Susan Anthony, one of America's most influential suffragettes said: She who succeeds in gaining the mastery of the bicycle will gain the mastery of life. In her opinion, "the bicycle had done more for the emancipation of women than anything else in the world. It gives a woman a feeling of freedom and self-reliance." (Bonnie Alter).
http://www.treehugger.com/

Belonging to this group are artefacts that have been developed to serve specific gender roles. For example, the development of home machines at the beginning of the 20th Century. The group of artefacts that are aimed to support pregnancy and child delivery; this group of technologies are also indirectly connected to sexuality towards its consequences.

Figure 61: Giving birth. A woman giving birth on a birth chair.

From: Eucharius Rößlin, *Der Swangern frawen vnd hebamme(n) roszgarte(n)*. Hagenau: Gran, um 1515. Wikimedia Commons.

Sexual imagery

The human mind identifies artefacts as male or female if they resemble the male or the female sexual organs and their properties. We can therefore speak about male–artefacts and female–artefacts. The identification happens in two levels: first,

we find the *form* of the artefact and second the *function* of it. The reference that makes the determination of the *ontology* is the factual form of the sexes, the phallus and the vulva or vagina. The reference that determines the sexual category by *function* is the relational dynamics of the act of copulation translated to the act of congruence between pragmata: these traditional roles are *passive* respectively *active*; *dry* respectively *humid*, *rigid* respectively *stretchy*. Furthermore, artefacts can be *bisexual* because they act as 'females' in some situations and as 'males' in some other situations. A nail for example, can be seen as a she–artefact in respect to the hammer (functionally) but a he–artefact in respect to timber. The process of sexualisation of the everyday world is archaic and can be found in any society of any time. The ontological sexualisation of nature plays a very important role in the process of "taming natural forces". Wind and rain, mountains and floods have always been sexualized. The same process determines the character of jobs, carriers and professions that organizes in connections with procedures that we see as male work and female work depending on the dominating functions of the procedures used in the working process. According to psychoanalysis, human communication is highly sexualized and artefacts are the natural sexual symbols of it. An analysis of the ontological properties of the human body conduces to the conclusion that because the body has the capacity to act on itself, it could be seen as a *hermaphrodite* artefact. In this sense, machines could also be seen as hermaphrodites. Many secondary artefacts (beds, couches, tables, chairs, etc.) can be seen as female while many tertiary artefacts as tools or machines often are seen as male. However there are plenty of exceptions; bags for example, can be seen as "female" by a kind of sexual definition transmissible by usage:

> Bags are female seeming objects, and have strong associations with female experience in many cultures. Few women are able to bear the horror of male fingers rummaging in their handbags; there is no man who has never itched to do this. In Britain and America, subtle, untaught but unbreakable rules still govern the kind of bags that men and women can feel comfortable holding or carrying. One of the rules seems to be that the floppier the bag, the less male it seems. Another bizarre rule concerns the length of the handle. The longer the handles of a bag, the more effeminate the bag, perhaps because the more handle there is attached to a bag, the more it can appear to be something hanging on to you, rather than something that you are actively holding. And then, for reasons which I cannot easily explain, a man's masculinity seems more compromised by a string bag than any other kind.[155]

According to Calvin S. Hall[156], in psychoanalysis "one object or activity be-

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[155] Connor, Steven. *Bags*. http://www.bbk.ac.uk/english/skc/magic/bags.htm
[156] Hall, C. S. (1953). "A cognitive theory of dream symbols." The Journal of General Psychology, 48, 169-186.

