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Architecture & Research: a possible structure

Abstract

This article results from three conferences organized by the research project titled "Architectural research framework" developed by the research center Architectural Lab – LabART – of the Lusófona University, and also by my personal experiences and dialogs with other members of the EAAE research committee.
Architectural research always existed, but only recently some major questions have emerged, by the time that Europe started the last universitary reform on the 80's.
Two aspects are crucial in understanding the problematic that we are referring to. On the one hand we verify that the architectural teaching should maintain the articulation and close relationship between the theoretical and practical aspects. On the other hand, there is a need to confer academic degrees, as the MsC and PhD's in the Faculties of Architecture. Inevitably, discussions began about the scientificity of architecture (its grounding), the types of research, methodological models, as well as on the evaluation criteria and the quality of research, or the relevance of the results.
We will try to approach some of these discussions, and by the end, establish a basic structure that allows us to obtain an open model for research in architecture.

Keywords: Architecture, Research, Epistemology, Phenomenology, Science.

1. General Research and architectural research

If we analyze architecture, we found that we can look at it from two points of view, the disciplinary (formalized in treatises and in the great foundational texts[1]) and the professional. The first one presents a greater tendency for the theoretical development and the second to the practice elaboration[2], however the practical nature of the discipline itself implies considering that both have no existence without an implicit and structural complementarity.

Traditionally in the academy, when we approach research in architecture, there is a strong tendency to consider only the disciplinary and theoretical aspects, this is because we regard the communication of knowledge according to the correct idea that verbal language is the more intelligible. And as we shall see, the academy considers the ability to present knowledge and procedures intelligibly as one of the main points of research. Another one is that image, object and drawing are illustrative forms of written text, playing a verifying roll of the logical and coherent verbal discourse.

Thus, we can say that research in architecture would be characterized by generating disciplinary theoretical knowledge and professional practical knowledge. The definition of what is one and another, as well as the relationships established between both are fundamental to the knowledge of what is architectural research.

The research model and the idea that scientific knowledge is cumulative and progressive has led to a collage between general research and scientific research, whereas the second is the one that has an ability to approach the "truth" of the world. The *Objective* term is seen as hierarchically superior to the *subjective* term and still today, in traditional and empirical thought the truth is closer to the object than the subject. This led to an extraordinary outlay of energy to make certain humanistic and artistic disciplines "more scientific" or "more objective".

In reaction to this narrowing and based on the trans-disciplinary structure of architecture many research studies began to push the boundaries of the discipline, searching in the human sciences for the more "free" but stabilized, giving rise to a vast array of investigations into architecture. Studies that could have been made by non-architects, since the disciplinary methods used are not innocent compared to the

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[1] The term "foundational texts" is taken in the sense conferred by Françoise Choay (1980*) La Règle et le Modèle*. Paris: Seuil.

[2] We do not establish a bond between disciplinary knowledge and theoretical knowledge, nor professional knowledge and empirical knowledge, we only consider a certain dominance and prejudice in these links.

results obtained, as we now know. Thus, the areas of architectural research become all the areas with which architecture intersects.

2. The disciplinary knowledge and practice knowledge

In the first known treatise on architecture, Vitruvius already identified two types of knowledge, *fabrica* and *ratiocinatione*[3], generically translated by practice and theory. The disciplinary knowledge is associated with a trans-disciplinary knowledge; which means knowledge of multiple disciplines that contributes to the architectural culture. The knowledge of doing would be a know-how or, in a more general view, a *poiética*. Vitruvius relates two inherences " In all matters, but particularly in architecture, there are these two points: the thing signified, and that which gives it its significance. That which is signified is the subject of which we may be speaking; and that which gives significance is a doctrinal demonstration by reason[4]. It appears, then, that one who

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[3] Architecti est scientia pluribus disciplinis et variis eruditionibus ornata [cuius iudicio probantur omnia] quae ab ceteris artibus perficiuntur opera. Ea nascitur {ex} fabrica et {ratiocinatione}. Fabrica est continuata ac trita {usus} meditatio quae manibus perficitur e materia {cuiuscumque} generis [cuius] opus est ad propositum deformationis. Ratiocinatio autem est quae res fabricatas sollertiae ac rationis proportione demonstrare atque explicare potest. (Liber I, *De architectis instituendis*).

