A reductionist reading of Husserl's phenomenology by Mach's descriptivism and phenomenalism

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Abstract. *Husserl's phenomenology is what is used, and then the conception of "bracketing reality" is modelled to generalize Peano arithmetic in its relation to set theory in the foundation of mathematics. The obtained model is equivalent to the generalization of Peano arithmetic by means of replacing the axiom of induction with that of transfinite induction.*

A comparison to Mach's doctrine is used to be revealed the fundamental and philosophical reductionism of Husserl's phenomenology leading to a kind of Pythagoreanism in the final analysis.

Key words*: eidetic reduction, phenomenological reduction transcendental reduction; epoché; Husserl's, phenomenology; Mach's "economy of thought"*

1 INTRODUCTION

Philosophical phenomenology (Husserl's doctrine, first of all) establishes an inherent link between: (a) logic and mathematics; (b) philosophy; (c) psychology: The link relates the three by means a kind of transcendental idealism in the German philosophical tradition. Thus a bridge for transfer and reinterpretation between notions of psychology, logic and mathematics is created under the necessary condition for those concepts to be considered as philosophical as referred to that kind of transcendental subject.

Mach's and Husserl's doctrines share descriptivism, but they are radically different to phenomenality distinguishing the phenomenalism of the former from the phenomenology of the latter.

Mach presupposed some constant metaphysical elements, to which both consciousness and reality can be *reduced* being at the same time rather something middle.

What Husserl universalized was the process of *reduction* itself allowing of the "phenomenon" of anything to be deduced after "bracketing reality" without presupposing whatever universal phenomena.

If one applies Mach's economy of thought to his "elements" therefore reducing them to the necessary properties and "razoring" any metaphysical hypotheses about their metaphysical nature including the sensual one, they might be identified as the successive stages of Husserl's reduction.

The unification of Mach's phenomenalism and Husserl's phenomenology leads to a kind of Pythagoreanism reducing all being to the natural numbers just as in Leopold Kroneker famous sentence. Then the universal mathematizability of being and therefore that of all scientific theories seems to be reliably grounded.

One can question about the mathemazability of one (or any) scientific theory formally of that historical and conceptual background. The intention is the approach of Husserl's phenomenology to be formalized and applied in both directions: to intension ("eidos", "phenomenon", intention) and to reality.

One can introduce "epoché" both to "phenomenological" and to "eidetic reduction". As to the latter, it would mean the entire processes of removing one by one all free variables of the corresponding extension.

The paper is organized as follows. *Section 2* describes a few features of Mach's doctrine relevant and sufficient for the reductionist reading of Husserl's phenomenology. *Section 3* offers a way to be unified Mach's phenomenalism and Husserl's phenomenology my means of Mach's economy of thought applied to his phenomenalism. *Section 4* compares reductionism in mathematics in the other sciences. The last, *5th Section* summarizes and generalizes the paper to a few conclusions and directions for future work.

2. MACH'S "RAZOR" AS A FUNDAMENTAL AND PHILOSOPHICAL REDUCTIONISM

Still the original "razor", Occam's was created to remove redundant hypotheses and unfounded assumptions [1], [2]. They are the source of delusions and confusions [3].

Science still since the age of Euclid and Greek philosophy has aspired after the reduction of all knowledge and being to a few first principles or elements, from which all the rest might be deduced logically and convincingly. In other words, science has always utilized that "razor" as a methodological principle.

However, science of the modern age invented another "razor", that of experience and experiments [4]. Both "razors" are the ground of science in nowadays, however they often offer different results inconsistent to each other [5]

Occam's razor removes redundant hypotheses and restricts the appearance of new facts inconsistent to the established principles. On the contrary, the experimental razor removes established principles by new facts. So, science turns to be

doubly razored, both to outdated principles and redundant assumptions.

However, the two razors are directed oppositely to each other, and the intersection of their joint action might generate only an empty set for the ideal, doubly razored science.

If one identifies Russell's barber's razor[1] with both razors treating science, the emptiness of the set above might be proved: the one razor corresponds to that intended to those who do not razor themselves (as the established principles razored externally by the facts), and the other razor, to those who razor themselves (as the established principles razoring themselves from redundant hypotheses). Thus the established principles turn out to be in Russell's barber's position.

Mach's doctrine including both descriptivism and phenomenalism [8, 9, 10], [11], [12], [13] can be considered as one of the most elegant way out of the contradiction. As Russell's barber's existence, the existence of a nonempty intersection of the action of both razors is able to be postulated without any contradiction. Its elements can be called "sensual" or however else, and then, two different, even disjunctive contexts of use (or interpretation) are able to be introduced: as first principles of description, from which any derivative description in science can be deduced consistently; and as first elements of the phenomena experienced immediately or by experiments [11].