comes a stand–in for another object or activity" because some law of resemblance as follows: 1) Association by resemblance in shape to the human sexes. All circular objects and containers with the vagina, and all oblong artefacts with the penis. 2) Association by resemblance in function of the human sexes. All objects that are capable of extruding something, e.g., gun, a fountain, a pen, a bottle with a penis. 3)Association by resemblance in acting. Any act that separates a part from a whole, e.g., beheading, losing a tooth, an arm or a leg, having a wheel come off an automobile identifies with castration. By the same token, dancing, climbing stairs, riding horseback, going up and down in an elevator identifies with the coitus. 4) Association by resemblance in colour. Chocolate identifies with faeces, yellow identifies with urine, milky substances identifies with semen. 5) Association by resemblance in value. Gold identifies with faeces, jewellery identifies with female genitals. 6)Association by resemblance in number. The number three identifies with penis and testicles. 7) Association by resemblance in sound. The blaring of a trumpet or bugle or the sound of a wind instrument identifies with flatulence. 8) Association by resemblance in quality. A wild animal identifies with sexual passion, a horse identifies with virility. The Church identifies with virtue, a night club identifies with sensuality, a bathtub identifies with cleanliness.

We see that the way in which psychoanalysis understands the kinship between pragmata and the imaginary, is possible when it in some sense is related to the concept of docking (congruence).

Multistability in sexual technologies

Don Ihde discovered an important particularity of the process of developing technologies which he named *multistability*. He explains multistability as the phenomena in which the "same technology takes quite different shapes in different contexts."[157] Applying the concept of multistability to the field of sexual technologies, an example could be the discovery of the possible use of a bottle as a dildo; a very possible scenario for a family of brokenness that we have called "technologies of poverty".

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[157] Don Ihde. Janus Head: "Technologies—Musics—Embodiments":
http://www.janushead.org/10-1/Ihde.pdf p. 13.

Type of brokenness	The type of relationship	Argumentation
pragma broken	The bottle is used as a dildo	Intentionality is redirected. The pragmatics of the bottle, its *bottle-hood* is broken
noema broken	The bottle is used just as a bottle, only to explore its *dildo-hood*	There is a lack of knowledge about the bottle's "other face", that is, that of the possibility of being converted into a sexual tool.
ontic-broken	The other way around: A dildo (a bottle-like sexual tool) that is used as a bottle (to drink-like activities)	The relationship between the bottle and the dildo *is not symmetrical*; in this case the dildo *cannot be* used to drink-like activities. There is a lack of knowledge about how the dildo and the bottle dock *together* with the world
ontology-broken	A bad dildo (a bottle-like sexual tool that cannot be used as a dildo) and that can only be used as a (bad) bottle	The artefact does not work neither as a dildo nor as a bottle, but still is intended to be a dildo

Table 20: Don Ihde's concept of multistability combined with the analysis of brokenness in technology

In our terms what happens with the bottle could be studied step by step according to the four fundamental alternatives of the dialectics of intentionality and knowledge that we presented in our work *Broken Technologies*: 1) the acting (intentionality) is redirected and the pragma of the bottle is broken; 2) there is a lack of knowledge that reveals the absence of a noema that match the new use of the bottle as a dildo and then experimenting is necessary ; 3) The other way around; there is a lack of knowledge about how the dildo and the bottle dock *together* with the world. 4) There are artefacts that cannot match the one or the other properly.

Heuristic properties

Sexuality is female and male and a study of sexual technologies must considere these two aspects of praxis. Obviusly, for example, it is not the same to "penetrate" than to "be penetrated", and even if these two roles—the female and the male—are independent of the actual sex of the practitioners, it is necessary to study from which perspecive the sexual device has been conecieved. Because of the importance of sexuality for the human being, it is almost inevitable to use sexuality as the analogical reference to any form of congruence transcribed as the property of "initiative" and related properties as "complementary", "participative" and "receptive". This underlying sexual congruency can be followed in games such as "rock, paper and scissors." The relationship between rocks, papers and scissors is not depending on human sexuality, but sexuality is related to it through intentionality and knowledge. This relationship is developed on the artefact's intrinsic (ontological/ontical) properties, properties that change as soon as these artefacts are confronted with others. The properties of the paper in relation to the rock are different than those of the paper in relation to the scissors. One artefact is acting on the other according to its ontological properties causing a relation of dominance and subservience which in fact is characteristic for any form of communication in which one part drives the initiative and the other part is the follower.

