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Dossiê

Wittgenstein and the sciences

Wittgenstein e a Ciência

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Abstract: In the *Tractatus Logico-Philosophicus*, Wittgenstein states that man has the ability to construct languages with which all meanings may be expressed, but that it is humanly impossible to immediately extract its logic from it. Thus, language is a costume that disguises thought while proposition is a figuration of reality. This paper is aimed at showing how the position of the *Tractatus* in relation to sciences puts aside the idea that scientific knowledge should be rooted in raw data, that is, observations that may be made regardless of any theoretical orientation. Accordingly, this study claims that the Tractarian position does not admit the presumption that behind raw data there is a reality that is independent of the observer, considering that, as stated by Wittgenstein, the limits of language indicate the limits of the world, and not the other way around.

Keywords: Language, Scientific Realism, Science, *Tractatus Logico-Philosophicus* , Wittgenstein.

Resumo: *No Tractatus Logico-Philosophicus, Wittgenstein afirma que o homem possui a capacidade de construir linguagens com as quais se pode exprimir todo sentido, porém que é humanamente impossível extrair dela, de modo imediato, sua lógica. Por isso, a linguagem é um traje que disfarça o pensamento enquanto a proposição é uma figuração da realidade. Neste artigo, pretendemos mostrar como a posição do Tractatus em relação às ciências afasta-se da ideia de que o conhecimento científico deve estar enraizado em dados brutos, isto é, observações que podem ser feitas independentemente de qualquer orientação teórica particular. Para tanto, sustentamos que a posição tractatiana, por conseguinte, não admite a presunção de que por trás dos dados brutos há uma realidade independente do observador, uma vez que, como afirma Wittgenstein, são os limites da linguagem que indicam os limites do mundo, e não o contrário.*

Palavras-chave: Linguagem , Realismo Científico , Ciência , Tractatus Logico-Philosophicus , Wittgenstein .

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Introduction

The first half of the 20th century is grounded in meta-scientific investigation. It aims to define its scope, on the one hand, and the epistemic soundness and semantic legitimacy of scientific statements, on the other hand. This effort is mostly observed in valuing the rational character of science, which is generally evaluated through the elements of scientific progress and testability among research programs, its formal and symbolic expression of facts as well as its political reaction to its enemies.

As McGuinness (1969, p. 155) wrote, in this context the *Tractatus* "was clearly much influenced by writings on the philosophy of science, notably by those of Hertz". As later complemented by McGuinness, Hertz had affirmed that our minds could produce images or representations of reality in such a way that possible variations or alterations in the representation accurately mirrored all the different possibilities of the physical system.

Wittgenstein, in turn, generalizes the position of Hertz by taking it not only as a report of how natural science was possible for us, but also how thought and language could do the same (JANIK, 1994; KJÆRGAARD, 2002). Thus, still according to McGuinness, in the *Tractatus* Philosophy of Science is discussed almost exclusively based on the aphorism 6.3, from which the philosopher aims to establish that the various types of propositions found in science may be explained without assuming that there are propositions that are neither meaningful propositions (that is, pictorial propositions) nor meaningless propositions (that is, tautologies or contradictions).

In this sense, how should we situate statements such as "**psychology** is no more closely related to philosophy than any other natural science. Theory of knowledge is the philosophy of psychology" (TLP 4.1121); "**Darwin's theory** has no more to do with philosophy than any other hypothesis in natural science" (TLP 4.1122); "**philosophy** sets limits to the disputed sphere of natural science"(TLP 4.113); "**Logic** is not a body of doctrine, but a mirror-image of the world. Logic is transcendental" (TLP 6.13); "**Mathematics** is a logical method. The propositions of mathematics are equations, and therefore pseudo-propositions" (TLP 6.2); "(...) **Mechanics** determines one form of description of the world by saying that all propositions used in the description of the world must be obtained in a given way from a given set of propositions – the axioms of mechanics" (TLP 6.341); "**Mechanics** is an attempt to construct according to a single plan all the true propositions that we need for the description of the world" (TLP 6.343) or "The **laws of physics**, with all their logical apparatus, still speak, however indirectly, about the objects of the world" (TLP 6.3431)?