Mach's approach has the double advantage to be both simplest and self-applicable. His "razor" removes the hypothesis of "atoms" or material reality as equally redundant therefore angering both "Church of Physics" [14], [15] and Lenin [16].

Thus, Mach's doctrine can be seen as a kind of radical, fundamental and philosophical reductionism or "ontological reductionism" according to *Oxford companion to philosophy* [17]. Of course, the real reductionism in science does not refer to the elements of the being itself as a rule, in the exceptions of which Mach is almost alone for he applied his approach to physics influencing Einstein's thought to general relativity though rejecting his relation to it later [18], [19].

In fact, reductionism in science and philosophy share that of removing the redundant, therefore being quite relative as a common structure though interpreted in different contexts and degree of generalization.

The realization of Mach's doctrine as reductionism assists to be further discussed Husserl's phenomenology in the same way [20], [21] for Husserl himself introduced three kinds of (just right) *reduction* [22, 23] as the methods for one to achieve to phenomenology from reality.

Husserl distinguished himself from Mach's phenomenalism flatly [24], [25], [26, 27], [28, 29]. What is the essential difference between Mach's and Husserl's "phenomenon"? One can notice immediately that Mach's phenomenalism is a form of naturalism according to Husserl's criticism [30]. All phenomena after Mach are complexes of one and the same elements and thus only different re-orderings of them [31], [32]. Indeed, Mach's elements are not Boltzmann's atoms; however, both kinds generate phenomena similarly, by their reordering as still Democritus suggested [33].

The phenomenon after Husserl is maybe rather the shared *eidos* of real things therefore unified them as a class. That *eidos* cannot be and is not defined in relation to some universal elements whatever they would be. It can be defined only to relation of that class real things, from which can be obtained by *reduction* and only then postulated as generating them. Thus, Mach's descriptivism can be conserved [34].

The dimensions of reduction of reality are quite different after Husserl in comparison with those after Mach. They are mathematical for the former [35], but physical for the latter [36]. One can notice the comparison of Ernst Mach's reductionism and Erwin Schrödinger's methodology [37] as a way for Husserl's phenomenology and Mach's phenomenalism to be reconciled to each other. If one finds a way to unify physics and mathematics into a single science erasing or fulfilling the gap between them, this will be at the same time a way to unify Husserl's phenomenology with Mach's phenomenalism. This would be a solution of the problem "phenomenalism vs. phenomenology" [38].

3. MACH'S "RAZOR" TO ITSELF: HUSSERL'S PHENOMENOLOGY

One can attempt to overcome the obvious mismatch between Husserl's phenomenology and Mach's phenomenalism right utilizing the razor of Mach's *economy of thought* ... however to itself.

In fact, Mach's elements, whatever they are called and would be, are only a new hypothesis. The principle of economy of thought [39] would remove them if the same result might be achieved without their utilization. Even more, Husserl's phenomenology might be recognized as Mach's phenomenalism razored from the redundant elements.

Indeed, those elements are situated on the boundary between consciousness and reality therefore to bridge them over the gap deducing consciousness in the one direction, and reality in the opposite direction. One can define them more economically as something middle, the only necessary property of which is to suspend the law of excluded middle as to the pair of reality and consciousness.

Consequently, the principle of economy of thought applied to Mach's elements themselves reduces them to suspending "excluded middle" as to reality and consciousness. The nature of that middle exhausts itself by being right "middle" as what the reduction after Husserl allows of being thought.

Indeed, the middle between reality and phenomenon in Husserl is reduction. Returning back to Mach, his "elements" might be already interpreted as successive stages of the process of reduction. Their names are only ordinal natural numbers after they should be *common* for any process of reduction to any phenomenon. That *commonness* is required by Mach's way to be defined the elements.

Summarizing, if Mach's elements are deliberated from any metaphysical nature just according to his doctrine, they turn out to be natural numbers generating consciousness in the one direction, and reality in the opposite direction. Then furthermore, they are absolutely consistent to Husserl's

[1] The kidding version [6] of Russell's paradox [7] about the set of all sets is meant.

phenomenology as the successive stage of reduction leading from reality to phenomena.

There is still one, even more economical scheme for the same, realized by Brouwer's intuitionism [40]: after both consciousness and reality are derivative from natural numbers, they themselves might be interpreted as two kinds of numbers: finite natural numbers and transfinite ordinal numbers, and the middle consists only in admitting the middle between the two kinds of numbers. If all those are granted, any "creative subject" might construct the universe [41].