Figure 62: "Rock, Paper and Scissors"

We will analyze the phenomenological features of the traditional game 'Rock, Paper and Scissors' in respect to these properties. The point of departure of the reductive work of analysis is always the world as we have apprehended intuitively during our childhood. This world is presented to us as 'natural' and Husserl referred to this original presentation as the "natural attitude". In the traditional game 'Rock, Paper and Scissors', artefacts are imitated by the movement of the hands. The structure and process of the game is depicted in the following Presentation:
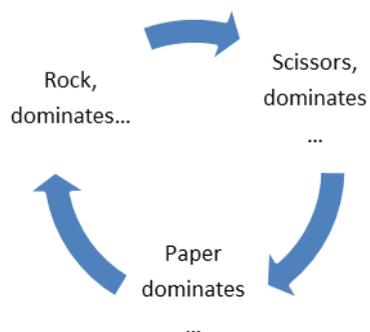
Figure 63: We symbolize 'dominance' with 'D' and reproduce the mechanism of the game as follows: Rock 'D' Scissors / Scissors 'D' Paper / Paper 'D' Rock

The game assumes that the artefacts are congruent with the human hands. This knowledge about the congruence-status is part of the common sense of the everyday world. Let us see the combination of these individuals in a game-structure. The game as it is, shows to us—through its materiality and concreteness—three artefacts that are related to each other according to some rules of dominance that are *techno-sexual*. That means that these properties *are determined by means of sexual heuristics.* We understand 'heuristics' as the study of the *act of discovering* the inner *congruence of the world* the necessary step before the development of any technology. The word comes from the Greek *heuriskein*, which means 'to discover' or 'to find'. We think that heuristics depends on phenomenology and hermeneutics working together; as Don Ihde has observed:

> If phenomenology is the archaeology of getting back to the 'thing themselves,' hermeneutics is the archaeology of unlayering meaning-sediments originally associated with texts, but to become a broader unlayering of philosophical traditions.[158]

Our work will follow this double path in two steps; the first step entails, designing an *eidetic* reduction that can lead us to the *grammar of connectedness* and then a *hyletic* reduction that can lead us back to "the thing themselves" or *examples* of connectedness. An eidetic reduction of the game presented, will give us the understanding of these phenomenological rules making them visible. The first step of the eidetic reduction needs to deconstruct the references to concrete bodies (rocks, papers and scissors). The eidetic reduction reduces the materiality of the artefacts (their hyle) to pure *sexual imagery* (heuristic relations of congruence). To

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[158] Ihde, Don. Expanding Hermeneutics. Visualism in Science. 1998; p. 80.

reproduce this process we will change the three artefacts to three substituting symbols e.g. A, B and C. This first reduction reveals their mutual relationships. We notice that the rock 'blunts or breaks' the scissors, the scissors 'cut' the paper and the paper 'covers' the rock. In other words, 'blunting or breaking', 'cutting' and 'covering' have to be related to the 'heuristic properties' that we are searching for.
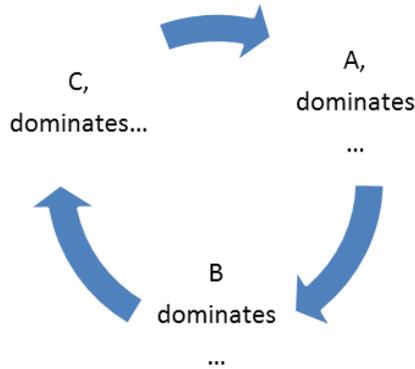
Figure 64: Eidetic reduction,
A 'D' B / B 'D' C / C 'D' A

