ISSN: 2978-5391

Journal of Arts Humanities and Linguistics

SCIENTIFIC Research and Community

Review Article

Open Access

The Metaphysics of Science: The View of Aristotle, Kant and The Vienna Circle

Jakub Z Lichański

Full Time Professor, Humanities in the Discipline of Literary Studies, University of Warsaw, Poland

ABSTRACT

The problem of metaphysics and its connections/references to science is very interesting in itself. This question has been posed and tried to be solved by many philosophers, as well as representatives of exact sciences. The analysis of databases such as PhilPapers or entries in the Stanford Encyclopedia of Philosophy may discourage you from taking up this subject again. If I dare to do so, referring to Aristotle, Immanuel Kant, Rudolf Carnap, or, more broadly, the Vienna Circle, but also Hans Reichenbach, it is not because I see close connections here, but because, I believe, this problem can be solved.

Aristotle and his attempt to systematize knowledge must be made the starting point. Although the proposals represented by other philosophers and representatives of exact sciences depart from the views of the Stagirite, it is in him and in logic and rhetoric that one can look for an attempt to outline the mutual relations of both, seemingly distant, fields. This study is a proposal to resolve the questions related to these compounds.

***Corresponding author**

Jakub Z Lichański, Full Professor, Humanities in the Discipline of Literary Studies, University of Warsaw, Poland.

Received: October 22, 2025; **Accepted:** October 27, 2025; **Published:** November 05, 2025

Keywords: Aristotle, Immanuel Kant, Rudolf Carnap, Hans Reichenbach, Werner Heisenberg, The Vienna Circle, Mordehai Milgrom, Metaphysics, Science, Logic, Rhetoric, Mond

The reason of this is a that experience is knowledge of particulars, but art of universals; and actions and the effects produced are all concerned with the particular.
ARIST., metaph., 981 a 6-8 [tranl. H. Tredennick]

Why Aristotle (and others)?

Aristotle in the Metaphysics speaks unequivocally [1]

Now art arises when from many notions gained by experience one universal judgement about a class of objects is produced.

What does the Stagirite really say? He points out that knowledge is created by generalizing judgments, or rather particular perceptions, which are subject to generalizations. These generalizations have the character of metaphysical propositions (the term will be subject to some modification and specification; at present, it is enough to state by Tadeusz Czeżowski that the task of metaphysics is to determine the most general properties of objects [2], which is just another definition of what Aristotle called: one universal judgement (properities) about a class of objects is produced [3]. Aristotle de facto points to a problem here, which was only described in detail by Werner Heisenberg [4].

[the outcome of an observation] should be theoretically predicted [...] only the probability of a particular outcome of an observation can be established; the theorem concerning this probability can be tested by repeating the experiment many times [...]. The act of observation changes the probability function discontinuously; out of all possible events, one event is selected that actually occurs. [...] if we want to describe the course of an event in the world of atoms, we must realize that the word "occurs" can only refer to the act of observation, not the situation between two observations. […] Classical physics is a certain theoretical idealization within which we can talk about particular fragments of the world without referring to ourselves. Its successes led to the creation of a common ideal of an objective description of the world. Objectivity has become the basic criterion for the value of all scientific research results.

There is a problem here that Aristotle recognized but described in his works on logic. Before I get to these issues, a note about rhetoric is necessary.

Excursion - Rhetoric, Logic and ... Metaphysics

We should start by recalling the important remarks of Wilhelm Windelband and Ulrich von Wilamowitz-Moellendorff, who pointed out that Aristotle's works referred to as the Organon include, apart from strictly logical works, such as Topics or On Sophistic Proofs, also Rhetoric (Windelband 1888, 258-265; Windelband 1905, 387 sqq: thanks to grammar and rhetoric, we learned the correct rules of thinking; Wilamowitz-Moellendorff 1905, 100-101sqq: the Theory of Speech (= Rhetoric), insofar as it is related to Logic, was scientifically founded by Aristotle) [5,6]. This resulted from the view quite obvious to Aristotle that every proposition, whether particular or general, must be formulated in language, and this is subject to the rules described in the Organon, especially in Poetics and Rhetoric and logic (ARIST. poet., XIX. 1456a35-1456b15; ARIST., rhet., passim; ARIST.,

metaph., 995a17-21; Ax 2000). It is Wolfram Ax who points out that it is not grammar or poetics (lexis), but rhetoric that allows us to formulate thoughts (dianoia); both grammar and poetics only teach us to organize words, and the construction of correct sentences, but it is rhetoric that teaches how to subordinate these correct sentences to thoughts and transform them into teleological texts [7].