4. MATHEMATICAL REDUCTIONISM VERSUS SCIENTIFIC REDUCTIONISM

At first glance, the opposition of mathematical reductionism [42] to scientific reductionism [43] is wrong for mathematics is one among the other sciences. Nevertheless, its type of reductionism is essentially different from that in all the rest:

Its fundamental methods, the axiomatic and deductive ones are reductionist [44]. Its universal validity in the contemporary mathematics implies that any entity claiming to be mathematical has to be equivalently reducible to a certain structure, which can be exhaustedly described by a few axioms. All mathematics is strictly subordinated by complete reducibility leading to arithmetic (the natural numbers) and set theory.

The reducibility in all other sciences, even in physics, which shares rather features of mathematics, is only partial and unstrict. There are even sciences such as esthetics founded on subjective estimation and interpretation or such as history avoiding any generalization and describing events as unique. Nevertheless, one or other form of reductionism might exist in each of them. How many the sciences and even the theories and methods are, so many the kinds of reductionism are.

The reductionism in mathematics in that background is total and maximal. Particularly, it does not admit any exceptions. That exception in any mathematical theory testifies incompleteness. The incompleteness as well as any contradiction means its inconsistency: that theory is false.

Consequently, mathematics is the only science where the concepts of truth and reducibility are inherently linked to each other. All other science even partially irreducible can be nevertheless true for the correspondence to reality.

Mathematics does not presuppose reality [45]: the condition of that is total reductionism. Consequently, its reductionism is founded in the kind of truth in it and in the renunciation of (the concept of) reality.

Hilbert mathematics involves that kind of total reductionism into the being itself. The ultimate base is the natural numbers as still Kroneker proclaimed [46].

One can visualize that being in Hilbert mathematics utilizing Einstein's way to exemplify the curvature of space-time in general relativity. He used the two-dimensional analogy of a curved surface, to which people have immediate sensual intuition about both externality and internality of it [47].

One can figure that the creatures in a computer game have consciousness and perceive its environment and their bodies approximately as we perceive them … or ours. Nevertheless, we, being right outside of the computer, which is their universe, know very well that their existence and environment are only software programs, bits of information of a Turing machine.

Then we might imagine our universe as a quantum computer where the alleged boundary between software and hardware is already overcome by quantum information and its units, the qubits. Any qubit is both software and hardware corresponding to each other, but always disjunctive being complementary to each other.

The base in the former and in the latter case is one and the same: information, though classical information and separated hardware, on the one hand, and quantum information merging with the hardware, on the other hand.

The former case corresponds to Gödel mathematics, the latter case to Hilbert mathematics, and the present analogy between those cases to the model of Hilbert mathematics into Gödel mathematics, intended to demonstrate the not less consistence of the former to that of the latter.

Furthermore, in Hilbert mathematics, the transition between mathematics and physics should be gradual and smooth. The concept and quantity of information and its theory can be that "middle" situated between mathematics and physics transforming the former into the latter gradually.

In essence, information can be considered not less as those elements ultimate as Mach's [48], which generate in one context, that of consciousness, mathematics and all phenomena in Husserl's sense, but into the opposite context, that of reality, initially the physical and further all the rest in the universe, i.e. reality.

Information can be thought as the more fundamental generalization of the natural numbers where the natural numbers are right considered as those ultimate elements generating both conscious and reality as two equally probable disjunctive alternatives.

Indeed, any bit of information can be interpreted as the empty cell of a natural number, in which can be recorded either "0" = "consciousness" or "1" = reality. Before any recording, the sell is only a natural number.

5. CONCLUSIONS & FUTURE WORK

The main conclusion is: that reading of Husserl's phenomenology is as possible as fruitful. It implies the interpretation of "phenomenon" in Husserl's meaning as Numbers (capitalized to be emphasized their generalized, Pythagorean sense):

They are what "remains" after the eidetic reduction of whatever, or after eidetic reduction of all eidoi (the eidos of eidos). Therefore, Numbers are the (transcendental) phenomenon of all (psychological) phenomena.

In the framework of Husserl's phenomenology, that reading postulates additionally that a universal eidos can be identified as the transcendental phenomenon of all phenomena. Furthermore, it can be substantive as Numbers.

A basic direction of future work is the fundamentally philosophical (or "phenomenological") foundation of arithmetic as a secondary science about the primary Numbers as numbers. A link and reverse reading from "Logical investigations" to "Philosophy of arithmetic" seems to be fruitful:

One studies philosophically arithmetic as that specification of logic, to which distinguishability, e.g. by choice and well-ordering, is complemented.

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