The definition of *ratiocinatione* is the one that most changed, because it is necessary to realize that the idea of intentionality or theoretical object is, during the classical period, associated with the concept of *Symmetria*.

[4] The terms used by Vitruvius seem to have generated some confusion in the various translations/interpretations, this is for two reasons: first because his speech did not adequately develop the idea, or develop it but not explicitly, and secondly because the direct translation of the terms to *signifying* and *significant* induce us to consider the universe of current linguistic theories whose formalism is not part of the ideas expressed at that time. There were two Greek currents that focused on this subject the Stoics and the Epicureans [the latter are the source of Vitruvius]. The Stoics use the term *semainomenon* (meaning) or *lekton* (the saying, the intentional), the difference is that the latter refers to an intention, which (when complete) is a statement that expresses, is a representation of the content. An expression would have two aspects of meaning, first what the term meant in itself, second, how it was combined with other expressions (a context) to mean a thought.

The Epicureans, who are more materialistic, just consider the existence of words and objects, the *lekton* and the *pragma* (as a form of abstract *semainomenon*) are, for them, pure inventions, which means that the Epicureans only consider the *significatur* which is a simplified version of the *semainomenon*, but it absorbs the materiality of the referent (*pragma*) and the *significant* that maintains the materiality of *semainon* as a system of discursive and theoretical terminology. We think that we should not consider here the

professes himself an architect should be well versed in both directions. He ought, therefore, to be skilled and amenable to instruction. Neither skills without instruction nor instruction without skills can make the perfect artifice."[5]

These two types of knowledge structuring and "inherent" to the architecture, from its beginnings, allow us in an analytic way, to organize the various types of classical research (Archer, 1995), (Boddington, 2005). So we could consider the "Fundamental research" and "Strategic Research" as part of "Disciplinary Research", while the "Applied Research" and "Research by Action" would be most suited in "Practice Research". In arts in general and in architecture the concept of "Applied Research" is usually translated as "Research by Design" and this can be divided into "Practice based-research" and "Practice led-research" (Candy, 2006). Between "Practice led-research" and "Action Research" there isn't a big difference, the two can be interchangeable, however, we can say that the first includes the second, but not always the second includes the first.

Before proceeding we should do two small, but critical, repairs. To say that Disciplinary Research (fundamental or strategic) tends to theorization, doesn't meant that their results cannot be of practical utility and likewise to say that Research by Design (practice based or led research) tends to get practical results does not mean that cannot obtain theoretical results. It is also truth that currently there is a real conflict between these two types of research, particularly in terms of financing. In Portugal for example there is the National Foundation for Science and Technology (FCT) and in Europe, the European Science Foundation (ESF) who show an unbalanced and anachronistic trend with a penchant for applied research, meaning that this foundations promote a predominant funding in areas that allow immediate economic impact, even after several warnings from some of the main funding agencies of the United States, calling for a re-balancing of funding in research.

For the purpose of clarification we can now define the various concepts of research, thus there are: "Basic research" corresponding to a general disciplinary research aimed at acquiring new knowledge but no practical purpose or particular application;

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modern semiotic system (the definition of a sign) because its formal tendency, doesn't allow us to see that Vitruvius refers to a content [*significatur*] which is also the material thing, whose organization follows the relationship between objects [material things] and the talent, skill and natural ability of the architect, while the discourse [significant] obeys the rules of the knowledge of the disciplines, the way those think and express themselves. So if we need to have a ethnocentric reference we must consider that the relationship is far from resembling a semiotic relation, being closer to a semantic relationship, but it is only an approximation and not an actual semantic relationship.

[5] Translation from Morgan (1914) with some alterations by my Latin translation of the original.

"Strategic research" is a further investigation directed to address issues left open by the "basic research"; " practice based-research " is an investigation through practice or on its findings and seeks to acquire new knowledge about the practice or discipline; "Practice led-research and/or Action Research" is an investigation that is done by practice but seeks to acquire new knowledge about that practice. (Candy, 2006)

Practice based-research is an original research based on practice and its products. It is characterized by the research of their processes (design research) and of their results (projects, buildings, models, urban spaces, etc.) in order to obtain new knowledge about architecture in general (disciplinary and practice). In academic terms, the research presents results that contextualize and explain the significance of artifacts verbally, but always implies the presence of those artifacts to claim the originality of the research itself. Thus both the explanatory text and the resulting artifacts, are essential.