A particularly indicated passage from the Metaphysics is significant (ARIST., metaph., 995a17-21): Hence one must be already trained to know how to take each sort of argument, since it is absurd to seek at the same time knowledge and the way of attaining knowledge; and it is not easy to get even one of the two. The problem indicated here touches on argumentation and forces us to ask what rhetoric is really about? Well, it is a theory of text and a theory of argument based on probability, scil. probable indications; logic deals, of course, with questions of reasoning based on truth and falsehood. So why invoke rhetoric? Well, because of the above-mentioned reasoning based on probability, and that rhetoric allows - I repeat - to transform correct sentences into teleological texts (Perelman 1977, 188: Rhetoric reigns supreme in the field of not formalized thought; Perelman 1989, passim; Lichański 2017a, 89-104) [8-10]; this is essential to our study. When we are dealing with observations / perceptions resulting from experience, then our general propositions are often based on probability (cf. Heisenberg's remark). Therefore, as Aristotle emphasizes, we cannot base our assertions only on strictly logical propositions, but also on probable ones. However, these can be unreliable.

Why Aristotle (and Others)? - Continued

Thus, generalizing what has been said, Aristotle in his deliberations points out that what we call metaphysical propositions are based on detailed observations, but generalizations, which are often based on them as well as on previously adopted assumptions, may or may have the nature of metaphysical propositions. And those, to refer to Immanuel Kant, may be synthetic a priori propositions, the truth of which may be doubtful. They, moreover, which is already my addition, are often an example of metaphysical judgments. This is, for example, the assumption about the objectivity or physical nature of descriptions of the world (Wissenschaftliche Weltauffassung 1929, 299-338; The method of this clarification is that of logical analysis; Russell says of her ([7] p. 2f.)). Russell, followed by the Vienna Circle, therefore speak very much like Aristotle (and, let's add, Kant!); after all: Practical knowledge is born when a general judgment about similar things is formed from many experimental perceptions [1]. And let there be no doubt: I consider this judgment of Aristotle to be a metaphysical judgment. It defines the most general properties of objects, and this is the task of metaphysics [2]. We ask about the consequences of many experimental perceptions, and from them we form a general judgment about similar things [1]. However, we must first prove that the things under investigation are similar.

How to Understand the Terms?

It may be objected that I should begin by giving an understanding of the terms I use next. However, I started differently, due to the fact that Aristotle's views are often misinterpreted. among others what Windelband pointed out, that the Organon also includes the Rhetoric, is forgotten [6,11]. And that Aristotle's view of metaphysics would indicate that he understands it as a general methodology for what we today call scientific, and sets out specific rules of conduct: Elle comprend la connaissance des choses divines en meme temps que celle des principes des sciences et de l'action. [It includes the knowledge of divine things at the same time as that of the principles of science and action] [12]. Aristotle says exactly this: For the science which it would be most meet for God to have is a divine science, and so is any science that deals with divine objects; and this science alone has both these qualities; for (1) God is thought to be among the causes of all things and to be a first principle, and (2) such a science either God alone can have, or God above all others. All the sciences, indeed, are more necessary than this, but none is better. (ARIST., metaph., 983a4-15; see also: ARIST., metaph., 995a17-21). But to convey this knowledge / science we must use language, and this operation requires logic and rhetorical skills.

Therefore, we use the following concepts: metaphysics (understood as the knowledge of divine things at the same time), the rules of scientific conduct, action(s), logic, rhetoric. One more thing must also be added to these concepts: probability. However, the meaning of these six terms is subject to change; I went back to Aristotle to show, by a rather obvious example, that they cannot be considered separately, but as terms that co-occur together. In other words, we should consider them together as elements of definition by enumeration [13].

A concept that must raise doubts and even reservations is the definition that we are dealing with the knowledge of divine things at the same time that is, with something that the Vienna Circle found the latent parameter unacceptable in scientific proceedings [14]. I guess it's safe to say Kurt's Gödel famous theorem Über formal unentscheidbare Sätze der "Principia Mathematica" und verwandter Systeme I showed, contrary to hope, inter alia Immanuel Kant that the statement about Pean's axiomatics hides or may hide an error in our reasoning, e.g. that every first-order formal system "covers" the set of all theorems of arithmetic in its entirety [15]. This must be related to the fact that what Aristotle, for lack of better terms, defined as the knowledge of divine things, today we would rather associate with something that, following Immanuel Kant, can be described as synthetic propositions (this was the nature of the hypothesis cited), whose aim was to make hypotheses and expand our knowledge. And they were to be subject to the normal procedure of checking through observation and experience. I will come back to these issues at the end of these considerations.