Now we ask ourselves if we can find some *other artefacts to play the game*. We can try to find other adequate artefacts using the trial and error method introducing new artefacts and checking if the *technology of the game still works*. This is essential for phenomenology as methodology, and is known as the *study the variations* of a phenomenon. For example, we can substitute the *paper* with a *glass bottle*. We discover that a glass bottle is *not congruent* with the rock and the scissors in respect to the rules of the game. We deduce then that according to the game, there is some kind of "hierarchical" structure among artefacts that the glass bottle does not fulfil. We say that the games-rules are broken and the glass bottle is a broken artefact in respect to the game.
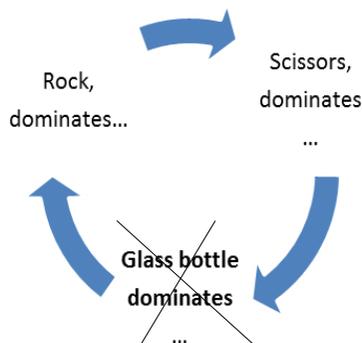
Figure 65: Hyletic reduction;
the glass bottle is not a solution for the general congruence of the game

This second reduction moves then, from the essential sphere to the concrete sphere, an acting based in a previous eidetic reduction. We call this second change in perspective a *hyletic reduction*. During this second moment, the essential features shall be reversed to create a new hyletic content, a process of embodiment of the eidetic content in a new materiality. Getting back to our example, we need to find three new artefacts that fulfil the principles derived from the eidetic reduction and which intend to be congruent with the eidetic model 'Rock > Scissors/Scissors > Paper/Paper > Rock'. We know that the relationship developed between the artefacts' heuristic properties, change as soon as these artefacts are confronted with others. We say that the heuristic properties of the paper in relation to the rock are different from those of the paper in relation to the scissors but they must be *invariant properties* that can be found and which can be found in other artefacts. In other words it is necessary to find the rules that regulate the three artefacts to find other artefacts that fulfil the games rules. In doing so, we will find three other artefacts which present the same reciprocal congruence. We can try to be more selective in the choice of a new artefact: we can substitute the scissors with an *axe* because the axe "cuts" as the scissors does. However, we notice immediately that to use an axe instead of scissors produce a new kind of *brokenness*.
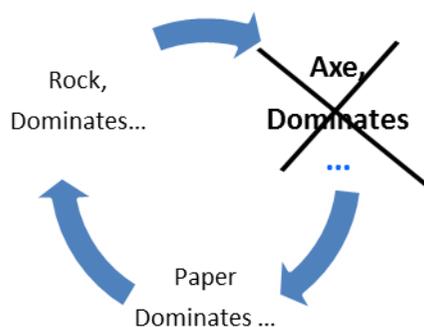
Figure 66: The axe is not a solution of the 'equation' of the game.
Not every way "to cut" is equivalent to any other. In other words,
"to cut" is not a single praxis and it cannot be reduced to a universal.

Another try: if we can use paper to wrap up a rock, then we can use paper to wrap up the *Reichtag*, and the *Reichtag* will break the scissors.

However, in spite of being theoretically adequate, the **Reichtag** is not working properly.[159] We noticed that "size" is important for congruence and it is something inappropriate in docking artefacts of critical size differences.
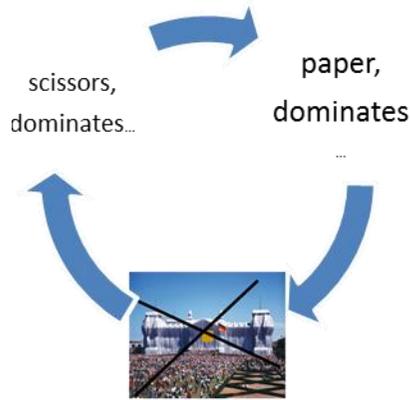
Figure 67: Because its size, the *Reichtag* cannot substitute the rock.

As we said before, to find new artefacts to play the game we need to perform a second reduction - which is the inverse of the eidetic- which we named "the hyletic reduction". We assume that the heuristic properties of the paper in relation to the rock are different than those of the paper in relation to the scissors, but that they express *invariants* that can be found in other artefacts. These invariants are the heuristic properties. We discover that some artefacts are the centre of acting and name these as *initiatory*. An artefact is *initiatory* if it is the point of departure of a human acting and essential for the performing of the acting. Otherwise, it is *receptive*. In our actual game the rock is *initiatory* respect to the scissors which are *receptive* respect to the rock; further the scissors are *initiatory* respect to the paper which is *receptive* to the scissors and finally the paper is *initiatory* resect toe the rock which is *receptive* respect to the paper. After studying the cases of invariance (try and error method) we find that a new adequate set of artefacts could be the following: 'Water > Fire/Fire >Sponge/Sponge>Water.'