Although the *Tractatus* presents several passages approaching science, Wittgenstein is not directly interested *in* science or, to be more precise, in the various approaches of science. According to him, as argued in this paper, the fundamental question seems to be to show the reader the movement that took him from the consideration of an empirical model form to the idea of elementary proposition form. In other words, Wittgenstein aims to show that the problems of a Philosophy of Science lie in the way the very sciences are based on the idea of an isomorphism between propositions and the world, probably a conception derived from the reading of *Prinzipien der Mechanik in Neuen Zusammenhange Dargestellt*, by Hertz. The present study was developed based on this hypothesis.

The Substance of the World and the Philosophical Image of Science

In the proposition 4.11 of *Tractatus Logico-Philosophicus*, Wittgenstein states, "the totality of true propositions is the whole of natural science (or the whole corpus of the natural sciences)." He then goes on to declare, "philosophy is not one of the natural sciences (The word 'philosophy' must mean something whose place is above or below the natural sciences, not beside them)" (TLP 4.111). Regarding this, what kind of science does the philosopher have in mind in establishing this methodological distance? In approaching a direct access to an element of reality, would Wittgenstein be committing himself, even if subtly, to the old problems between idealists and realists? For example, in a later passage Wittgenstein argues "that solipsism, when its implications are followed out strictly, coincides with pure realism" (TLP 5.64). Thus, Tractatus seems to intersect the perspective that on the one hand, we can have an immediate experience of the objects of reality, and on the other hand, references to names are independent of the subject.

These paradoxical statements demonstrate that the objective of science and philosophy indicate toward specific and, to some extent, complementary paths. Despite the argument that the former (science) indicates specific objects as well as natural classes of objects, and its function is to describe the reality of the statements it is concerned with, the latter (philosophy) consists precisely of the "logical clarification of thoughts" (TLP 4.112), as "the result of philosophy is not a number of 'philosophical propositions,' but to make propositions clear" (TLP 4.112). Thus, Wittgenstein seems to clearly understand that scientific materials are not mentally or ontologically independent of human beings, but rather science corresponds only to one version of reality. Contrary to the classical argument of scientific realism, which affirms, in general, that the terms of science or the product of successful scientific research is the knowledge of objects that are independent of theory and external to the mind, Wittgenstein is simply rejecting any metaphysical perspectives of continuity between natural languages and scientific languages (PERUZZO JÚNIOR; VALLE, 2014; PERUZZO JÚNIOR, 2018).

In *Wittgenstein and Scientific Knowledge*, Derek Phillips argues that in the *Tractatus* there would be a middle ground between the absolutism of positive science and the relativism of the new emerging image of science. However, it is possible to find in Wittgenstein the recognition of the impact of the knowing subject on the known object, while there is a knowledge that saves respect for the resilience of facts of the world. Phillips (1977, p. 20) then emphasizes that experience is not a mere mirroring of facts that exist independently of us, as "he wanted to show how propositions succeed in presenting real states of affairs in the world, and this sense he was part of an ancient tradition which conceived of language as reference, as our way of referring to things in the world".

Also according to Phillips, in the *Tractatus* Wittgenstein aimed at introducing a philosophical image of the world, that is, showing how propositions manage to present states of affairs in the world. It is in this sense that Wittgenstein was part of an ancient tradition that conceived language as a reference, that is, as our way of referring to things of the world. Therefore, he accepted that the world has a fixed structure, represented for us by language, which is an image of reality. Based on this argument, Wittgenstein begins to consider language as an image of reality and that, therefore, there must be a similarity of structure between what portrays and what is portrayed. In other words, it would mean that the form of language should be the same as reality.

Furthermore, the *Tractatus* seeks to define the existence of a correlation between the elements of an image and the elements of what must be portrayed. The correlation constitutes the pictorial relationship of the image, as each sentence is an image of a state of affairs. But then what are the consequences of this argument? According to Wittgenstein, objects in the state of affairs are in a biunivocal correspondence with the terms in the sentence referring to such objects. Thus, propositions that convey false beliefs do so because they arrange names in such a way that the very objects are not correctly arranged. On the other hand, in the Tractatus propositions that are understood as images carry the idea of language as an image of reality.

Thus, as suggested by the proposal of Phillips (1977), it becomes evident that the Tractatus is not interested in entering the debate of scientific realism (here understood as an epistemic attitude towards the content of our best theories and models about the world described by sciences) and finding a justifiable way for language to be able to step outside of itself and find possible external empirical properties. Propositions tell how reality is shown by its form. In the *Tractatus*, Wittgenstein believes that the logical form is also the form of reality, as what guides the truth value of elementary propositions is that they may be logically compared to reality, that is, with what they represent. Naturally, this implies a correspondence theory, that is, that elementary propositions are compared to atomic states of affairs and, consequently, to the epistemological question of how we came to know what we know, how our cognitive claims are justified.