However, I think Aristotle's view is tenable insofar as he recognizes the relationship that exists between the knowledge of divine things and time - at the same time. Later research, also by Kurt Gödel, confirmed this remark of the Stagirite [16].

Discussion

The basic objection to this reasoning is quite obvious. The presented considerations abstract from the vast literature on the subject, and this is shown inter alia by analyzes of databases such as PhilPapers or entries in the Stanford Encyclopedia of Philosophy [17,18]. However, my goal was neither to describe nor to analyze these databases or entries, but to show that, despite the passage of time, Aristotle's research can suggest to us, if we take into account a different way of defining the problem [13], possible way to solve the problem: metaphysics and science or rather, the metaphysics of the sciences, but they can indicate to us what issues we should pay attention to in the description and analysis of these issues.

The key seems to be the problem of language (hence rhetoric understood as the theory of the text and the theory of argument based on probability, scil. probable premises) and logic. In

both cases, we should pay attention to the problem of topics, but perceived as patterns of reasoning [19,20]. I note that the separation of these issues from the whole theory of rhetoric caused, inter alia, Rudolf Carnap to encounter considerable difficulties in his attempt to build a language for describing scientific experience [21]. Linguistic research, research on the application of the theory of rhetoric, or the problem of describing the language of science are to some extent divergent (Histoire de la rhetorique dans l'Europe moderne 1999; Bourbaki 1969, 9 [22,23]: The general impression ... of the [Greek fifth-century] texts is that there prevails an increasingly conscious effort to extend to the whole field of human thought the modes of expression employed so successfully by modern rhetoric and mathematics--in other words, to create logic in the most general sense of the word.

We can also add a weighty remark by Immanuel Kant [24]: Considering something to be true or the subjective validity of a judgment has the following three degrees in relation to a belief (which is also objectively valid): belief (Meinen), belief (Glauber) and knowledge (Wissen). Opinion is considering [something] to be true with the knowledge that it is insufficient either subjectively or objectively. If this belief is only subjectively sufficient and it is considered objectively insufficient, then it is called faith. And finally, considering as true both subjectively and objectively sufficient is called knowledge. Subjective sufficiency is called belief (Überzeugung) [for myself], objective sufficiency is called certainty [for everyone].

In other words, opinion (Meinen) as understood by Kant exhausts the argumentative procedure that we deal with in the **theory of rhetoric**. The entire cited passage from the Critique of Pure Reason shows where (how) rhetorical reasoning turns into strictly logical reasoning. The former are important because Kant's subjective sufficiency describes the fact that reasoning based on belief (Überzeugung) succeeds in so far as it convinces me and, let us add, like-minded people. However, to be sure - I have to refer to knowledge. Here you can point to a specific discussion between the supporters of the theory of relativity or quantum theory and the MOND (Modified Newtonian Dynamics) theory - all of them are for me a variation of what Aristotle can call the knowledge of divine things, because they are typical hypotheses that require confirmation in experiments and observations, i.e. the "ordinary" research procedure.

I believe that Aristotle's considerations, as well as inter alia Quintus Cornificius, when we look at them as attempts to combine metaphysics and science, would help us in a more complete description and analysis of the relationship between terms and the objects they define, such as: metaphysics (understood either as general judgments/ properities about similar things, or as a priori synthetic judgments / properties), rules of scientific procedure, action(s), logic, rhetoric, probability.

Conclusions

The conclusions are quite obvious. Here, returning to Aristotle is not a futile exercise, but it indicates to us, or may indicate, in understanding that the concepts indicated earlier are elements of the definition by calculating the utility of these concepts. The definition of the metaphysics of science would therefore look as follows:

Let μ denote metaphysics (=the knowledge of divine things at the same time), α (principles of scientific procedure), δ (action(s), λ (logic), ρ (rhetoric), π (probability),

Then

$\mu \equiv (\alpha, \delta, \lambda, \rho, \pi)$

which means that by metaphysics we understand the set of the above elements (components), or that metaphysics consists of the above elements (components). This means broadening the scope of the meaning of the concept of metaphysics itself, but at the same time it is consistent with Czeżowski's judgment that metaphysics is a definition of the most general properties of objects [2]. The above formula is just another expression of the same judgment.