Practice led-research and/or Action Research is characterized by an original research carried out in architectural practice. Since its study lies mainly in the processes (design, organization, technical, etc.) it doesn't need creative artifacts but marginally, presenting the full results verbally. However, and since they are the operational aspects of practice that is being studied, often makes use of active practice as a methodology, but almost always to search for new understandings about the practice. So we can see practice led-research in which artifacts appear, but these are less important than the processes that give rise to it and always require a strong verbal component that explains it.

We assume that research by design is not the same as design, because the first search to acquire new knowledge's - generalization - and the second one only seeks to respond to a specific demand - contingency. In this sense for an investigation to exist there has to be an intentionality of study, interpretation and reflection about the act of doing, as there must be a systematic inquiry that can be carried out by different individuals, with more or less, identical results. This does not mean, nor can it mean that design cannot turn into research by design, but "scientific objectivity is only possible after we have broken with the immediate object" (Bachelard, 1971, 129). The method that best fits practice based-research will be the phenomenological method, provided there is a real *épochè*, and the maintenance of the intuitive aspects, while the practice led-research can use more formal methods (such as the exegesis with the structuralism formalization, constructivist or simply descriptive) since it corresponds to a reflection on practice in a deferred time.

3. Architectural research areas

The architectural research areas became a real labyrinth, fed by interdisciplinary notions. The American Institute of Architects (AIA) addresses the research areas by major themes: social research (which studies the use of architectural spaces and habitat); cultural research (studying the settlements and the habitat standards in time); environmental research (investigating the physical context of the architecture); technological research (which studies the physical materials, methods, systems and processes of construction and design); organizational research (studying the collaboration in architectural practice and in organizations of agents and groups); educational research (studies pedagogies); and the design research (studying the processes of design, of formalization and of space creation). Besides, these seven themes intersect with four areas of knowledge, namely the leadership (management), the practice, the design and the performance.

Nowadays in which applied research seems to have the leadership we find the most interesting and synthetic text, about the several areas under investigation in Architecture. We refer to the text of Jeremy Till (2005) responding to a challenge from the Royal Institute of British Architects (RIBA), which he seeks to end the endless lists of areas and objects of architectural research. This turns to be possible by the synthesis around architectural practice, once it is the architectural practice the final object of architecture itself or as Till refers the practice "has the raw data on which architectural knowledge is founded" (p. 4) and therefore it should contain the areas for its research. Architecture is a design process that involves the construction of creative artifacts of social use and in that sense there are three major areas of research, the processes, the products and the performances.

The first refers to the research on the processes involved in the design and construction of the artifacts, which may include, the processes of design (Schon, 1963rd, 1963b; Alexander, 1964, 1968, 1979; Jones, 1970; Lebahar, 1983), the operations of conception (Boudon, 1992, 1994, 1997), aspects of construction, representation, relationships between the various actors of the project (Conan, 1981, 1990, Prost, 1992, 1994, etc.), the configuration of the environment, etc.

The second refers to research on the designed artifacts or complete objects and systems with a high degree of identity. Therefore it studies the object, either in its history, aesthetics, materials and construction techniques, etc. It covers most of the studies using monographies. Such research tends to use methods drawn from the humanities, and although it may present an architectonic specific research (linked to

the studies of design and reception of the work) it also shows very diverse methodologies usually drawn from humanistics.

The third refers to the aspects of use, fruition and performance of buildings or constructed artifacts, encompassing both the technical, environmental, social, cultural, perceptual, etc. In general its studies the impact that the produced works have over the users, allowing an enrichment of their own design.

These steps should cross the respective knowledge's and in a fundamental research it should be obligatory.

4. Methodological and grounding questions on scientific research

Methodological problems in architectural research took place mainly with the development or transition to the academy of applied research. However, as complex and hardly treatable as this problematic can be, in an article of this nature, it has to resort to the general context of the epistemology of science. We will do a brief *excursus* on the main protagonists that gave rise to epistemological thought of today, referring us to Gaston Bachelard, Karl Popper and Thomas Kuhn.