It is therefore important to note that the purpose of the *Tractatus* is not to question the structure of reality, but how language is a logically rigid essence hidden behind the everyday speech. In a sense, the observation by Read (2012, p. 37) is pertinent here, stating that "Wittgenstein offers the conception of a 'network' of scientific concepts and of a set of 'axioms' that, together, might very roughly be seen as prefiguring embryonically the concept of a 'paradigm' that Kuhn famously gave us". Thus, if authors like Kuhn are in fact heirs of the thought of Wittgenstein, they would not be interested in the field of facts, but in the proximities of the conceptual change that takes place in science or, perhaps, in what we mean after a revolution, where scientists are responding to a completely different world.

In any case, as noted by Andrew Lugg (2009, p. 211), however much Wittgenstein has practiced with concrete scientific problems prior to being introduced to Russell, he was singularly indifferent to them, resisting the suggestion that Philosophy could benefit from an infusion of factual information. In fact, the position of indifference of Wittgenstein towards science stems from his hostility to professional philosophy and, in turn, to the treatment that it would be a style of thought opposed to another, especially through philosophical speculation disguised as science (PERUZZO JÚNIOR, 2022, p. 6).

Wittgenstein, an anti-philosopher of science?

First, it must be remembered that modern scientific rationality entered a crisis, especially in the second half of the 19th century. Mathematics and its questioning of Euclid's axioms (Gauss, Peano, Cantor, Bolyai, Lobachevsky, and Riemann), the theory of evolution (Lamarck and Darwin), the emergence of "Sciences of the Spirit" (Dilthey), as well as quantum mechanics (Boltzmann and Planck) and the theory of relativity in physics (Einstein) imploded the models of scientific rationality. Therefore, the emergence of a new epistemology to account for these problems and the consolidation of an image of science that assumes its grammar as its *modus operandi* became necessary. In contrast to developing any conception of science or affiliating Wittgenstein to the "philosopher of science" jargon, *Tractatus* aims to clarify the metaphysical asperity of scientific realism and dethrone the debate between direct and indirect access to the objects that make up reality or the world. However, what is the meaning of the phrase that scientific propositions describe reality?

According to *Tractatus*, the natural sciences are constituted by genuine propositions because they depict facts about the world. In other words, scientific theories cast *nets* about the world. For example, Tomasini Bassols (2010, p. 18) affirms "that a scientific theory is, above all, an instrument that, depending on its fineness, allows for a better or worse manipulation of objects." In turn, they could only indirectly deal with objects, which provides an opportunity for arguing that nets, or scientific theories, are conventionalized systems, and Wittgenstein advocates an instrumentalist conception of science. If scientific theories are symbolic constructions that work through logical coordinates, *Tractatus* enables an idealism about scientific knowledge. Thus, according to Tomasini Bassols (2017, p. 23), the logical approach in the *Tractatus* is and must be purely formal, in addition to "having as its objective the enunciation of the necessary traits of symbolism, as well as in another context it generates the enumeration of the necessary, purely formal traits of reality". Thus, insofar as the logical function consists in portraying facts, the basic conditions for something to be a portrayal of a possible situation is that a. the elements of the portrayed fact are present in the portrait; b. there are connections between signs and objects, and finally, the elements of the

portrait are arranged in the same way as the objects of the portrayed fact (TOMASINI BASSOLS, 2017, p. 29; BASSOLS; PORRAS, 20160).

However, contrary to the previous idealist argument that views the impossibility of direct access to external realities, Wittgenstein maintains that no mental veil can prevent the demonstrability of scientific knowledge. According to him, this is a linguistic problem, since the language of science is "behind" the language of nature. In any case, even if scientific theories do not provide us with information about the ultimate structure of objects and our access to them is indirect, this supposed "idealism" is "philosophically innocuous" (Tomasini Bassols, 2010, p. 19). It aims to attack the metaphysical position of scientific realism because when something is "planted" outside a language, even if it exists, it would lack any significance. For *Tractatus*, the idea of representation as a mental reconstruction is not necessary, since the domain of logic is sufficient to show the path of validity of scientific propositions. For instance, when Wittgenstein states that "reality must, by means of the proposition, be restricted to a yes or no" (TLP 4.023) and that "the proposition constructs a world with the help of a logical framework," he implies that there must be a common link between the model and the modeled, that is, between the symbolic construction and existence in reality. A possible conception of science in *Tractatus* is linked to the conception of logical grammar and, accordingly, to its picture theory of language.