There remains, admittedly, a difficult to accept term: the knowledge of divine things, which looks like, as I said: hidden parameter. However, if we treat it as a suggestion, quite obvious, that certain objects of our knowledge may contain not hidden parameter(s), but rather different possibilities of theoretical description of the same phenomena, then observations, experiments, etc. will allow us to verify theoretical assumptions. After all, this is what Immanuel Kant talked about in the preface to the second edition of the Critique of Pure Reason when he pointed to the Copernican revolution in scientific thinking. Also, when he suggested the existence of synthetic a priori judgments, the task of which is to describe what Aristotle called the knowledge of divine things. For the task of metaphysics - let us repeat - is to define the most general properties of objects [2]: and these are hidden under the terms - the knowledge of divine things and Kantian synthetic judgments. And so that there is no doubt: analytic judgments only explain our knowledge, synthetic judgments - extend [24]:

Die ersteren könnte man auch Erläuterungs-, die anderen Erweiterungs-Urteile heissen [The former could also be called explanatory propositions, the others extensional propositions].

Increasing science is the knowledge of divine things, because, as the divine Homer in the Odyssey will say (H., O., XII.190): [...] we know all things that come to pass upon the fruitful earth.

References

1. Aristotle (n.d.) Metaphysics, 6-8. https: //classics.mit.edu/Aristotle/metaphysics.1.i.html.
2. Czeżowski Tadeusz (1948) O metafizyce, jej kierunkach i zagadnieniach [About Metaphysics, Its Trends and Issues]. Antyk Publishing House. https: //tezeusz.pl/o-metafizyce-jej-kierunkach-i-zagadnieniach-1948-r-czezowski-tadeusz-1342730.
3. Gabryl Franciszek (1903) Metafizyka ogólna czyli nauka o bycie [General Metaphysics, or the Science of Being]. Księgarnia Spółki Wyd. Polskiej, Kraków. https: //rcin.org.pl/Content/67748/PDF/WA004_1483_P10292_Gabryl-Metafizyka.pdf.
4. Heisenberg Werner (1959) Physik und Philosophie. S Hirzel Verlag, Stuttgart. Polish translation: Fizyka a filozofia, tł. P Amsterdamski, Warszawa. English translation: Physics and Philosophy: The Revolution in Modern Science, introd. Paul Davies, Penguin Books, London (2000). https: //manchester.spydus.co.uk/cgi-bin/spydus.exe/ENQ/OPAC/BIBENQ?SETLVL=&BRN=406692.
5. Windelband Wilhelm (1888) Geschichte der Philosophie im Altertum. In: S Günther, W Windelband, Geschichte der antiken Naturwissenschaft und Philosophie, Nördlingen, Handbuch der klassischen Altertumswissenschaft 5: 258-265.
6. Windelband Wilhelm (1905) Die neuere Philosophie. In: P Hinneberg (ed.) Kultur in Geschichte und Gegenwart, Berlin 1: 5.
7. Ax Wolfram (2000) Lexis und Logos: Studien zur antiken