Bachelard is perhaps the first philosopher to study the consequences of the relativity theory of Einstein on the scientific epistemology[6]. And so by considering that the empirical nature of science had come to an end and was misguided, he created a split between empirical thought (phenomenological) and scientific thought (rational and critical). Split which, eventually, dominated all his work, dividing it into two parts: in the first part of his life he studied the scientific thought and in the second part, the phenomenological thought. The independence of scientific thought is possible through the elimination of certain epistemological obstacles from the inductive empirical thinking. Bachelard (2002) considers as epistemological obstacles: the obstacle of the first experience (beliefs); the obstacle of generalization (the vague idea); the verbal obstacle (metaphors); the analogical obstacle (useful = true); the substantialist obstacle of qualities (the allure of mystery); the realistic obstacle (the value); the animist obstacle (desire); the digestive obstacle (depth); the libido obstacle (virtue); the of quantitative rigor obstacle (calculation). These obstacles are part of the phenomenological or empirical knowledge and constitute the majority of studies of the second part of his work.

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[6] But the examples go until the concept of rotation of the earth and cover the physical sciences, chemistry and mathematics (including geometry).

The Bachelard proposal doesn't deny, the phenomenological knowledge at the expense of scientific knowledge, but considers that both are differentiated knowledge and must remain so. The scientific object (whether material or immaterial) differs from the empirical object, once the first corresponds to the progressive rationalization and to a precision scale, while the second is in his phenomenological nature an active agent able to entice us to daydream . The interesting aspect is that this phenomenological knowledge that intertwined us with the world, canceling distances and times, is not in jeopardy, much less set aside "in spite of the successes of developed thought, and against the lessons of the scientific experiments" (Bachelard, 1989, 10).

Popper only addresses the science in a strict sense and considers that the starting point cannot be an empirical fact, since the viewer is not "innocent". So the starting point must be a work of the mind, must be a problem found or a constructed knowledge. Once the problem is found the observer proposes several hypotheses in order to deduce a specific statement that will be confronted with the experience and will be refuted or not (made false). The fundamental difference between one system and the other is that the first (empirical system) always tries to start from the empirical phenomenon, attributing to the fact all the veracity without questioning the observation system, while the second starts from a previous conscient knowledge, thereby building a progressive spiral of knowledge (by accumulation, by diversification of forms of knowledge or by replacement). Consequently the unity of science is acquired by the methodological processes and not by the nature of the studied objects. Methodologically Popper accepts the deduction by *falsificationism*. And there by the *falsificationism* can be seen as follows: starting from a non-supported initial hypothesis other hypotheses will be formulated that will menace the first, and in case these hypotheses can't deny it they will corroborate it. In general, the idea is that any starting hypothesis must be made based on its *falsification*, since it is necessary just a single negative to undermine the initial hypothesis; there is not a sufficient number of hypotheses to confirm it. This means that science is only one set of assumptions that remain till they will be refuted (*falsified*). In this sense science is identified by the possibility of the *falsification* of its conjectures, even if it means accepting that the conjectures cannot be proved. This is named the "problem of demarcation" between science and belief. The fact that Popper speaks about conjectures doesn't allow us to consider all the scientific research as subjective, because, such as Bachelard (1971)[7], also Popper believes that objectivity is transferred

[7] "It is not the object which designate precision, it is the method." p. 132.

to the methodology, once the methodology seeks for the objectification of the original conjecture.

Popper (1996) believes in the possibility and freedom of research of the individual in the context of the liberal capitalist society and thus, believes in the scientific evolution as a simple problem solver, not questioning, particularly in terms of human sciences, the veracity of the objective evolution of the initial paradigms, and doing so he is considered by some authors a positivist (Kuhn, 1962) (Hubner, 1978). Thus, epistemology proposed by Popper was quickly appropriate by technologies and by applied research and is today a possible method of investigation. As Bachelar (1971, 136) already mentioned "all the active scientific methods are the latest methods. Not the summary of the acquired habits by a long scientific practice. (…) The doubt is ahead and not behind as in the Cartesian path."