Another important space must be considered in Wittgenstein's view: if the natural sciences are empirical disciplines, discussing *a priori* knowledge about them could mean revitalizing a metaphysical space. In this sense, how can we know whether there are causal relations between events, situations, and facts? According to Wittgenstein, our language allows us to do this as long as all propositions remain truth-functions of themselves. When we establish connections, we only know about their given possibilities *a priori*. Therefore, determining the causality between phenomena and events through something empirical is not the aim, as a modern author might argue. Because of these possibilities, we know about the *law of causality*. In this regard, the philosopher affirms, "The law of causality is not a law but the form of a law," (TLP 6.32) and "'Law of causality' is a class name. Similar to mechanics, there are minimum-laws, such as that of least action. Thus, in physics there are causal law, laws of the causality form" (6.321). Similar to the subsequent statements (TLP 6.3211 and 6.33), the existence of an *a priori* law is not at stake here, but its possibility based on a logical form.

With respect to the previous question, one can understand that laws do not recognize their regularity in the experience given by the phenomena. Here, Popper became one of his main heirs since the propositions we construct in certain logical ways serve as *a priori*. According to Tomasini Bassols (2010, p. 29), "to speak of laws is to indicate regularity, but to indicate regularities is to allude to connections that we can think about and therefore articulate." Consequently, the previous idea of causation is placed in parentheses: *by knowing the formal properties of language a priori, one can determine the causal relations between phenomena and events.*

The previously mentioned thesis explains Wittgenstein's statement 5.1361: "The events of the future cannot be inferred from those of the present. Superstition is the belief in the causal nexus." Thus, causality is not a mental postulate, or something extracted from a relational observation between facts, events, or phenomena. If a proposition logically determines its scope *a priori*, the occurrence is independent of the facts and, consequently, imposes a kind of world description. In other words, scientific theories are linguistic nets that capture facts of the world, since the description is restricted to the universe of the object it proposes to demonstrate. For instance, if we cast a net to capture a salmon, the net will not allow for the discovery of anything other than the object it purports to show. Therefore, theories cannot exceed empirical generalizations because what they can aprioristically conclude is nothing more than a theoretical construct anchored in logical symbolism.

Thus, *Tractatus* observes that scientific languages fulfill their role to the extent that a) the language decomposed into sentences and b) the sentences decomposed into concatenations between names c) allow a relationship between model and fact. Hence, within this relationship, it is necessary for the models and their elements to *represent* the same relationship that they maintain between the elements of the fact. In other words, an examination of such a formal language allows us to know whether the proposition is a logical picture of the world. Such a sentence may be considered meaningful because it is a picture of a possible fact or a combination of possible pictures. However, according to Wittgenstein, there are no logical facts, just as logical truths do not state anything – they *only* show the structure of facts and propositions.

Therefore the *Tractatus* program consists in developing a logical view of language and reality, as according to Wittgenstein there is no such thing like a logical universe waiting to be discovered (TOMASINI BASSOLS, 2021). Thus, language adjusts to the laws of syntax and reality is logically structured, hence indicating that language and reality are subordinated to logic. Accordingly, the *Tractatus* indicates that although language is the totality of propositions, just as the world is the totality of simple facts and that there are (simple) ultimate propositions and simple facts which are not analyzable, it is firstly necessary to know what names are being used for them. Therefore, if it is known that reality is made up of facts and that facts are made up of objects, they will only be known to the extent that the vocabulary of names available is known. It is precisely here that the determination of such objects only appears in an *a posteriori* way, and then this becomes an investigation that goes beyond the domains of the very philosophy.

From Language to Science: the logical reconstruction of the world

If Wittgenstein's interest is not anchored in inductivism and mentalism, what happens when science, similar to Newtonian physics appropriates properties such as hardness, impenetrability, rigidity, inertia, among

others, to define a concept – such as *body*? Stating that a table is impenetrable is to present a tautology. For Wittgenstein, these are not pictures of the facts. Moreover, to affirm that this table is not rigid would constitute a contradiction. Consequently, we must see that there is a clear boundary between the concepts that are part of scientific language, on the one hand, and the formal structure of language that determines all possible representations, on the other. It seems that Wittgenstein is not interested in the pragmatic role of science but in the structural conditions that precede the movement of scientific language over the world.