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[159] Christo and Jeanne-Claude wrapped the Reichstag in Berlin in 1995.
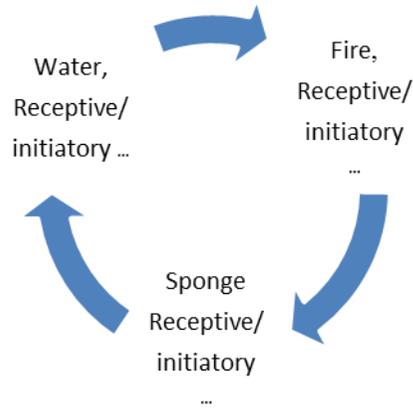
Figure 68: We can see that these three new artefacts are both initiatory and receptive in an adequate form for the rules of the game

Trying to play the game with sexual tools the following could be a solution:
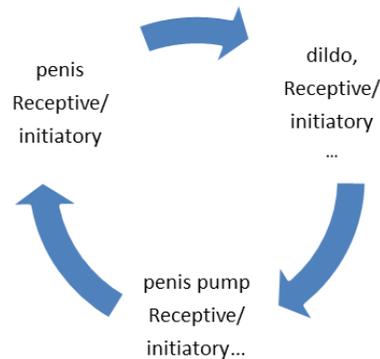
Figure 69: the heuristic properties of the sexual game

Beside these two acting-roles we find artefacts that are *indirectly connected* to human acting and call it *complementary* if its role in the implementation of an acting is secondary to the one that is *initiatory*. However, the rules of the game are based only in the heuristic properties of initiative and receptiveness. In general terms and beside this particular game, studying the acting general the four heuristic properties are

relevant. For example, studying the acting of 'nailing a shelf to a wall', we find that the hammer is the *initiatory* artefact and the shelf is the *receptive* artefact; the nails are the *complementary* artefact and the wall where the nails go into to hold the shelf, is the *participative* artefact. We can thereafter classify the kind of the human body and the artefacts that are related to sexuality, defining four fundamental heuristic properties of the human body respectively sexual artefacts. For instance, studying the acting of using a penis pump the cylinder is the *Initiatory* body and the penis is the *Receptive* body. The pump is the *Complementary* body and the Gas molecules inside the cylinder are the *Participative* body.

The dialectics of multistability			
Depending of human acting: An artefact is 'Initiatory' if it is the point of departure of a human acting; otherwise it is 'complementary'.			
Independent of human acting		Initiatory -A	Complementary -B
An artefact is 'participative' if it acts directly upon another artefact and it is 'receptive' if it receives the acting of another.	Participative -a	Initiatory/ Participative – *Male condom*	Complementary/ Participative – *Penis pump*
	Receptive -b	Initiatory/ Receptive *Female condom*	Complementary/ Receptive *Spermicide substances* *& Personal lubricants*

Table 21: The dialectics of multistability

Heuristic properties are related to *praxis. Initiatory, receptive, complementary* and *participative* are some examples of heuristic properties. The glass bottle, the axe and the wrapped *Reichtag* are three examples of artefacts that are *incongruent* with the rules of the studied game from the point of view of their heuristic properties. The glass bottle is not *initiatory* respect to the rock and is not *receptive* respect to the scissors. The axe could be seen as *receptive* and *initiatory* but in an unacceptable way because its *pragma* (the way and context in which it is used). Our conclusion is that to be *initiatory* is a general power dependent on the heuristic properties of the artefact to be *receptive*. The axe is *initiatory* to other artefacts different from the paper and the rock. Finally, the *Reichtag* is not a '*wrappable*' artefact, because 'to wrap' is related to smaller objects. These artefacts break the game down and convert the game into a case of

broken technology.

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