To understand Kuhn is necessary to inquire ourselves about the foundation of science, or of the nature of it. Kuhn argues that both the initial hypotheses and their acceptability as such, pass through the historical sieve, as well as social and even idiosyncratic of the several agents and the scientific community. But that fact deforms, from the beginning, its own issues and problematics. In other words the nature of science implies a human factor. Thus, there are a set of beliefs and sciences that determine a specific way of looking at the world, to this set of factors Kuhn called *paradigm*. Under a particular paradigm the scientific and educational communities lay the groundwork for future investigations and, in this sense, "a scientific community consists of men who share a paradigm" (Kuhn, 2003, 219). For this reason we must accept that "the conceptions of nature formerly current were neither less scientific nor less the product of idiosyncrasies of those currently in vogue." (Kuhn, 2003, 21) they were just what we might designate as "science of the moment." This way of thinking is behind the masterful work of another humanistic Erwin Panofsky (2001) in which he advocates the analogy between art, philosophy and theology during the Middle Ages.

Khun deduces that the issues raised earlier should be read in accordance with the historical context in which they occur, meaning that they should be read in accordance with the prevailing paradigm at the time for that specific scientific community (a macro-theory of interpretation and explanation of the world). The more generalized idea of paradigm emerged only just recently, because only now the "globalization" of the scientific community allows us to establish this foundation. But even in this case, we can speak of disciplinary paradigms, specific of each discipline in which case we would have a set of beliefs based on the several investigations already done by those disciplines. For Kuhn science should be viewed in a historical, geographical and

disciplinary point of view, leading him to identify certain periods as an underlying paradigm. Thus we would have periods: of normal science, during which science seems to work only as "problem solving", resulting in investigations subject to the prevailing and accepted paradigm; and periods of extraordinary science, resulting from investigations that jeopardize the existing paradigm and produce, in a progressive way, another paradigm. However, a paradigm may be in jeopardy for a particular discipline and the introduction of a new paradigm can only be an increase in another discipline, without challenging it. Kuhn (2003, 128) even considers that "to put a paradigm as a premise in an argument designed to defend it can, nevertheless, provide an example of how scientific practice is for all those who adopt a new conception of nature."

Kuhn's theories have had many problems of interpretation, both in terms of epistemologists like Popper, and in terms of other personalities of humanities and arts. These last saw in the words of Kuhn a scientific opening for the unscientific disciplines, since the model that formalizes the nature of the evolution of sciences appears to be very similar to the "evolution" of humanistic and artistic disciplines. Thus, the nature of scientific development "as a succession of periods bounded to tradition and punctuated by non-cumulative breaks" (Kuhn, 2003, 255) would imply an extension of the idea of science to other areas, usually placed outside of scientific knowledge. Because the "periodization in terms of revolutionary breaks in style, taste and institutional structure, have been among their standard tools" (Kuhn, ibidem).

But this kind of formalizations does not authorize a bond between scientific research and research in other areas non-scientific. The very idea of peer review, which is accentuated by Kuhn as the only way to audit and evaluate the scientific work, was also very popular among humanities and arts. And yet they have been forgotten, not only those by Popper, but also the questions raised by the author, namely: "what are the stages of the socialization of a group? What are the objectives of a collective group, what deviations, individual or collective, will it tolerate? How to control the acceptable aberration?" (Kuhn, 2003, 257).

5. Grounding of the methodological questions in architectural design

With the growing interest in applied research and later with the introduction of the arts as an area of research by the need for graduations in universities, a turbulent period but full of wealth began for the architecture.

It is in the 60's, more precisely in 1962 with "The Conference on Systematic and Intuitive Methods in Engineering, Industrial Design, Architecture and Communications" that, under the influence of Popper's thought, begin the research about design methods under the organization of John Christopher Jones from the University of Manchester Institute of Science and Technology and of Leonard Bruce Archer from the Royal College of Art in London. Later this current is influenced by the problem solving theories of Herbert Simon (1968, 1969). Opposed to this technical and rational current, under the influence of Kuhn's thought, appears Donald A. Schon with is 1963 cognitive studies on the creative processes and later more explicitly in opposition to H. Simon, with is 1983 developed studies directly adapted to the thought of design. The development of this current, formalized in the DRS Design Research Society, has been described by Cross Nigel (2006)[8]. Thus it appears that: in the 60's we assist to the behaviorists times, according to the application of systematic and deterministic rational methods; during the 70's comes an inflection which gives space to the concept of satisfactory and sufficient solutions, defining the concept of *satisficing* proposed by H. Simon, and also the notion of participative process; the 80's are characterized by the systematic methodologies of the "Engineering design", and it is also by this time that emerges a research focused on cognition in design[9].