Thus, the naive idea of an essential connection between cause and effect, typically rooted in the modern view of science, is eliminated. Obviously, this does not mean that every scientific explanation does not depend on the existence of laws to map the world, but the old resource of causation cannot be used with the same force. As Wittgenstein writes, belief in the causal nexus is superstition because committing to the consequences of the associative mechanism between phenomena and their generalization is something intrinsic to our natural way of thinking. The author declares in statements 6.362 and 6.363, "what can be described can happen too, and what is excluded by the law of causality cannot be described," and "the process of induction is the process of assuming the simplest law that can be made to harmonize with our experience." Immediately afterwards, he affirms that this [causal] process has no logical foundation, only a psychological one (TLP 6.3631).

Undoubtedly, Wittgenstein's position on science and scientific theories evokes the idea that they function as *nets*, which allow us to speak successfully about reality *a priori*. However, two issues become fundamental in *Tractatus*: first, scientific theories are not mere inductive generalizations, and second, they cannot be taken as "descriptions of reality." The first thesis stems from the fact that the success of our predictions occurs on a purely logical level. In turn, the second argues that scientific theories are not directly about objects but about theoretical terms and the fineness of their relations. Thus, *if there is a philosophy of science in Wittgenstein, it would implode the edifications of the philosophy of science and would maintain distance from a realist view*.

If science does not directly explain facts, to what extent can we accept that its descriptions are true and sufficient? The value of science is therefore fundamentally pragmatic. Its approaches allow us to manipulate and construct the world as well as to constantly reformulate them to the extent that their theoretical-explanatory nets show us other *finesses* of the world. If there is a nod to science from Wittgenstein in *Tractatus*, it is not a properly optimistic one. On the contrary, it places the way we, or science, can think about and represent the world in the traps of language. As he states in the *Blue Book*, philosophers are immersed in doing what they should not be doing, as science also falls into metaphysical errors: "Philosophers constantly see the methods of science before their eyes, and are irresistibly tempted to ask and answer questions in the way science does. (...) I want to say here that it can never be our job to reduce anything

to anything, or to explain anything. Philosophy is really purely descriptive (WITTGENSTEIN, 1958, p. 18).

Conclusion

Wittgenstein's aversion is not to science but to grotesque scientism that is mistaken in its method. In fact, Wittgenstein is more interested in making a prognosis about the role of philosophy. Philosophy, unlike science, is "to say nothing except what can be said, i.e., the propositions of natural science, i.e., something that has nothing to do with philosophy; and then always, when someone else wished to say something metaphysical, to demonstrate to him that he had given no meaning to certain signs in his propositions" (TLP 6.53).

However, although in Wittgenstein nature does not play a fundamental role in physics, following the position of Hertz and Boltzmann, a theory was conceived in the *Tractatus* as a completely formal representation not supported by any external positions (KJÆRGAARD, 2002, p. 129). Thus, he seeks to prevent the potential external reference from serving as a guarantee for an image of reality, as what is really at stake is whether the image that conceives reality represents a possibility of existence or non-existence of a certain state of affairs or just depicts a possible situation. Therefore, the *Tractatus* shows that what is portrayed by an image, on the one hand cannot be determined by looking at the very image, but only by comparing it with reality; on the other hand, this does not mean that the meaning of an image must be decided by reality. Therefore, it seems that the view held by Wittgenstein is that, particularly the theories of physics, are images of reality, having therefore only a descriptive relation with nature. On the contrary, different scientific theories in general are guided by different systems or ways of describing the world to the extent that they are not justifiable by experience, but by the framework of their own references.

In this respect, while scientific propositions are subject to rigorous logical examination, philosophical work is never exhausted. In one of the final statements of *Tractatus*, Wittgenstein expressed, "even if all possible scientific questions are answered, the problems of life have still not been touched at all. Of course, there is then no question left, and just this is the answer" (TLP 6.52). In any case, if Wittgenstein belatedly addressed other questions and had some new purpose, it seems undeniable that these now would be nothing close to the dogmatists, demarcationists, relativists, or negationists. The author's unique way of engaging with the problem of life is expressed by the indication that scientism is just an image among so many others (TEJEDOR, 2017). Therefore, the space of silence is not a simple consequence of the logically conceivable or of the limpidity and perspicuity of the icy mountains of Logic. Rather, it sprouts from the proposition that "it is not how things are in the world that is Mystical, but that it is" (TLP 6.44).

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