Grammatik und Rhetorik. Ed. Farouk Grewing, Franz Steiner Verlag Wiesbaden GmbH: 1-230.
8. Perelman Chaïm (1977) L'empire rhétorique: Rhétorique et argumentation. J Vrin, Paris: 1-188. https: //www.editions-ulb.be/fr/book/?GCOI=74530100328480.
9. Perelman Chaïm (1989) Rhétoriques. Editions de l'Université de Bruxelles, Bruxelles: 56-57.
10. Lichański Jakub Z (2017) W poszukiwaniu najlepszej formy komunikacji, czyli dlaczego wciąż jest nam potrzebna retoryka? [In Search of the Best Form of Communication, or Why Do We Still Need Rhetoric]. Coll. Columbinum, Kraków. https: //columbinum.com.pl/katalog/publikacja/id/348.
11. Tatarkiewicz Władysław (1978) Die Disposition der Aristotelischen Prinzipien. A Töpelmann, Giessen 2: 102.
12. Lalande Andre (1972) Vocabulaire technique et critique de la philosophie, 11th ed. PUF, Paris: 1-1376.
13. Reichenbach Hans (2008) Elements of Symbolic Logic. Macmillan Co., New York. https: //plato.stanford.edu/entries/reichenbach/.
14. Wissenschaftliche Weltauffassung (1929) Der Wiener Kreis. In: Veröffentlichungen des Vereines Ernst Mach, hrsg. vom Verein Ernst Mach, Artur Wolf Verlag, Wien: 299-317.
15. Gödel Kurt (1931) Über formal unentscheidbare Sätze der Principia Mathematica und verwandter Systeme I. Monatshefte für Mathematik und Physik 1: 173-198.
16. Gödel Kurt (1986) Collected Works. Ed. Solomon Feferman. Oxford University Press, New York 1: 5.
17. Schaffer Jonathan (n.d.) PhilPapers. https: //philpapers.org/browse/metaphysics.
18. Zalta Edward N, Nodelman Uri (2023) Stanford Encyclopedia of Philosophy. https: //plato.stanford.edu/.
19. Achmanow Aleksander (1965) Logika Arystotelesa [Aristotle's Logic]. Transl. A Zabłudowski, B Stanosz. PWN, Warszawa 69: 101-130.
20. Emrich Berthold (1972) Topik und Topoi. In: P Jehn (ed.) Toposforschung. Eine Dokumentation. Atheneum, Frankfurt am Main 68: 235-263.
21. Carnap Rudolf (2020) Logische Syntax der Sprache. Springer, Vienna [orig. 1937]. https: //plato.stanford.edu/entries/carnap/.
22. Fumaroli Marc (1999) Histoire de la rhétorique dans l'Europe moderne. Dir. Marc Fumaroli, PUF, Paris: 1376.
23. Itard J (1965) Bourbaki Nicolas, Éléments d'histoire de mathématique, 2nd ed. Hermann, Paris: 120-123.
24. Kant Immanuel (1971) Kritik der reinen Vernunft. Philipp Reclam Verlag, Leipzig. https: //onlinebooks.library.upenn.edu/webbin/book/search?amode=start&author=Kant%2C%20Immanuel%2C%201724%2D1804.
25. Aristotle (1983) Metaphysics. Transl. WD Ross. http: //classics.mit.edu/Aristotle/metaphysics.html.
26. Aristotle (2023) Metaphysics. http: //www.perseus.tufts.edu/hopper/text?doc=Perseus%3Atext%3A1999.01.0052%3Abook%3D1%3Asection%3D981a.
27. Aristotle (1984) Poetics. In: Rhetoric and Poetics. Transl. W Rhys Roberts, Ingram Bywater. Modern Library, New York. https: //archive.org/details/rhetoricpoet00davi.
28. Aristotle (1991) On Rhetoric: A Theory of Civic Discourse. Transl., introd., notes G A Kennedy. Oxford University Press, New York, Oxford. https: //philpapers.org/rec/ARIORA.
29. Calboli G (2021) Cornificius Quintus Rhetorica ad Herennium: Prolegomena, edizione, trad., commento. De Gruyter, New York, Berlin. https: //bmcr.brynmawr.edu/2021/2021.02.39.
30. Homer (2025) Odyssey. The Editors of Encyclopaedia Britannica. https: //www.britannica.com/topic/Odyssey-epic-by-Homer.
31. Homer (1919) Odyssey. Transl. A T Murray. Oxford University Press, W Heinemann Ltd, Cambridge MA, London. https: //www.perseus.tufts.edu/hopper/text?doc=Perseus%3Atext%3A1999.01.0136%3Abook%3D12%3Acard%3D153.
32. Kant Immanuel (2004) Kritik der reinen Vernunft. Ed. Karl Kerbrach, 2nd improved ed. Philipp Reclam Verlag, Leipzig [ca. 1878], Reclams Universal-Bibliothek.
33. Lichański Jakub Z (2017) Retoryka: metodologia nauk humanistycznych - teza Jamesa C. Raymonda po trzydziestu latach. In: C Mileczarski (ed.) Retoryka klasyczna i retoryka współczesna: Pola i perspektywy badań. Sub Lupa, Warszawa: 89-104.
34. Lichański Jakub Z (2022) On the hypothetical source of fake news: Apagogical reasoning in the interpretation of Q Cornificius' Rhetorica ad Herennium. International Journal of English and Cultural Studies 5: 19-25.
35. Milgrom Mordehai (1983) A modification of the Newtonian dynamics as a possible alternative to the hidden mass hypothesis. The Astrophysical Journal 15: 365-370.
36. Coulson J (1939) Shorter Oxford English Dictionary, Oxford University Press, Oxford: 1-2.
37. Wilamowitz-Moellendorff Ulrich von (1905) Die Griechische Literatur des Altertums. In: Die Griechische und Lateinische Literatur und Sprache. B G Teubner, Berlin-Leipzig 1: 464.