The difficulty in reconciling the design research with the scientific research due to the double component of architectural design, the creative and the scientific, led to the organization of the "Conference on Design: Science: Method" by the Design Research Society, in 1980. At this conference we witnessed, a change in the relation between design research (architectural or other) and science research from now on the predominant position is no longer about what design research can learn with science, but on the contrary, it is about what science can learn with design research. Several authors start talking about an epistemology of the design itself and about the difficult relationship that it may have with the scientific epistemology. This because it should belong to the design epistemology the task of developing the logic of creativity (Glynn, 1985). From here to the position that science is only one branch of the project goes a step that the constructivist Ranulph Glanville (1998) takes when he says "science as is done is, in fact, a branch of design."

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[8] See Rachael Luck (2006) Design Research: Past, Present and Future in Design Research Quarterly, paper accessed in February 2012 http://www.drsq.org/issues/drq1-1.pdf.
See also Nigel Cross (2006) "Forty Years of Design Research" in Design Research Quarterly 1:2 Dec., paper accessed in February 2012, http://www.drsq.org/issues/drq2-1.pdf.
[9] Books like Lawson, Bryan (1980) *How Designers Think.* Architectural Press and Rowe's *Design Thinking* (1987).

In France, Bachelard's influence is felt in the studies of Philippe Boudon on the epistemology of architectural conception, as early as 1971, and creates a new stream of studies, named *Architecturologie*. The research takes, as its starting point, the Bachalerd's idea of a discontinuity between scientific knowledge and phenomenological knowledge, thereby, right from the start, Boudon separates the creativity problem from the conception problem avoiding this way the anglo-saxonic problematic. The development of *Architecturologie* despite its expansion on the creation of a very specific investigation chain as a school, didn't spread worldwide, especially, in our view, because of the complexity of its arguments and because of the redefinition of some of its terms, already assimilated in common architectural language. However, it is the only current that is claimed to be on architectural research, since the "design research" was generalized to all design disciplines (all those that produce the artificial).

Boudon considers that the design is not a problem solving activity. The design is a transforming activity, and these transformations may constitute the solutions to eventual problems. As stated by Paul Valery, "the elementary of the intellect is the change that comprises substitutions and transformations." What can be considered a starting problem is not a problem data, but a data introduced by the architect and therefore a *reference* (what the architect decides to refer).

Beyond the obvious differences of the various ideological currents and the various attempts to connect and assimilate them, the important thing here is to see three key aspects of current research. On the one hand, all deny the research methodologies of the inductive empiricist thought that had dominated until then (Francis Bacon, 1620); on the other hand, and as a result of this denial, we assist to a release of the processes and methods towards the sources of the initial hypotheses; finally its seems consensual that there is a specific epistemology on design research[10].

Concerning research in architecture, we can say that studies on the cognitive aspects had the advantage of clarifying some aspects, namely the kind of thinking behind the work of architects (but still we must not confound the activity of the architect with discipline itself). In fact the project activity is characterized by having its object in a future time, what Boudon defined as a multi-object addressed by specific references.

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[10] Cross (2002) would say "We have realized that we do not have to turn design into an imitation of science; neither do we have to treat design as a mysterious, ineffable art. We recognize that design has its own distinct intellectual culture" p. 5.

Conclusions

We first must consider the epistemological questions focused along the text, according to a perspective of science and art grounding – about the scientific and the artistic object. The issue is too complex in its metaphysics in order to approach it in all its extension, so we will synthesize accepting the risk of this operation.

As we stated earlier, on what concerns the methodologies, we can consider that the first conjectures do not have a extra-theoretical ground, on the contrary, all the scientific ground (either in natural sciences or not) is determined by interpretations and develops from certain decisions whose determinant base is not "factual" nor empirical. It was not necessary to get to Bachelard for empiricism began to be questioned, the critical empiricism of David Hume had already question the naive belief that the laws exist in nature.

To Popper, although the correspondence between hypothesis and factual data is not always possible, there is however an approximation using certain methodological rules, namely: the internal logical concordance of thought; the effectiveness or ability to act on the phenomena explained by theory; the correspondence between theory and the facts. Thus, the popperian theory would be based on a paradigm according to which, the theories of coherence of evidence and pragmatism are accepted. This methodological system will be used by human sciences and by design methods.

The theoretical and methodological hypothesis by Popper (1975) is devoid of a basic fact that Kuhn (1997) considers the need to understand the historical progress of science, which grounds are beyond scientific reason. That is, according to Kuhn the idea of a correspondence between scientific theory and the facts of the world is impossible to establish, is just a chimera or a dream.

As I have stated before not only on the studies about perception, as also about our neuro-physiological system, the things that we apprehend and comprehend correspond to a world according to our mediation systems, being science another mediation system (Sequeira, 2009).

Henceforth, we witness a fusion of technique and science which provides a new freedom of inquiry that only complies with the internal rules of systematization. This is a new paradigm born of scientific inquiry itself, a paradigm that seeks, as we see in the criticism of Popper to Kuhn, a radical autonomy in relation to historical constrains, imbued with progressive ideas (in the technical sense of the term) and formal methodological rigor, without realizing that these characteristics are also historical. Just as it is historical cybernetics as a modern technique.

We can consider that from now on research in general and architectural research in particular, may adopt an indefinite number of methodologies, according to the research object, according to the chosen typology and according to the acting area (Feyerabend, 1975)[11].

In addition the scientificity of the different disciplines is in nowadays marked by methodological mathematization, turning technique (in the technological sense) in the only measure of scientific investigations. As if we were back to the XIX.[th] century measurement myth. The combination of science and technology cannot be seen as a last resort of the "measurable factuality" or the enclosure on a single physical-mathematical methodology, but a liberation from the constraints associated with the idea of opposition between theory and practice. Where vitruvian duality can be definitely understood, because the theory is always retrospective, it appears as a reflection on action (or thing) and the practice is always prospective, comes with the action.

To assume only a mechano-technique methodology (mechanical methodologies of research in humanities sciences)[12] or a digito-technique (visible in the proliferation of morphogenetic concepts and parameterizations) in architecture, will led us to new constraints. This constraints belong to the order of representation (usually verbal, in the first case, or virtual in the second) or to the cognitive order. It is important to open the way to the artistic freedom, leading for example, Bachelard phenomeno-technique beyond itself and returning to Husserl's phenomenology, turning it into a practical phenomenological epistemology. Looking for a liberation method of the spirit through a subjective experience, which should be able to transform our relations with the phenomenal reality. Transformation can occur, on the one hand, using the Husserlian's *épochè*, as a takeoff movement of the mere exegesis or simple

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[11] This author is quoted mainly for his theory on the liberation of epistemologies.

[12] Currently the human sciences follow a mechanical methodology in which we can find the following rules:
a) critical evaluation of previous investigations by the researcher; b) the theoretical position of approach should be made clear, c) the issues to be investigated should be expressed unambiguously d) the research must be calculated to expose new observations or further explanations; or should seek to falsify previous observations or explanations; e) should stick to the primary sources as a verification system; f) should pay serious attention to the principles and practice of research methodology; g) must conduct a single investigation in a systematic way; h) must obtain a substantial contribution to knowledge; i) any new information obtained should be recorded so as to be accessible to other researchers; j) primary conjectures or conclusions must be configured as to be refuted by others; k) a record of research and its findings should be published or exposed to critical judgment by other researchers.

description, suspending this way the first sense to allow the emergence of a deeper meaning, on the other hand, looking for a radical change of attitude. By doing so it is expected to open the research to an inconclusive practice and to a new and multiple future possibilities. Allowing, therefore, the new task of architectural research to liberate us from the technical-theoretical closure, calling to the otherness of the self (through first-person methodologies) and to the otherness of the other (through the confrontation with others' disciplinary fields), putting the creative practice, in the foreground.

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